

# Synchronous Servomotors MSM

**Data Sheet**  
**R911329338**

Edition 05



|                                 |                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Title</b>                    | Synchronous Servomotors<br>MSM                                                                                                                                                                                                                                                                                                  |
| <b>Type of Documentation</b>    | Data Sheet                                                                                                                                                                                                                                                                                                                      |
| <b>Document Typecode</b>        | DOK-MOTOR*-MSM*****-DA05-EN-P                                                                                                                                                                                                                                                                                                   |
| <b>Internal File Reference</b>  | RS-e2609feaf2a631970a6846a0002c9d48-7-en-US-3                                                                                                                                                                                                                                                                                   |
| <b>Purpose of Documentation</b> | <p>This documentation ...</p> <ul style="list-style-type: none"><li>• explains the features of the product, possibilities for use, operating conditions and operational limits von MSM motors.</li><li>• contains technical data.</li><li>• provides information regarding product selection, handling and operation.</li></ul> |
| <b>Record of revisions</b>      | <p>Edition 05, 2019-02</p> <p>See <a href="#">tab. 1-1 "Record of revisions" on page 3</a></p>                                                                                                                                                                                                                                  |
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| <b>Liability</b>                | <p>The specified data is intended for product description purposes only and shall not be deemed to be a guaranteed characteristic unless expressly stipulated in the contract. All rights are reserved with respect to the content of this documentation and the availability of the product.</p>                               |

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# 1 About this documentation

## Editions of this documentation

| Edition | State   | Note                                                                                    |
|---------|---------|-----------------------------------------------------------------------------------------|
| 01      | 09/2007 | First edition                                                                           |
| 02      | 02/2015 | Revision; Plug connector revision                                                       |
| 03      | 06/2015 | Encoder lifetime, storage and transport temperature from technical data tables removed. |
| 03.1    | 12/2015 | System accuracy encoder in definition                                                   |
| 04      | 09/2017 | System accuracy encoder M5, switching cycles holding brakes                             |
| 05      | 02/2019 | Update technical data holding brakes. Declaration of conformity, RohS China.            |

Tab. 1-1: Record of revisions

## 1.1 Presentation of information

**Safety instructions** The safety instructions in this documentation include signal words (danger, warning, caution, note) and a signal symbol (acc. to ANSI Z535.6-2006). The signal word is intended to draw your attention to the safety instructions and describes the seriousness of the danger. The warning triangle with exclamation mark indicates the danger for persons.

### DANGER

Non-compliance with this safety instructions **will** result in death or severe personal injury.

### WARNING

Non-compliance with this safety instructions **can** result in death or severe personal injury.

### CAUTION

Non-compliance with this safety instructions **can** result in moderate or minor personal injury.

### NOTICE

Non-compliance with this safety instructions **can** result in material damage.

**Safety sign** In the documentation, the following internationally standardized safety signs and graphic symbols are used. The table contains the significance of the signs.

## About this documentation

| Safety sign                                                                       | Meaning                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------|
|  | Warning against dangerous electric voltage                                   |
|  | Warning against hot surfaces                                                 |
|  | Warning against rotating machine parts                                       |
|  | Warning against overhead load                                                |
|  | Electrostatic sensitive devices                                              |
|  | Prohibition for persons with cardiac pacemakers or implanted defibrillators. |
|  | Do not carry along metal parts or clocks.                                    |
|  | Hammer scales are forbidden                                                  |

Tab. 1-2: *Meaning of safety signs*

**Markup** The following markups are used for a user-friendly text information representation:

 Reference to supplementary documentation



This note gives important information, which must be observed.

- Listings on the first level contain a bullet point
  - Listings on the second level contain a dash
- 1. Handling instructions are specified in numbered lists. Please comply with the order of the handling instructions.

## 2 Introduction

### Introduction to the product of MSM servomotors

The maintenance-free MSM motors are available in five different frame sizes up to a mechanical continuous power of 750 watt. High power density at a short frame length and a minimized flange dimension make use in most different applications possible. The motors with protection class IP54 are fitted with an absolute encoder and are available with or without holding brake. MSM motors with winding code "0xxx" are provided for operation on IndraDrive Cs controllers with nominal voltage 3x AC 230 V. MSM motors with winding code "Rxxx" are provided for operation on NYCe4000 controllers with nominal voltage 3x AC 100 V. Any operation on supply network with a higher nominal voltage is forbidden.

MSM motors are featured by

- Dynamic
- Compact construction
- Protection class IP54
- Precision due to optical Single- and Multiturn absolute value encoders
- Holding brake
- Plug connector for encoder and power connection

| Motor MSM<br> | Continuous power<br>$P_N$ [W] | Continuous torque at standstill<br>$M_O$ [Nm] | Maximum torque<br>$M_{max}$ [Nm] | Maximum speed<br>$n_{max}$ [min <sup>-1</sup> ] | Degree of protection |
|--------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------|----------------------------------|-------------------------------------------------|----------------------|
| 019A                                                                                             | 50                            | 0.16                                          | 0.48                             | 5000                                            | IP54<br>(Shaft IP40) |
| 019B                                                                                             | 100                           | 0.32                                          | 0.95                             |                                                 |                      |
| 031B                                                                                             | 200                           | 0.64                                          | 1.91                             |                                                 |                      |
| 031C                                                                                             | 400                           | 1.3                                           | 3.8                              |                                                 |                      |
| 041B                                                                                             | 750                           | 2.4                                           | 7.1                              | 4500                                            |                      |

Tab. 2-1: MSM motors: Features

This documentation serves to

- Select motors
- Describe variants

### Feedback

If you detect any failures or have any amendments, please do not hesitate to contact us.

Please send your comments to [dokusupport@boschrexroth.de](mailto:dokusupport@boschrexroth.de).



## 3 Operating conditions

### 3.1 Ambient and application conditions

MSM Servomotors are designed for use in machines and facilities.

#### Ambient and application conditions

| Designation                                                                                                                                                                                                                                                                                                                                                                | Symbol                                           | Unit | Value                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------|----------------------------------------------------------------|
| Protection class (IEC529)                                                                                                                                                                                                                                                                                                                                                  |                                                  |      | IP54                                                           |
| Use in scope of application of CSA / UL                                                                                                                                                                                                                                                                                                                                    |                                                  |      | Only allowed for use in NFPA-79 applications.                  |
| Storage temperature                                                                                                                                                                                                                                                                                                                                                        |                                                  |      | see chapter "chapter 8.1 "Transport of motors" on page 43"     |
| Transport temperature                                                                                                                                                                                                                                                                                                                                                      |                                                  |      | see chapter "chapter 8.2 "Storage of motors" on page 43"       |
| Allowed installation positions.<br>Definition of installation positions: refer to key-word "Installation positions"                                                                                                                                                                                                                                                        |                                                  |      | IM B5<br>IM V1<br>IM V3                                        |
| Ambient temperature range                                                                                                                                                                                                                                                                                                                                                  | $T_{a\_work}$                                    | °C   | 0 ... 40                                                       |
| Installation altitude                                                                                                                                                                                                                                                                                                                                                      | $h_{nenn}$                                       | m    | 1000                                                           |
| <b>Derating vs. ambient temperature:</b><br>Within ambient temperature range $T_{a\_work\_red}$ the power data <sup>3)</sup> have to be reduced by the reduction factor $f_{Ta}$ .<br>Use outside of $T_{a\_work}$ or $T_{a\_work\_red}$ is not allowed!                                                                                                                   |                                                  |      |                                                                |
|                                                                                                                                                                                                                                                                                                                                                                            | $T_{a\_work\_red}$                               | °C   | 40 ... 55                                                      |
|                                                                                                                                                                                                                                                                                                                                                                            | $f_{Ta}$                                         | %/K  | 2.0<br>also refer to technical data of the separate components |
| <b>Derating vs. installation altitude:</b><br>From installation altitude $h > h_{nenn}$ for factor $f$ reduced performance data <sup>2) 3)</sup> are available<br>For installation altitude in range $h_{max\_without}$ up to $h_{max}$ install an <b>overvoltage limitation</b> in the installation against transient overvoltage.<br>Use above $h_{max}$ is not allowed! |                                                  |      |                                                                |
|                                                                                                                                                                                                                                                                                                                                                                            | $h_{max\_without}$                               | m    | 2000                                                           |
|                                                                                                                                                                                                                                                                                                                                                                            | $h_{max}$                                        | m    | 4000                                                           |
| <b>Simultaneous derating</b> for ambient temperature and installation altitude                                                                                                                                                                                                                                                                                             | allowed;<br>reduce with factors $f$ and $f_{Ta}$ |      |                                                                |

## Operating conditions

| Designation                                                              | Symbol | Unit             | Value                 |
|--------------------------------------------------------------------------|--------|------------------|-----------------------|
| Relative air humidity                                                    |        | %                | 5 ... 95              |
| Absolute air humidity                                                    |        | g/m <sup>3</sup> | 1 ... 29              |
| Climatic class (IEC721)                                                  |        |                  | 3K3                   |
| Allowed degree of contamination (EN50178)                                |        |                  | 2                     |
| Allowability of dusts, vapors                                            |        |                  | EN50178 Tab. A.2      |
| Vibration Sinus: Acceleration at 10 ... 2000 Hz <sup>1)</sup> , axially  |        | g                | 1                     |
| Vibration Sinus: Acceleration at 10 ... 2000 Hz <sup>1)</sup> , radially |        | g                | 3                     |
| Overvoltage category                                                     |        |                  | III (nach IEC60664-1) |

- 1) acc. to EN 60068-2-6  
 2) reduced power data for drive controllers: allowed intermediate circuit continuous power, brake resistor - continuous power, continuous current  
 3) reduced power data for motors: Power, torque S1 and S3

Tab. 3-1: Ambient and conditions on use - use

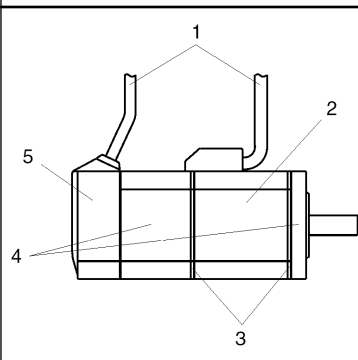
## 3.2 Compatibility with foreign matters

All Rexroth controls and drives are developed and tested according to the state-of-the-art technology.

As it is impossible to follow the continuing development of all materials (e.g. lubricants in machine tools) which may interact with the controls and drives, it cannot be completely ruled out that any reactions with the materials we use might occur.

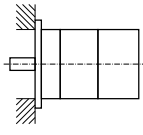
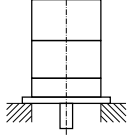
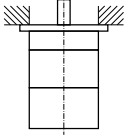
For this reason, before using the respective material a compatibility test has to be carried out for new lubricants, cleaning agents etc. and our housings/ materials.

## 3.3 Materials

|                                                                                                                   | No. | Material                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>motor_materialien.fh11</p> | 1   | Polyvinyl chlorid resin<br>(Oil resistance: according to standard" JIS C 3005"; test conditions: Oil temperature: 70 °C; Test duration (cable within oil): 4 hours; oil: Machine oil 46 (from GENERAL)) |
|                                                                                                                   | 2   | Aluminum; eloxed                                                                                                                                                                                        |
|                                                                                                                   | 3   | Rubber                                                                                                                                                                                                  |
|                                                                                                                   | 4   | Die-cast aluminum; blanc                                                                                                                                                                                |
|                                                                                                                   | 5   | Polyamid 46 (Nylon 46)                                                                                                                                                                                  |

Tab. 3-2: Materials

3.4 Frame shape and installation positions

| Motor design B05                                                                  |                                                                                    |                                                                                     |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| IM B5                                                                             | IM V1                                                                              | IM V3                                                                               |
|  |  |  |
| Flange attachment on the drive side of the flange                                 | Flange attachment on the drive side of the flange, drive side facing down          | Flange attachment on the drive side of the flange, drive side facing up             |

Tab. 3-3: Allowed installation types acc. to EN 60034-7:1993

**NOTICE**

**Motor damage due to penetration of liquids!**  
  
If motors are attached according to IM V3, fluid present at the output shaft over a prolonged time may penetrate and cause damage to the motors.  
Ensure that fluid cannot be present at the output shaft.

3.5 Installation space

Self-cooling of the motor should not be prevented due to the installation situation.

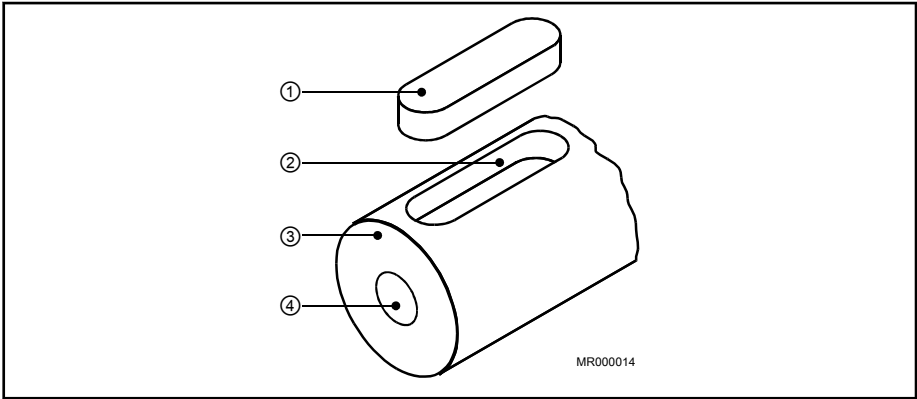
3.6 Output shaft

**Smooth shaft** MSM motors offer a non-positive shaft-hub connection without play with excellent running smoothness. Use clamping sets, clamping sleeves or tensioning elements to couple the machine elements to be driven.

Labeling within motor type: MSM.....-.....H

**Shaft with keyway** MSM motors with keyway allow form-locking transmission of torques with constant direction and low requirements on the shaft-hub connection. The keyway is not in the scope of delivery.

Labeling within motor type: MSM.....-.....L



- ① Key
- ② Keyway
- ① Motor shaft
- ① Centering hole

Fig. 3-1: MSM Output shaft with keyway

Operating conditions

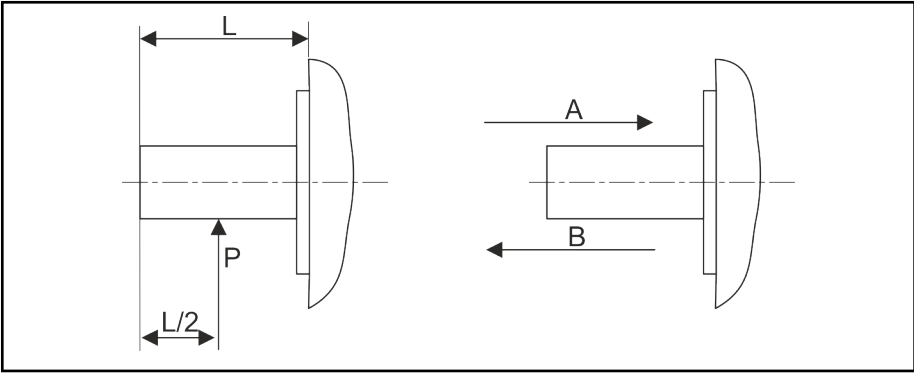
In addition, the machine elements to be driven must be secured axially via the frontal centering hole.

**NOTICE** Damage to property due to reversing mode!

Shaft damage! In case of intense reversing operation, the seat of the fitting spring may deflect. Increasing deformations can lead to a break of shaft.  
Preferably, use plain output shafts.

3.7 Bearing and shaft load

During operation, radial and axial forces act on the motor shaft and the motor bearings. The design of the machine and the shaft-side mounting of drive elements must be coordinated to ensure that the specified load limits are not exceeded.



L Shaft length  
P Point of application of radial force  
A, B Direction of axial force  
Fig. 3-2: Parameter for shaft load

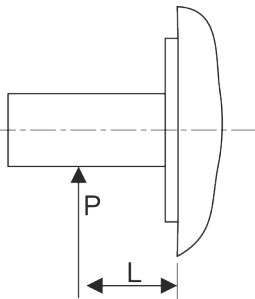
The following table shows the allowed shaft load of single motors.

| Motor  | At assembly      |                 |             | During operation |                 |
|--------|------------------|-----------------|-------------|------------------|-----------------|
|        | Radial force (N) | Axial force (N) |             | Radial force (N) | Axial force (N) |
|        |                  | Direction A     | Direction B |                  |                 |
| MSM019 | 147              | 88              | 117.6       | 68.6             | 58.8            |
| MSM031 | 392              | 147             | 196         | 245              | 98              |
| MSM041 | 686              | 294             | 392         | 392              | 147             |

Tab. 3-4: Allowed radial / axial force

In the case of adjusted point of application of radial force, calculate the allowed radial force according to the following formula.

Operating conditions

|                                                                                   | Motor   | Radial force dependend from the point of applica-<br>tion of force |
|-----------------------------------------------------------------------------------|---------|--------------------------------------------------------------------|
|  | MSM019A | $P = \frac{3533}{L + 39}$                                          |
|                                                                                   | MSM019B | $P = \frac{4905}{L + 59}$                                          |
|                                                                                   | MSM031B | $P = \frac{14945}{L + 46}$                                         |
|                                                                                   | MSM031C | $P = \frac{19723}{L + 65,5}$                                       |
|                                                                                   | MSM041B | $P = \frac{37044}{L + 77}$                                         |

Tab. 3-5: Radial force dependend from the point of application of force

Lifetime of motor bearing



When operating MSM motors within the limits specified for radial and axial load, the nominal bearing lifetime is **L<sub>10h</sub> 20,000 operating hours**.

When exceeding the allowed radial force, the bearing lifetime is reduced to:

$$L_{10h} = \left( \frac{F_{\text{radial}}}{F_{\text{radial\_ist}}} \right)^3 \times 20000$$

L<sub>10h</sub>

F<sub>radial</sub>

F<sub>radial\_act</sub>

Fig. 3-3:

Bearing service life (according to ISO 281, Version 12/1990)

Determined allowed radial force in N (Newton)

Actually acting radial force in N (Newton)

Calculating the bearing lifetime L<sub>10h</sub> if the allowed radial force F<sub>radial</sub> is exceeded.



The actually acting radial force F<sub>radial\_act</sub> may never be higher than the maximum allowed radial force F<sub>radial\_max</sub>.

3.8 Holding brakes

The following general details are binding for all MSM motors The frame size depending data of the holding brakes are specified in chapter"Technical data"

- The values specified in the technical data are typical values excluding holding torque, trip voltage and rated voltage.
- If the motor was moved, the brake clearance is ±1° or less.
- The power supply of the holding brake is done externally.
- The maximum number of acceleration and braking with the highest allowed angular acceleration: 10 million

## Operating conditions

### 3.9 Attachment of drive elements

Please observe the following notes during assembly of drive element onto the output shaft.

#### Gearbox mounting on motors

If transmissions are attached to motors, the thermal coupling of the motors to the machine or system design changes.

Depending on the type of transmission, the amount of heat generated at the transmission varies. In any case, the heat dissipation of the motor via the flange is reduced when the transmission is attached. This must be taken into account when planning the system.

In order not to thermally overload motors when using transmissions, it is necessary to reduce the specified performance data.

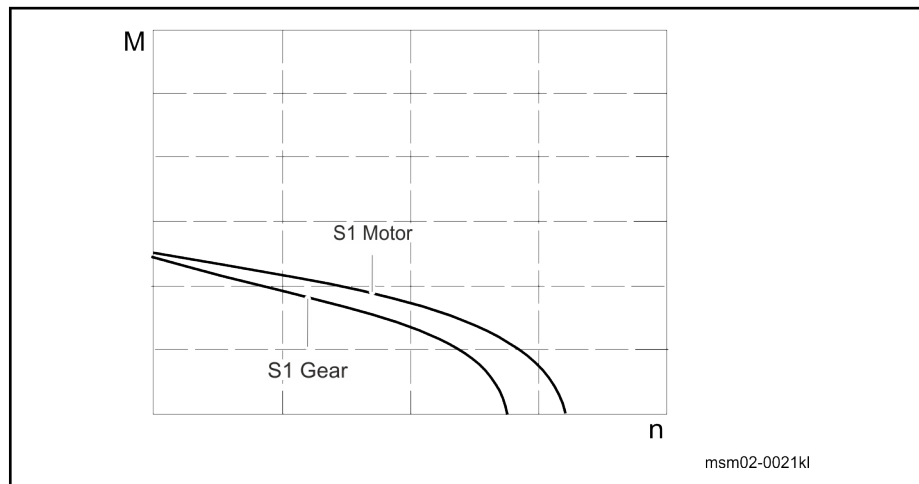


Fig. 3-4: S1 characteristic curve gearboxes



The torques specified in the motor characteristics must be reduced by approx. **10-20%** when attaching transmissions.

Observe all other notes and requirements in the documentation for the transmissions used.

#### Over-determined bearing

When assemble drive elements, avoid an over-determined bearing, because the indispensable existing tolerances lead to additional forces on the bearing of the motor shaft and, if necessary, to a significantly reduced bearing life.



If an over-determined arrangement cannot be avoided, please contact Bosch Rexroth.

#### Couplings

The machine construction and the drive elements used must be carefully adapted to the motor type so as to make sure that the load limits of the shaft and the bearing are not exceeded.



When mounting extremely rigid couplings, an unacceptably high load on the shaft and bearing can occur due to a radial force which constantly changes the angular position.

#### Bevel pinion or helical drive pinions

Due to thermal effects, the flange end of the output shaft can shift by up to 0.6 mm in relation to the motor housing. When using helical drive pinions or bevel gear pinions mounted directly on the output shaft, this change in length leads to

## Operating conditions

- A shift in the position of the axis, if the driving pinions are not axially fixed on the machine side,
- A thermally dependent component of the axial force, if the driving pinions are axially fixed on the machine side. There is a risk that the maximum permissible axial force will be exceeded or that the backlash within the gearing will increase excessively.
- Damage to the B-side motor fixed bearing due to exceeding the maximum permissible axial force.



Preferably use self-bearing drive elements which are connected to the motor shaft via axially compensating couplings!

---

## Operating conditions

## 3.10 Certifications

**Declaration of conformity** Declaration of conformity (see [chapter 12 "Appendix" on page 55](#) ) confirm that the components comply with the valid EN standards and EC Directives.

**MSM motors**

DX00011v01\_mn.FH11

CE-Conformity regarding

**EN 60034-1:** Rotating electrical machines - Part 1: Rating and performance: Rating and performance behavior (Edition 2010 + Cor.:2010 (2010, modified))

**EN 60034-5:** Rotating electrical machines - Part 5: Degrees of protection provided by integral design of rotating electrical machines (IP-Code) - Classification (Edition 2001 + A1:2007 (2000 + Corrigendum 2001 + A1:2006))

**C-UR-US-Listing** The motors are listed by **UL** ("Underwriters Laboratories Inc.®"). A proof of certification can be found in the Internet via <http://www.ul.com> under "Certifications" by entering the file number or the "Company Name: Rexroth".

**MSM motors**

CUR\_Zeichen.fh11

**Company Name:**

BOSCH REXROTH ELECTRIC DRIVES &amp; CONTROLS GMBH

**Category Name:**

Servo and Stepper Motors Components

For file numbers, standards refer to table "Technical data"

**Wiring material UL (ready-made cables of Rexroth)**

Only use copper lines of class 6 (or equivalent) with minimal allowed wire temperature of 75 °C in the scope of application of CSA / UL for wiring the components.

**Allowed degree of contamination**

Please observe the allowed pollution degree of the components (see "Ambient and application conditions").

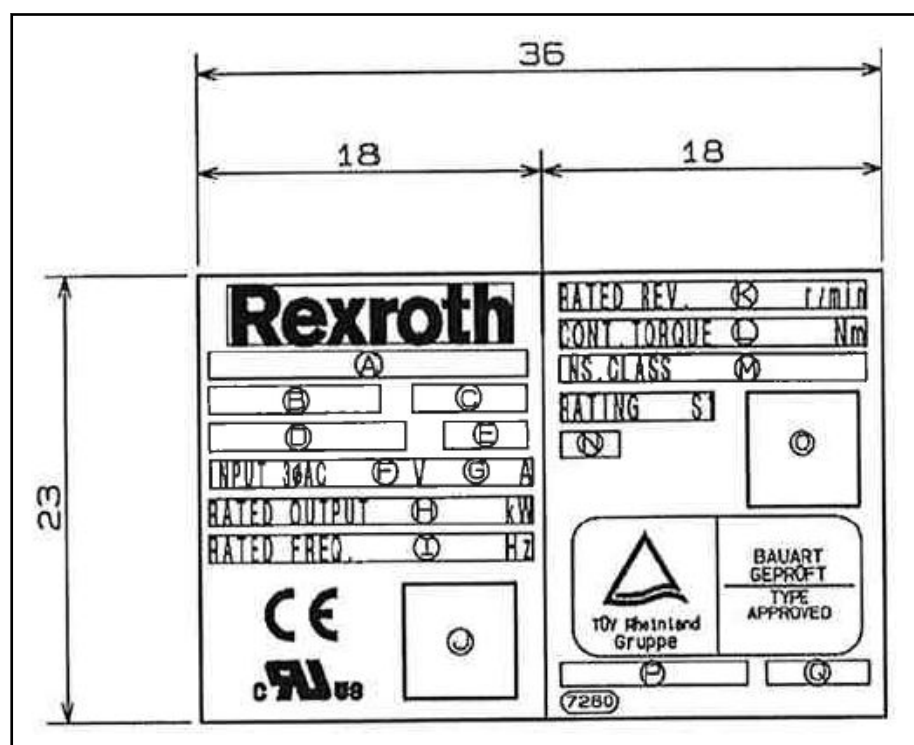
## 4 Identification and type code

### 4.1 Identification

MSM motors have an individual type plate showing the device designation and providing technical information. The two-part type plate is attached at the side of the encoder housing.

The type plate is provided for

- Identification of the motor
- Procurement of spare parts in case of a fault
- Service information.



|     |                         |
|-----|-------------------------|
| (A) | Type                    |
| (B) | Material number         |
| (C) | Date of manufacture     |
| (D) | Serial number           |
| (E) | Hardware index          |
| (F) | Rated voltage           |
| (G) | Rated current           |
| (H) | Rated power             |
| (I) | Frequency               |
| (J) | Serial number (Rexroth) |
| (K) | Speed                   |
| (L) | Torque                  |
| (M) | Insulation class        |
| (N) | Degree of protection    |
| (O) | Barcode                 |
| (P) | Country of manufacture  |
| (Q) | UL file number          |

Fig. 4-1: Type plate MSM

Identification and type code

## 4.2 MSM019 Type code



The figure illustrates the basic structure of the type code. Our sales representative will help you with the current status of available versions.

| Type Designation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Example:         | M | S | M | 0 | 1 | 9 | B | - | 0 | 3 | 0 | 0 | - | N | N | - | M | 0 | - | C | H | 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**Product**  
MSM ..... = MSM

**Frame Size**  
019 ..... = 019

**Frame Lengths**  
Frame length ..... = A, B

**Winding** <sup>1)</sup>  
MSM019A ..... = 0300  
MSM019B ..... = 0300, R300

**Cooling Mode**  
Natural convection ..... = NN

**Encoder** <sup>1) 2)</sup>  
Optical encoder, Multiturn absolute (17 Bit) ..... = M0  
Optical encoder, Multiturn absolute (20 Bit) ..... = M5

**Electrical Connection** <sup>2)</sup>  
Cable connection ..... = C  
Cable connection, circular connector M17 ..... = M

**Shaft** <sup>1) 2)</sup>  
Smooth shaft, without shaft sealing ring ..... = H  
Shaft with keyway, without shaft sealing ring ..... = L

**Holding Brake**  
Without ..... = 0  
Electrically released, 1.27 Nm ..... = 1

**Note:**  
1) Winding „R300“ for reduced voltage (100 V) only available with shaft „H“  
2) Encoder „M0“ only available with electrical connection „C“ and shaft „H“  
Encoder „M5“ only available with electrical connection „M“

msm02-0001ty

Fig. 4-2: MSM019

### 4.3 MSM031 Type code



The figure illustrates the basic structure of the type code. Our sales representative will help you with the current status of available versions.

| Type Designation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Example:         | M | S | M | 0 | 3 | 1 | B | - | 0 | 3 | 0 | 0 | - | N | N | - | M | 0 | - | C | H | 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**Product**  
MSM ..... = MSM

**Frame Size**  
031 ..... = 031

**Frame Lengths**  
Frame lengths ..... = B, C

**Winding** <sup>1)</sup>  
MSM031B ..... = 0300, R300  
MSM031C ..... = 0300, R300

**Cooling Mode**  
Natural convection ..... = NN

**Encoder** <sup>1) 2)</sup>  
Optical encoder, Multiturn absolute (17 Bit) ..... = M0  
Optical encoder, Multiturn absolute (20 Bit) ..... = M5

**Electrical Connection** <sup>2)</sup>  
Cable connection ..... = C  
Cable connection, circular connector M17 ..... = M

**Shaft** <sup>1) 2)</sup>  
Smooth shaft, without shaft sealing ring ..... = H  
Shaft with keyway, without shaft sealing ring ..... = L

**Holding Brake**  
Without ..... = 0  
Electrically released, 1.27 Nm ..... = 1

**Note:**  
1) Winding „R300“ for reduced voltage (100 V) only available with shaft „H“  
2) Encoder „M0“ only available with electrical connection „C“ and shaft „H“  
Encoder „M5“ only available with electrical connection „M“

msm02-0002ty

Fig. 4-3: MSM031

Identification and type code

4.4 MSM041 Type code



The figure illustrates the basic structure of the type code. Our sales representative will help you with the current status of available versions.

| Type Designation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Example:         | M | S | M | 0 | 4 | 1 | B | - | 0 | 3 | 0 | 0 | - | N | N | - | M | 0 | - | C | H | 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**Product**  
MSM ..... = MSM

**Frame Size**  
041 ..... = 041

**Frame Length**  
Frame length ..... = B

**Winding** <sup>1)</sup>  
MSM031B ..... = 0300

**Cooling Mode**  
Natural convection ..... = NN

**Encoder** <sup>1) 2)</sup>  
Optical encoder, Multiturn absolute (17 Bit) ..... = M0  
Optical encoder, Multiturn absolute (20 Bit) ..... = M5

**Electrical Connection** <sup>2)</sup>  
Cable connection ..... = C  
Cable connection, circular connector M17 ..... = M

**Shaft** <sup>1) 2)</sup>  
Smooth shaft, without shaft sealing ring ..... = H  
Shaft with keyway, without shaft sealing ring ..... = L

**Holding Brake**  
Without ..... = 0  
Electrically released, 2.45 Nm ..... = 1

**Note:**  
1) Encoder „M0“ only available with electrical connection „C“ and shaft „H“  
Encoder „M5“ only available with electrical connection „M“

msm02-0003ty

Fig. 4-4: MSM041

## 5 Technical data

### 5.1 Basics

**Operation modes** The motors are documented according to the test criteria and measuring methods of EN 60034-1. The specified characteristic curves correspond to operating modes S1.

**Duty cycle** Operating mode S6 is only available with duty cycle DC ≤100%. The duty cycle is calculated:

$$ED = \frac{\Delta t_P}{T_C} \times 100\% = \left( \frac{M_d}{M_{KB}} \right)^2 \times 100\%$$

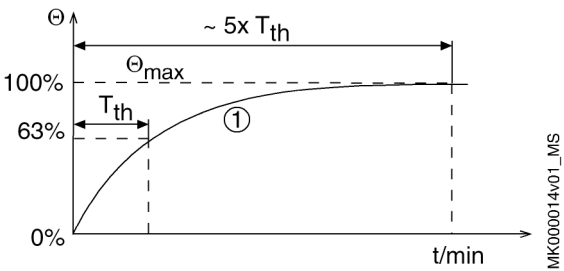
**ED** Duty cycle  
**T<sub>C</sub>** Cycle duration  
**ΔT<sub>P</sub>** Operating time with constant load  
**M<sub>d</sub>** Continuous torque  
**M<sub>KB</sub>** Short-time service torque

*Fig. 5-1: Relative duty cycle*

#### Definition of parameters

| Designation                             | Symbol                 | Unit                | Definition                                                                                                                                              |
|-----------------------------------------|------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cooling mode acc. to EN 60034-6         |                        |                     | Short name acc. to EN                                                                                                                                   |
| Listed acc. to UL standard (UL)         |                        |                     | UL Standard                                                                                                                                             |
| Listed acc. to CSA standard (UL)        |                        |                     | CSA Standard                                                                                                                                            |
| UL-Files (UL)                           |                        |                     | UL File Number                                                                                                                                          |
| <b>Electrical parameters</b>            |                        |                     |                                                                                                                                                         |
| Continuous torque at standstill 60 K    | M <sub>0_60</sub>      | Nm                  | Continuous torque that can be applied to the motor output shaft at a speed of n ≥ 0.1 Hz.                                                               |
| Continuous current at standstill 60 K   | I <sub>0_60(eff)</sub> | A                   | Phase current (crest value) of the motor M <sub>0_60</sub> required for the continuous torque at standstill at a speed of n ≥ 0.1 Hz.                   |
| Maximum current                         | I <sub>max(eff)</sub>  | A                   | Maximum, temporarily permissible phase current of the motor winding without adverse effect on the permanent magnet circuit of the motor.                |
| Maximum torque                          | M <sub>max</sub>       | Nm                  | For maximum current I <sub>max</sub> , for approx. 400 ms exchangeable maximum torque. The achievable maximum torque depends on the drive control unit. |
| Torque constant at 20 °C <sup>1)</sup>  | K <sub>M_N</sub>       | Nm/A                | Ratio of generated torque to motor phase current at motor temperature 20 °C. Valid up to approx. i = 2x I <sub>0_60</sub> .                             |
| Voltage constant at 20 °C <sup>2)</sup> | K <sub>EMK_1000</sub>  | V/min <sup>-1</sup> | Root-mean-square value of the induced motor voltage at a motor temperature of 20 °C and 1,000 revolutions per minute.                                   |
| Winding resistance at 20 °C             | R <sub>12</sub>        | Ohm                 | Winding resistance measured between two phases.                                                                                                         |
| Winding inductance                      | L <sub>12</sub>        | mH                  | Measured inductance between two strands.                                                                                                                |
| Discharge capacity of the component     | C <sub>dis</sub>       | nF                  | Discharge capacity                                                                                                                                      |
| Number of pole pairs                    | p                      | -                   | Number of pole pairs                                                                                                                                    |
| <b>Mechanical parameters</b>            |                        |                     |                                                                                                                                                         |
| Moment of inertia of rotor              | J <sub>rot</sub>       | kg*m <sup>2</sup>   | Moment of inertia of the rotor without optional holding brake.                                                                                          |
| Power wire cross-section                | A <sub>60</sub>        |                     | Minimum cross-section of the power wire to be connected on the motor                                                                                    |

Technical data

| Designation                                  | Symbol    | Unit              | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------|-----------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thermal time constant                        | $T_{th}$  |                   | <p>Duration of the temperature rise to 63% of the final temperature of the motor housing at motor load with permissible S1 continuous torque. The thermal time constant is determined by the cooling type used.</p>  <p>① : Chronological course of the motor housing temperature<br/><math>\Theta_{max}</math> : Highest temperature (motor housing)<br/><math>T_{th}</math> : Thermal time constant</p> |
| Maximum speed                                | $n_{max}$ | $\text{min}^{-1}$ | Maximum permissible speed of the motor. Centrifugal forces or bearing stress can result in mechanical and DC bus voltage can result in electrical limiting factors.                                                                                                                                                                                                                                                                                                                         |
| Mass <sup>3)</sup>                           | $m$       | kg                | Motor mass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Ambient temperature during operation         | $T_{amb}$ |                   | Admissible ambient temperature during operation                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Installation altitude                        |           |                   | Maximale installation altitude                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Insulation class according to DIN EN 60034-1 | ---       | -                 | Insulation class                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Protection class acc. to IEC60529            | ---       | -                 | IP type of protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Sound pressure level                         | $L_p$     |                   | Value of sound emission                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

1) 2)  
3)

Manufacturing tolerance ±5%  
(...) Values for motors with holding brake

Tab. 5-1:      Definition of parameters

## 5.2 MSM019

### 5.2.1 MSM019 Technical data

| Designation                              | Symbol                 | Unit                | MSM019A-0300-NN      | MSM019B-0300-NN | MSM019B-R300-NN |
|------------------------------------------|------------------------|---------------------|----------------------|-----------------|-----------------|
| Cooling mode acc. to EN 60034-6          |                        | -                   | IC00                 |                 |                 |
| Listed acc. to UL standard               |                        | -                   | UL 1004; ANSI UL 840 |                 |                 |
| Listed acc. to CSA standard              |                        | -                   | CSA-C22,2 No, 100    |                 |                 |
| UL-Files                                 |                        |                     | E335445              |                 |                 |
| Electrical parameters                    |                        |                     |                      |                 |                 |
| Rated power                              | P <sub>N</sub>         | kW                  | 0.05                 | 0.10            |                 |
| Continuous torque at standstill 60 K     | M <sub>0_60</sub>      | Nm                  | 0.16                 | 0.32            |                 |
| Continuous current at standstill 60 K    | I <sub>0_60(eff)</sub> | A                   | 1.10                 |                 | 1.70            |
| Maximum current                          | I <sub>max(eff)</sub>  | A                   | 3.30                 |                 | 7.20            |
| Maximum torque                           | M <sub>Imax</sub>      | Nm                  | 0.48                 | 0.95            |                 |
| Torque constant at 20 °C                 | K <sub>M_N</sub>       | Nm/A                | 0.14                 | 0.30            | 0.19            |
| Voltage constant at 20 °C <sup>1)</sup>  | K <sub>EMK_1000</sub>  | V/min <sup>-1</sup> | 8.6                  | 17.4            | 11.4            |
| Winding resistance at 20 °C              | R <sub>12</sub>        | Ohm                 | 9.30                 | 13.20           | 5.50            |
| Winding inductance                       | L <sub>12</sub>        | mH                  | 5.650                | 9.250           | 3.800           |
| Discharge capacity of the component      | C <sub>dis</sub>       | nF                  | 0.3                  | 0.7             |                 |
| Number of pole pairs                     | p                      | -                   | 4                    |                 |                 |
| Mechanical parameters                    |                        |                     |                      |                 |                 |
| Moment of inertia of rotor <sup>2)</sup> | J <sub>rot</sub>       | kg*m <sup>2</sup>   | 0.0000025            | 0.0000051       |                 |
| Wire cross section                       | A <sub>60</sub>        | mm <sup>2</sup>     | 0.75                 |                 |                 |
| Maximum speed (electrical)               | n <sub>max el</sub>    | min <sup>-1</sup>   | 5000                 |                 |                 |
| Mass <sup>3)</sup>                       | m                      | kg                  | 0.32 (0.53)          | 0.47 (0.68)     |                 |
| Storage temperature                      | T <sub>L</sub>         | °C                  | -20 ... +60          |                 |                 |
| Ambient temperature during operation     | T <sub>amb</sub>       | °C                  | 0 ... 40             |                 |                 |
| Installation altitude                    |                        | m                   | 0 ... 1000           |                 |                 |
| Thermal class (EN 60034-1)               | T.CL.                  | -                   | 130 (B)              |                 |                 |
| Protection class acc. to IEC 60529       | IP                     | -                   | IP54                 |                 |                 |
| Sound pressure level                     | L <sub>p</sub>         | dB[A]               | < 70                 |                 |                 |
| Latest amendment: 2019-02-14             |                        |                     |                      |                 |                 |

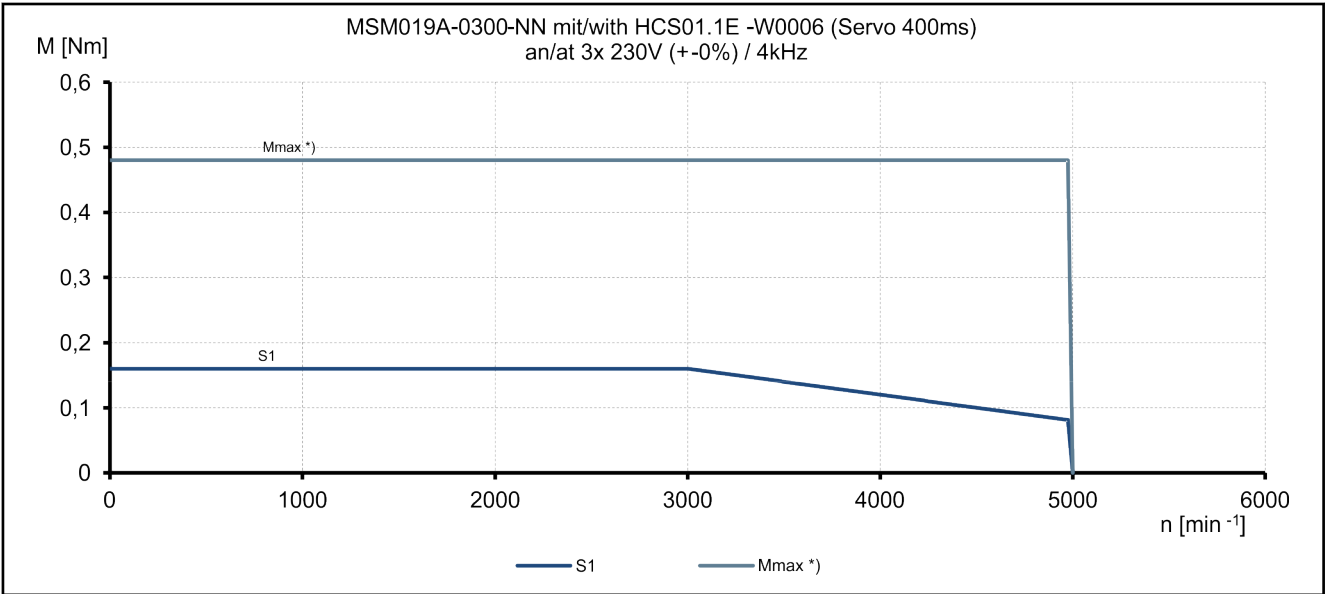
- 1) Manufacturing tolerance ±5%  
2) Tolerance ± 10%  
3) (...) Motors with holding brake 1, 2, ...  
Tab. 5-2: MSM - Technical data

Technical data

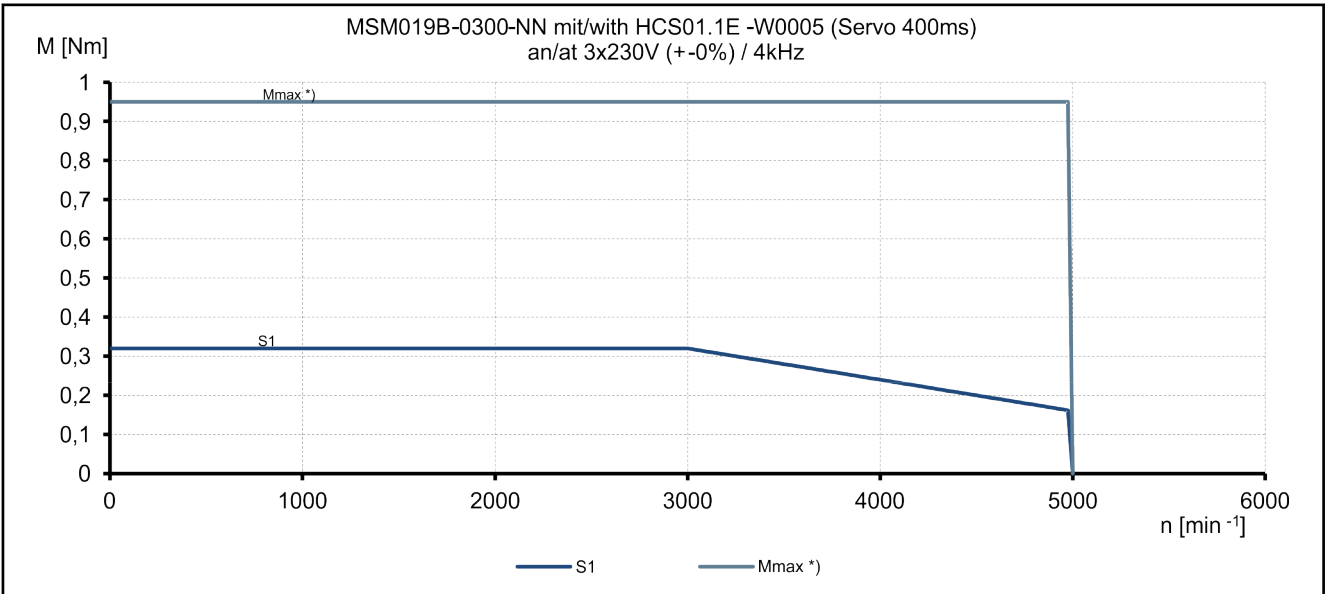
| Designation                            | Symbol   | Unit              | Holding brake 1 (MSM019) |
|----------------------------------------|----------|-------------------|--------------------------|
| Holding torque                         | $M_4$    | Nm                | 0.29                     |
| Rated voltage <sup>1)</sup>            | $U_N$    | V                 | 24 ±1.2                  |
| Rated current                          | $I_N$    | A                 | 0.30                     |
| Maximum connection time                | $t_1$    | ms                | 20                       |
| Maximum disconnection time             | $t_2$    | ms                | 35                       |
| Moment of inertia of the holding brake | $J_{br}$ | kg*m <sup>2</sup> | 0.0000002                |
| Switching cycles within standstill     |          |                   | 2 Mio                    |

Latest amendment: 2019-02-14

Tab. 5-3: MSM019 Holding brakes - Technical data (optional)

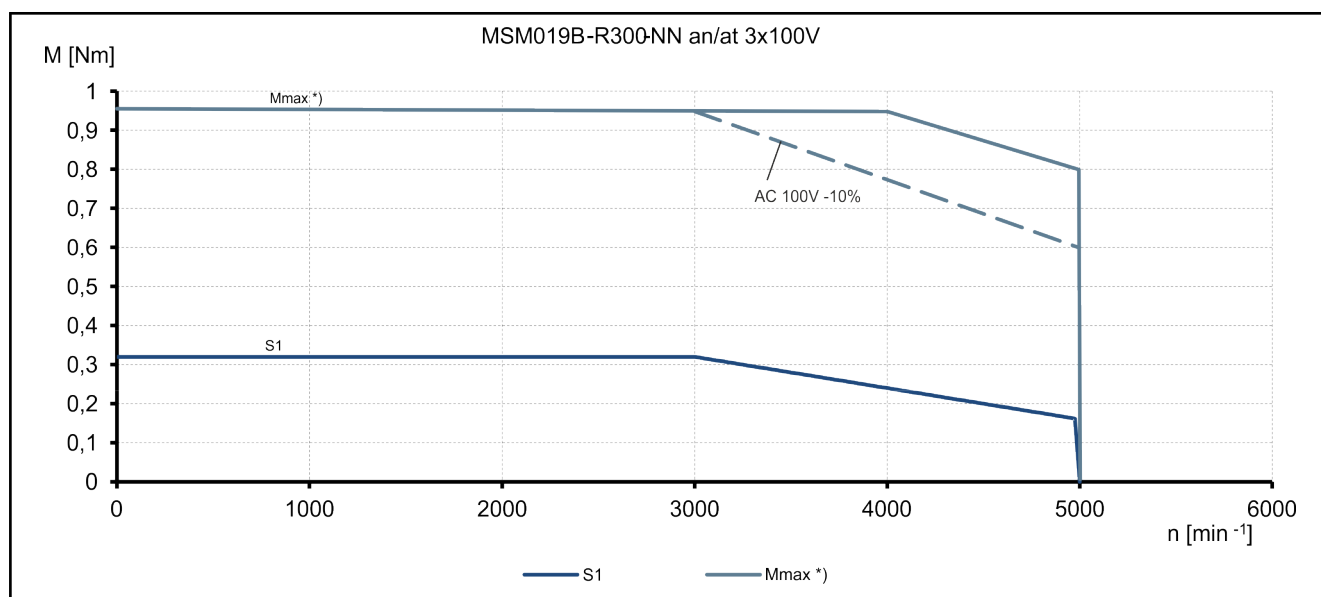


\*) maximum permitted nominal line voltage 3x 230V  
Fig. 5-2: Speed-torque characteristic curves



\*) maximum permitted nominal line voltage 3x 230V  
Fig. 5-3: Speed-torque characteristic curves

Technical data



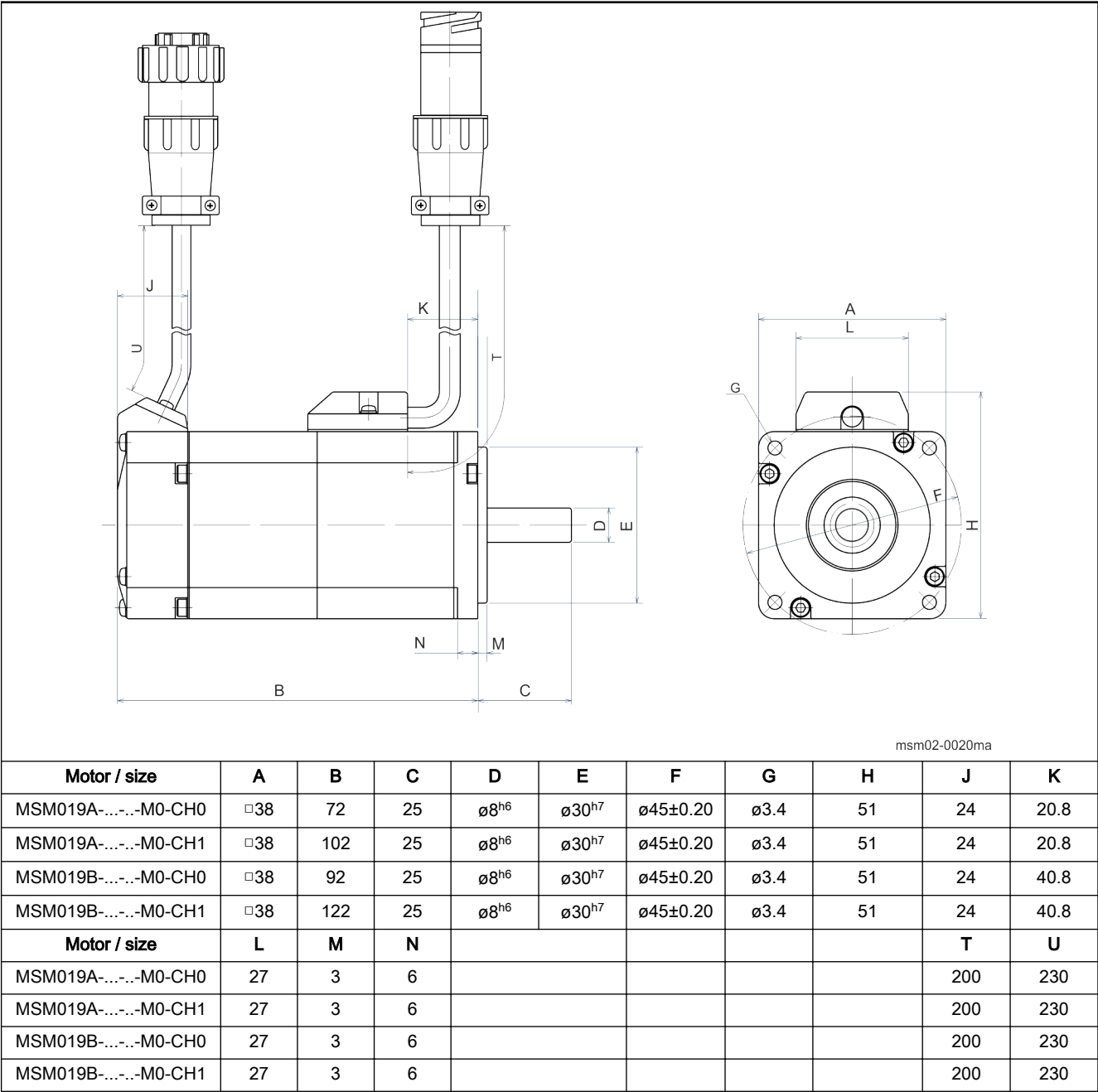
\*) maximum permitted nominal line voltage 3x 230V  
Fig. 5-4: Speed-torque characteristic curves

Technical data

5.2.2

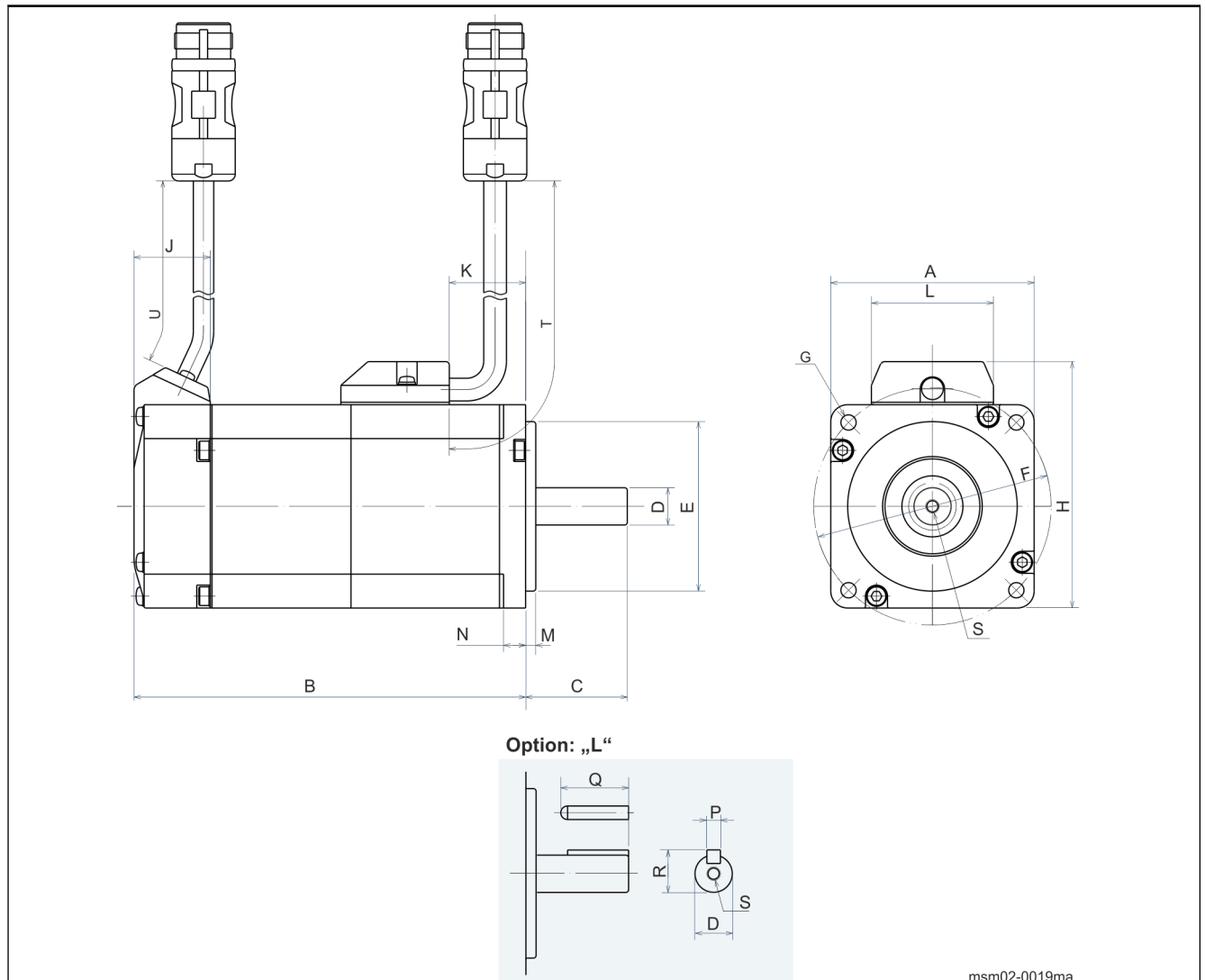
MSM019 Specifications

MSM019...M0-C...



Tab. 5-4: Dimensions MSM019

MSM019...M5-M...



| Motor / size       | A   | B   | C  | D                | E                 | F        | G    | H           | J   | K    |
|--------------------|-----|-----|----|------------------|-------------------|----------|------|-------------|-----|------|
| MSM019A-...-M5-M.0 | □38 | 72  | 25 | ø8 <sup>h6</sup> | ø30 <sup>h7</sup> | ø45±0.20 | ø3.4 | 51          | 24  | 17.3 |
| MSM019A-...-M5-M.1 | □38 | 102 | 25 | ø8 <sup>h6</sup> | ø30 <sup>h7</sup> | ø45±0.20 | ø3.4 | 51          | 24  | 17.3 |
| MSM019B-...-M5-M.0 | □38 | 92  | 25 | ø8 <sup>h6</sup> | ø30 <sup>h7</sup> | ø45±0.20 | ø3.4 | 51          | 24  | 37.4 |
| MSM019B-...-M5-M.1 | □38 | 122 | 25 | ø8 <sup>h6</sup> | ø30 <sup>h7</sup> | ø45±0.20 | ø3.4 | 51          | 24  | 37.4 |
| Motor / size       | L   | M   | N  | P                |                   | Q        | R    | S           | T   | U    |
| MSM019A-...-M5-M.0 | 27  | 3   | 6  | 3h9 (groove p9)  |                   | 14       | 9.2  | M3 (6 deep) | 200 | 230  |
| MSM019A-...-M5-M.1 | 27  | 3   | 6  | 3h9 (groove p9)  |                   | 14       | 9.2  | M3 (6 deep) | 200 | 230  |
| MSM019B-...-M5-M.0 | 27  | 3   | 6  | 3h9 (groove p9)  |                   | 14       | 9.2  | M3 (6 deep) | 200 | 230  |
| MSM019B-...-M5-M.1 | 27  | 3   | 6  | 3h9 (groove p9)  |                   | 14       | 9.2  | M3 (6 deep) | 200 | 230  |

Tab. 5-5: Dimensions MSM019

## Technical data

## 5.3 MSM031

## 5.3.1 MSM031 Technical data

| Designation                              | Symbol                 | Unit                | MSM031B-0300-NN      | MSM031B-R300-NN | MSM031C-0300-NN | MSM031C-R300-NN |
|------------------------------------------|------------------------|---------------------|----------------------|-----------------|-----------------|-----------------|
| Cooling mode acc. to EN 60034-6          |                        | -                   | IC00                 |                 |                 |                 |
| Listed acc. to UL standard               |                        | -                   | UL 1004; ANSI UL 840 |                 |                 |                 |
| Listed acc. to CSA standard              |                        | -                   | CSA-C22,2 No, 100    |                 |                 |                 |
| UL-Files                                 |                        |                     | E335445              |                 |                 |                 |
| Electrical parameters                    |                        |                     |                      |                 |                 |                 |
| Rated power                              | P <sub>N</sub>         | kW                  | 0.20                 |                 | 0.40            |                 |
| Continuous torque at standstill 60 K     | M <sub>0_60</sub>      | Nm                  | 0.64                 |                 | 1.30            |                 |
| Continuous current at standstill 60 K    | I <sub>0_60(eff)</sub> | A                   | 1.60                 | 2.50            | 2.60            | 4.60            |
| Maximum current                          | I <sub>max(eff)</sub>  | A                   | 4.90                 | 10.60           | 7.70            | 19.50           |
| Maximum torque                           | M <sub>max</sub>       | Nm                  | 1.91                 |                 | 3.80            |                 |
| Torque constant at 20 °C                 | K <sub>M,N</sub>       | Nm/A                | 0.41                 | 0.26            | 0.51            | 0.28            |
| Voltage constant at 20 °C <sup>1)</sup>  | K <sub>EMK_1000</sub>  | V/min <sup>-1</sup> | 24.5                 | 15.4            | 30.6            | 17.0            |
| Winding resistance at 20 °C              | R <sub>12</sub>        | Ohm                 | 6.10                 | 2.50            | 3.60            | 1.10            |
| Winding inductance                       | L <sub>12</sub>        | mH                  | 14.700               | 5.700           | 10.600          | 3.200           |
| Discharge capacity of the component      | C <sub>dis</sub>       | nF                  | 0.7                  |                 | 1.4             | 1.2             |
| Number of pole pairs                     | p                      | -                   | 4                    |                 |                 |                 |
| Mechanical parameters                    |                        |                     |                      |                 |                 |                 |
| Moment of inertia of rotor <sup>2)</sup> | J <sub>rot</sub>       | kg*m <sup>2</sup>   | 0.0000140            |                 | 0.0000260       |                 |
| Wire cross section                       | A <sub>60</sub>        | mm <sup>2</sup>     | 0.75                 |                 |                 |                 |
| Maximum speed (electrical)               | n <sub>max el</sub>    | min <sup>-1</sup>   | 5000                 | 3000            | 5000            | 3000            |
| Mass <sup>3)</sup>                       | m                      | kg                  | 0.82 ( 1.3 )         |                 | 1.2 ( 1.7 )     |                 |
| Storage temperature                      | T <sub>L</sub>         | °C                  | -20 ... +60          |                 |                 |                 |
| Ambient temperature during operation     | T <sub>amb</sub>       | °C                  | 0 ... 40             |                 |                 |                 |
| Installation altitude                    |                        | m                   | 0 ... 1000           |                 |                 |                 |
| Thermal class (EN 60034-1)               | T.CL.                  | -                   | 130 (B)              |                 |                 |                 |
| Protection class acc to IEC 60529        | IP                     | -                   | IP54                 |                 |                 |                 |
| Sound pressure level                     | L <sub>p</sub>         | dB[A]               | < 70                 |                 |                 |                 |
| Latest amendment: 2019-02-14             |                        |                     |                      |                 |                 |                 |

Latest amendment: 2019-02-14

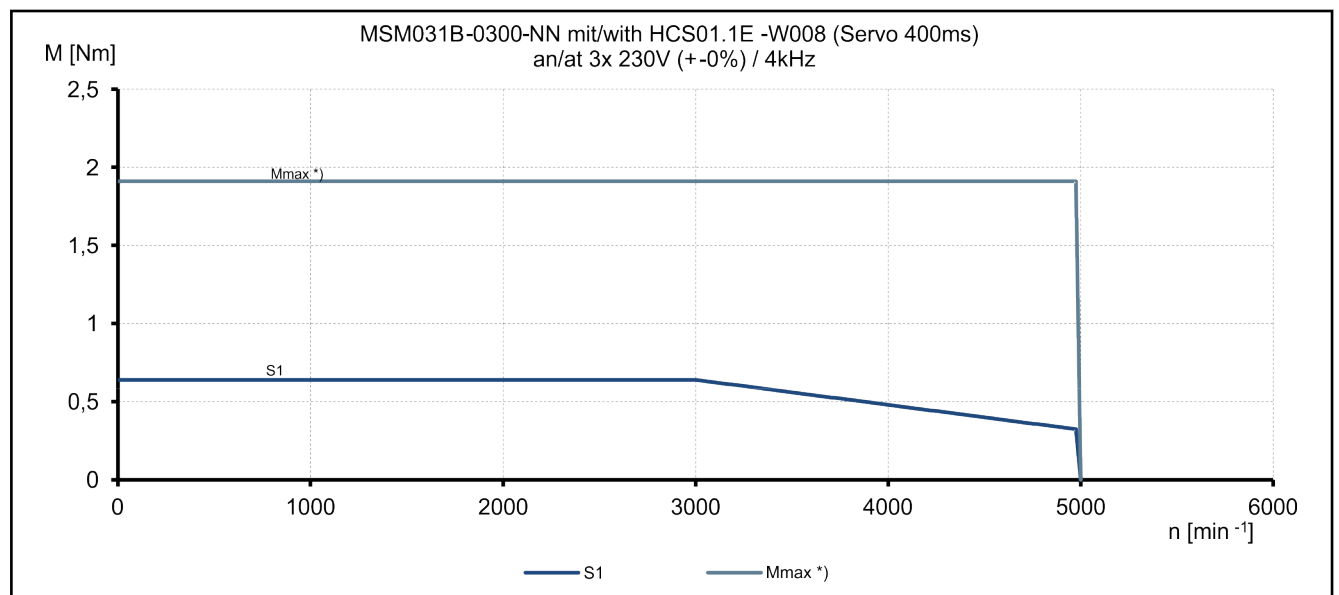
- 1) Manufacturing tolerance ±5%  
 2) Tolerance ± 10%  
 3) (...) Motors with holding brake 1, 2, ...

Tab. 5-6: MSM - Technical data

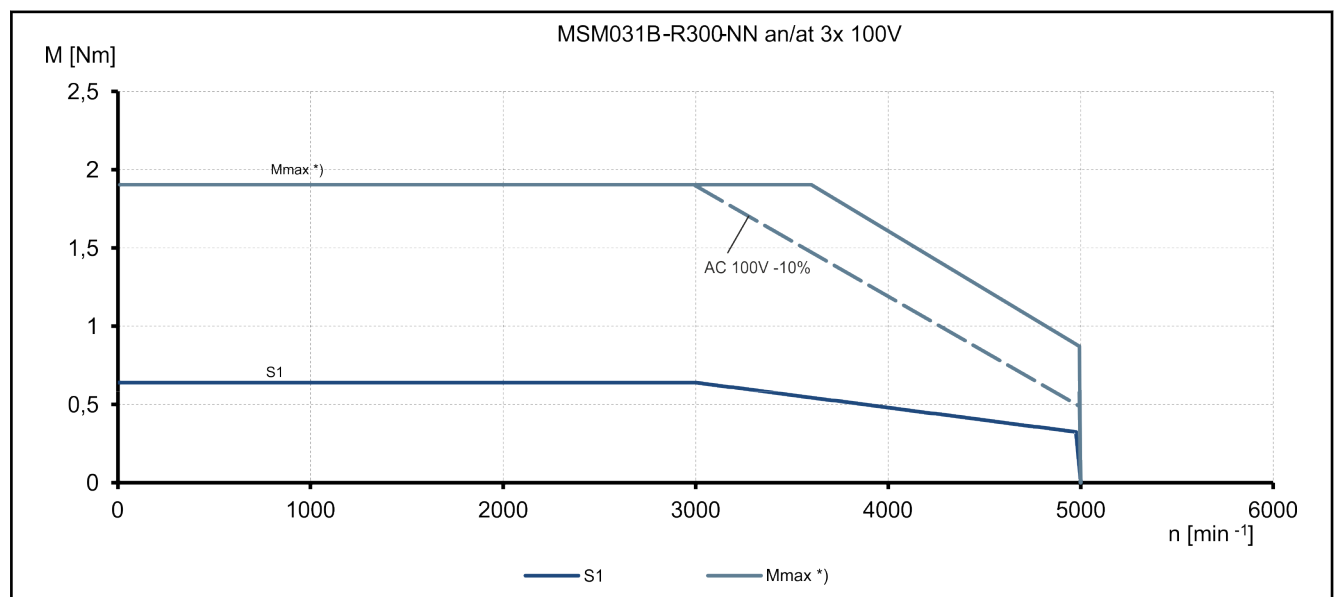
Technical data

| Designation                            | Symbol   | Unit              | Holding brake 1 (MSM031) |
|----------------------------------------|----------|-------------------|--------------------------|
| Holding torque                         | $M_4$    | Nm                | 1.27                     |
| Rated voltage <sup>1)</sup>            | $U_N$    | V                 | $24 \pm 1.2$             |
| Rated current                          | $I_N$    | A                 | 0.36                     |
| Maximum connection time                | $t_1$    | ms                | 15                       |
| Maximum disconnection time             | $t_2$    | ms                | 50                       |
| Moment of inertia of the holding brake | $J_{br}$ | kg*m <sup>2</sup> | 0.0000018                |
| Switching cycles within standstill     |          |                   | 2 Mio                    |
| Latest amendment: 2019-02-14           |          |                   |                          |

Tab. 5-7: MSM031 Holding brakes - Technical data (optional)

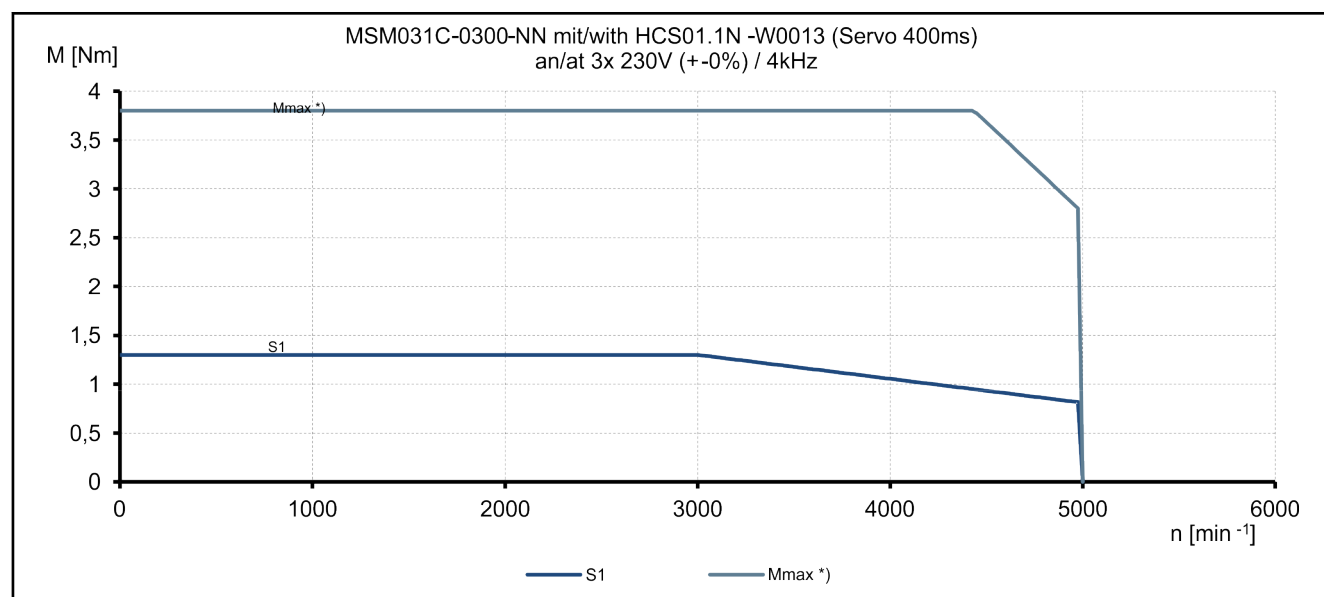


\*) maximum permitted nominal line voltage 3x 230 V  
Fig. 5-5: Speed-torque characteristic curves

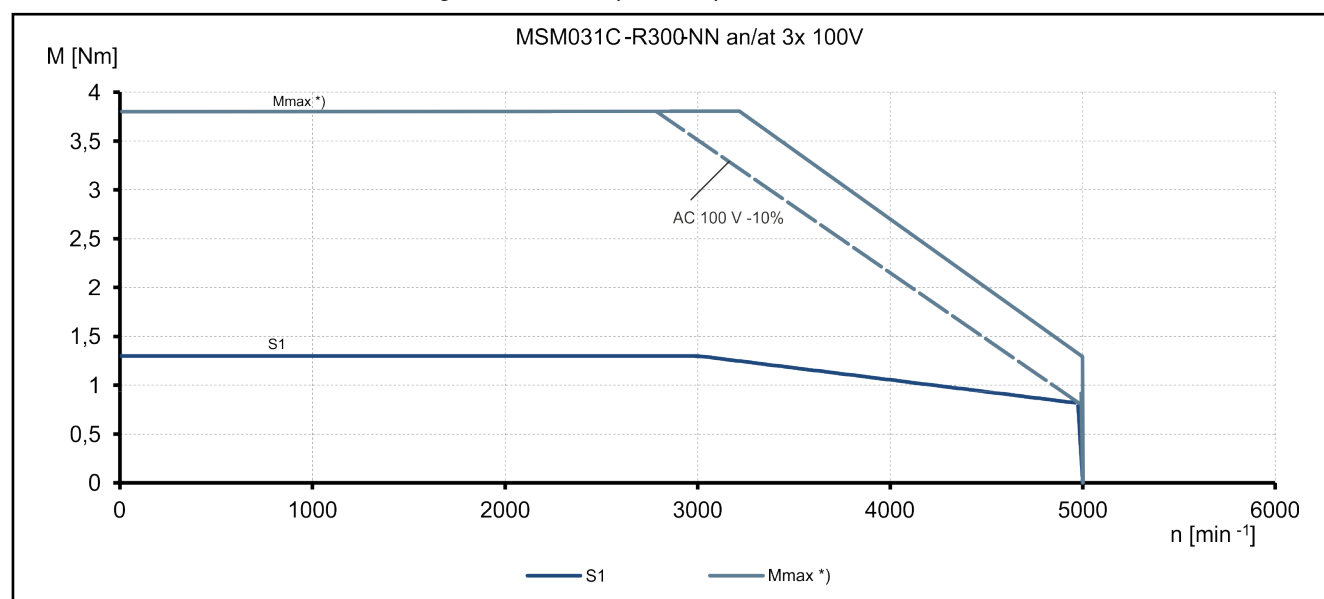


\*) maximum permitted nominal line voltage 3x 100V  
Fig. 5-6: Speed-torque characteristic curves

## Technical data



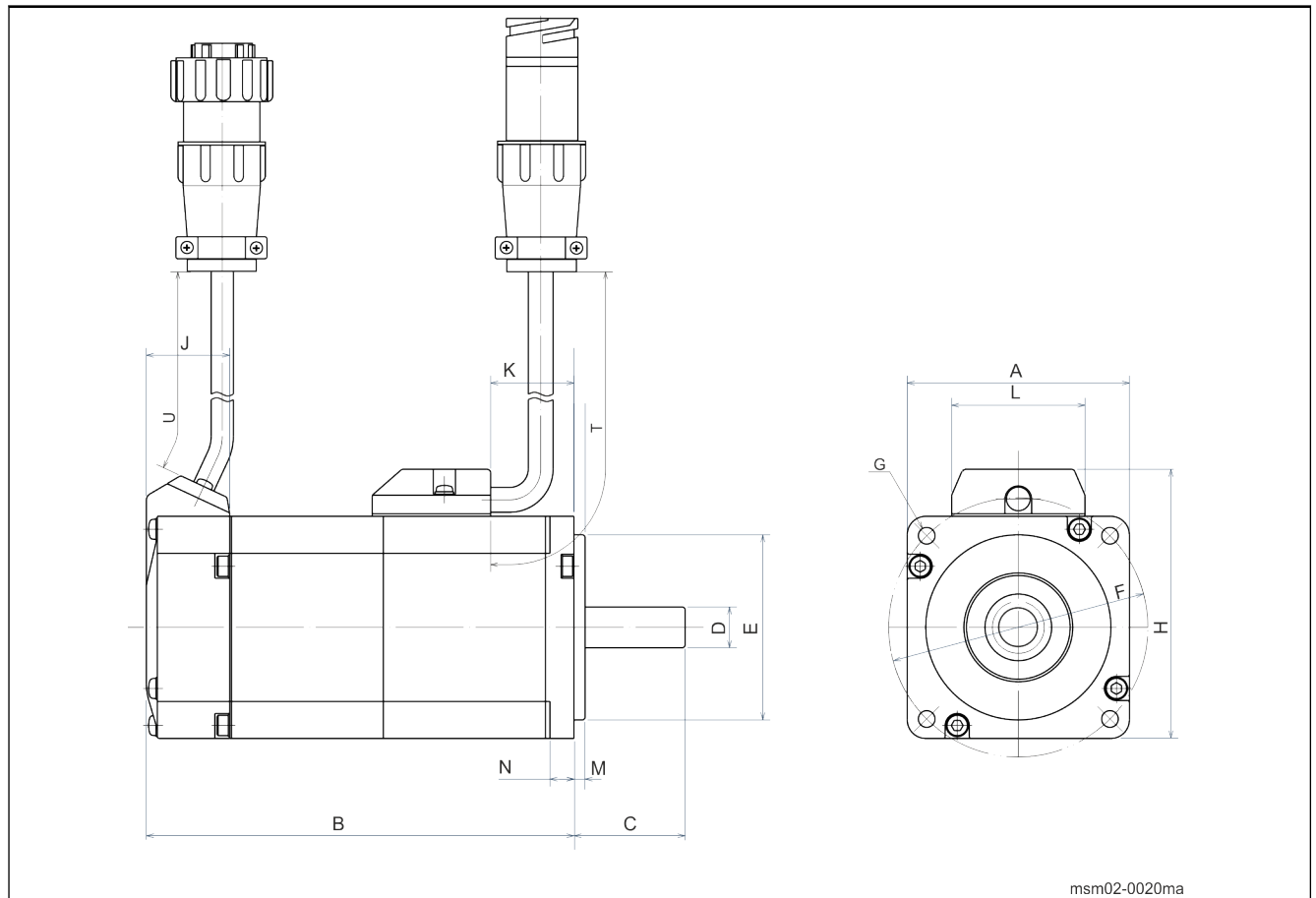
\*) maximum permitted nominal line voltage 3x 230 V  
Fig. 5-7: Speed-torque characteristic curves



\*) maximum permitted nominal line voltage 3x 100V  
Fig. 5-8: Speed-torque characteristic curves

## 5.3.2 MSM031 Specifications

### MSM031...M0-C...



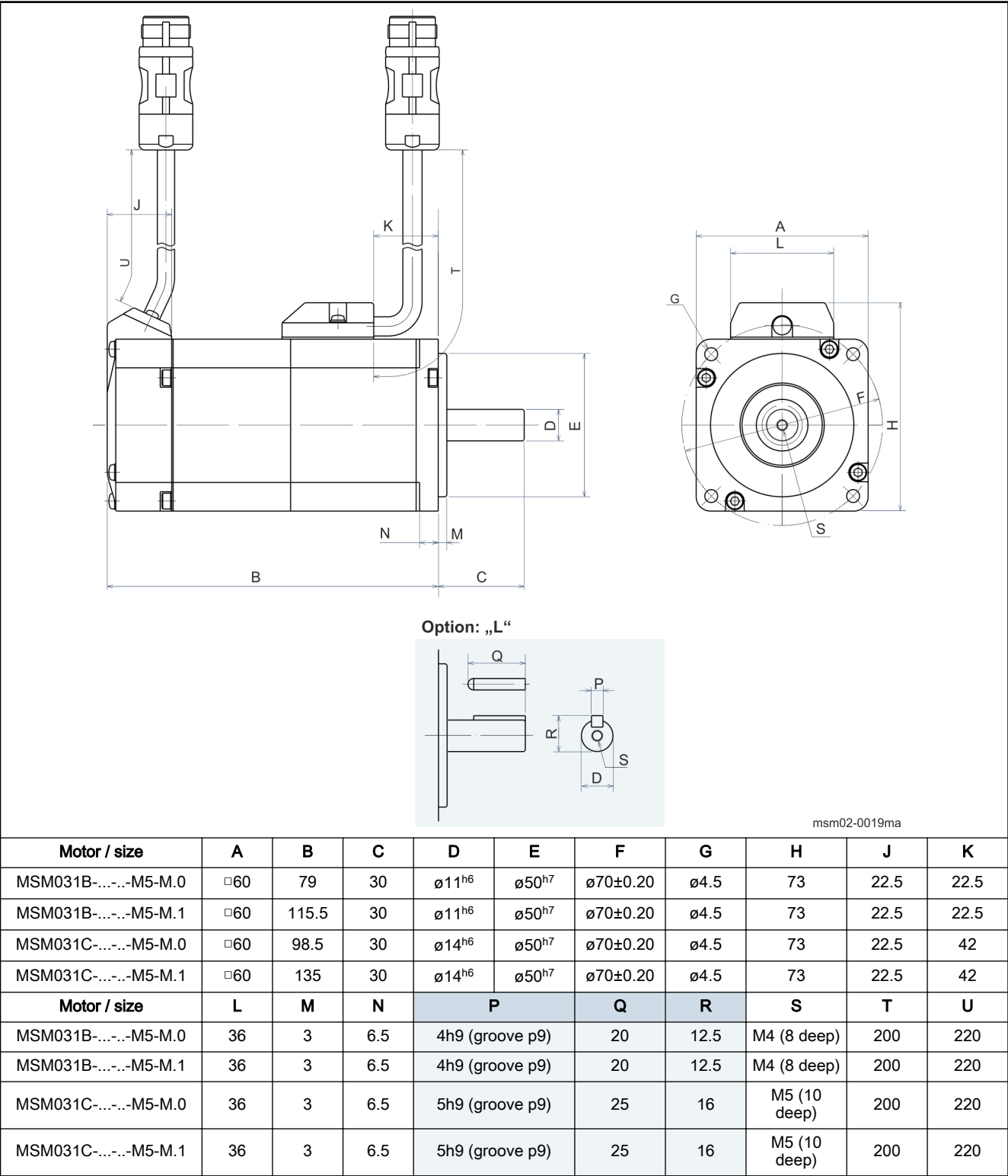
msh02-0020ma

| Motor / size       | A   | B     | C   | D                 | E                 | F        | G    | H  | J    | K    |
|--------------------|-----|-------|-----|-------------------|-------------------|----------|------|----|------|------|
| MSM031B-...-M0-CH0 | □60 | 79    | 30  | ∅11 <sup>h6</sup> | ∅50 <sup>h7</sup> | ∅70±0.20 | ∅4.5 | 73 | 22.5 | 22.5 |
| MSM031B-...-M0-CH1 | □60 | 115.5 | 30  | ∅11 <sup>h6</sup> | ∅50 <sup>h7</sup> | ∅70±0.20 | ∅4.5 | 73 | 22.5 | 22.5 |
| MSM031C-...-M0-CH0 | □60 | 98.5  | 30  | ∅14 <sup>h6</sup> | ∅50 <sup>h7</sup> | ∅70±0.20 | ∅4.5 | 73 | 22.5 | 42   |
| MSM031C-...-M0-CH1 | □60 | 135   | 30  | ∅14 <sup>h6</sup> | ∅50 <sup>h7</sup> | ∅70±0.20 | ∅4.5 | 73 | 22.5 | 42   |
| Motor / size       | L   | M     | N   |                   |                   |          |      |    | T    | U    |
| MSM031B-...-M0-CH0 | 36  | 3     | 6.5 |                   |                   |          |      |    | 200  | 220  |
| MSM031B-...-M0-CH1 | 36  | 3     | 6.5 |                   |                   |          |      |    | 200  | 220  |
| MSM031C-...-M0-CH0 | 36  | 3     | 6.5 |                   |                   |          |      |    | 200  | 220  |
| MSM031C-...-M0-CH1 | 36  | 3     | 6.5 |                   |                   |          |      |    | 200  | 220  |

Tab. 5-8: Dimensions MSM031

Technical data

MSM031...M5-M...



Tab. 5-9: Dimensions MSM031

## 5.4 MSM041

### 5.4.1 MSM041 Technical data

| Designation                              | Symbol                       | Unit                | MSM041B-0300-NN      |
|------------------------------------------|------------------------------|---------------------|----------------------|
| Cooling mode acc. to EN 60034-6          |                              | -                   | IC00                 |
| Listed acc. to UL standard               |                              | -                   | UL 1004; ANSI UL 840 |
| Listed acc. to CSA standard              |                              | -                   | CSA-C22,2 No, 100    |
| UL-Files                                 |                              |                     | E335445              |
| <b>Electrical parameters</b>             |                              |                     |                      |
| Rated power                              | $P_N$                        | kW                  | 0.75                 |
| Continuous torque at standstill 60 K     | $M_{0,60}$                   | Nm                  | 2.40                 |
| Continuous current at standstill 60 K    | $I_{0,60(\text{eff})}$       | A                   | 4.00                 |
| Maximum current                          | $I_{\text{max}(\text{eff})}$ | A                   | 12.00                |
| Maximum torque                           | $M_{\text{max}}$             | Nm                  | 7.10                 |
| Torque constant at 20 °C                 | $K_{M,N}$                    | Nm/A                | 0.64                 |
| Voltage constant at 20 °C <sup>1)</sup>  | $K_{\text{EMK}_1000}$        | V/min <sup>-1</sup> | 37.6                 |
| Winding resistance at 20 °C              | $R_{12}$                     | Ohm                 | 1.50                 |
| Winding inductance                       | $L_{12}$                     | mH                  | 6.700                |
| Discharge capacity of the component      | $C_{\text{dis}}$             | nF                  | 1.3                  |
| Number of pole pairs                     | $p$                          | -                   | 4                    |
| <b>Mechanical parameters</b>             |                              |                     |                      |
| Moment of inertia of rotor <sup>2)</sup> | $J_{\text{rot}}$             | kg*m <sup>2</sup>   | 0.0000870            |
| Wire cross section                       | $A_{60}$                     | mm <sup>2</sup>     | 0.75                 |
| Maximum speed (electrical)               | $n_{\text{max el}}$          | min <sup>-1</sup>   | 4500                 |
| Mass <sup>3)</sup>                       | $m$                          | kg                  | 2.3 ( 3.1 )          |
| Storage temperature                      | $T_L$                        | °C                  | -20 ... +60          |
| Ambient temperature during operation     | $T_{\text{amb}}$             | °C                  | 0 ... 40             |
| Installation altitude                    |                              | m                   | 0 ... 1000           |
| Thermal class (EN 60034-1)               | T.CL.                        | -                   | 130 (B)              |
| Protection class acc. to IEC 60529       | IP                           | -                   | IP54                 |
| Sound pressure level                     | $L_p$                        | dB[A]               | < 70                 |
| Latest amendment: 2019-02-14             |                              |                     |                      |

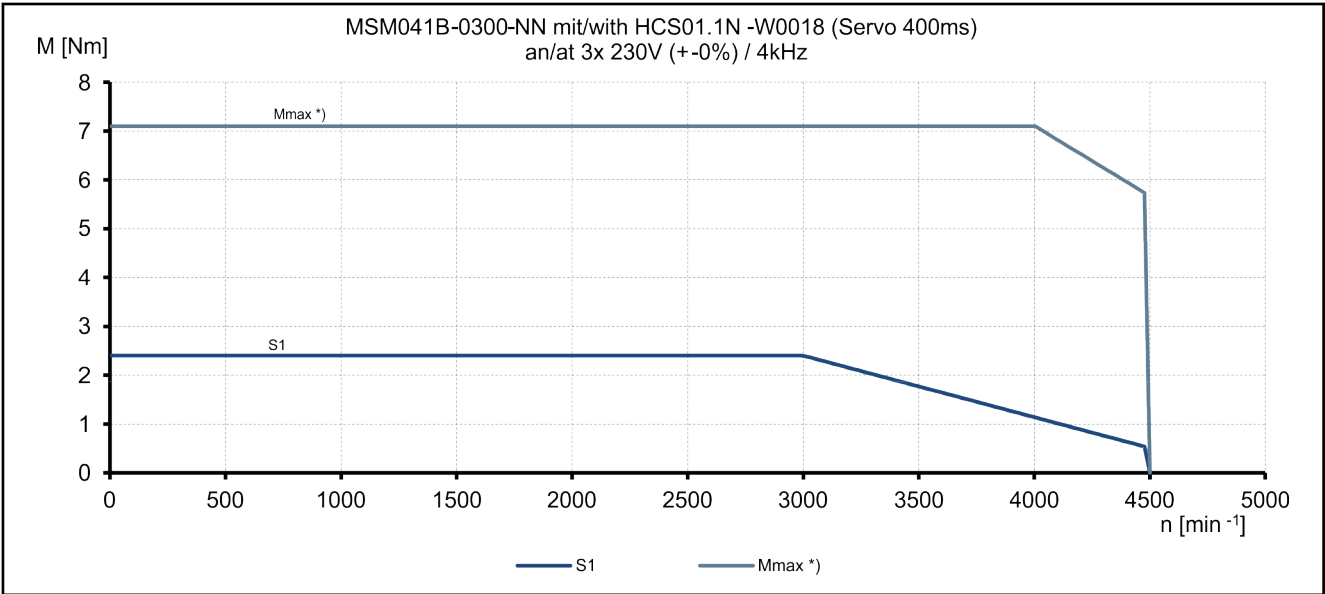
- 1) Manufacturing tolerance ±5%  
2) Tolerance ± 10%  
3) (...) Motors with holding brake 1, 2, ...  
Tab. 5-10: MSM - Technical data

Technical data

| Designation                            | Symbol   | Unit              | Holding brake 1 (MSM041) |
|----------------------------------------|----------|-------------------|--------------------------|
| Holding torque                         | $M_4$    | Nm                | 2.45                     |
| Rated voltage <sup>1)</sup>            | $U_N$    | V                 | 24 ±1.2                  |
| Rated current                          | $I_N$    | A                 | 0.42                     |
| Maximum connection time                | $t_1$    | ms                | 20                       |
| Maximum disconnection time             | $t_2$    | ms                | 70                       |
| Moment of inertia of the holding brake | $J_{br}$ | kg*m <sup>2</sup> | 0.0000075                |
| Switching cycles within standstill     |          |                   | 2 Mio                    |

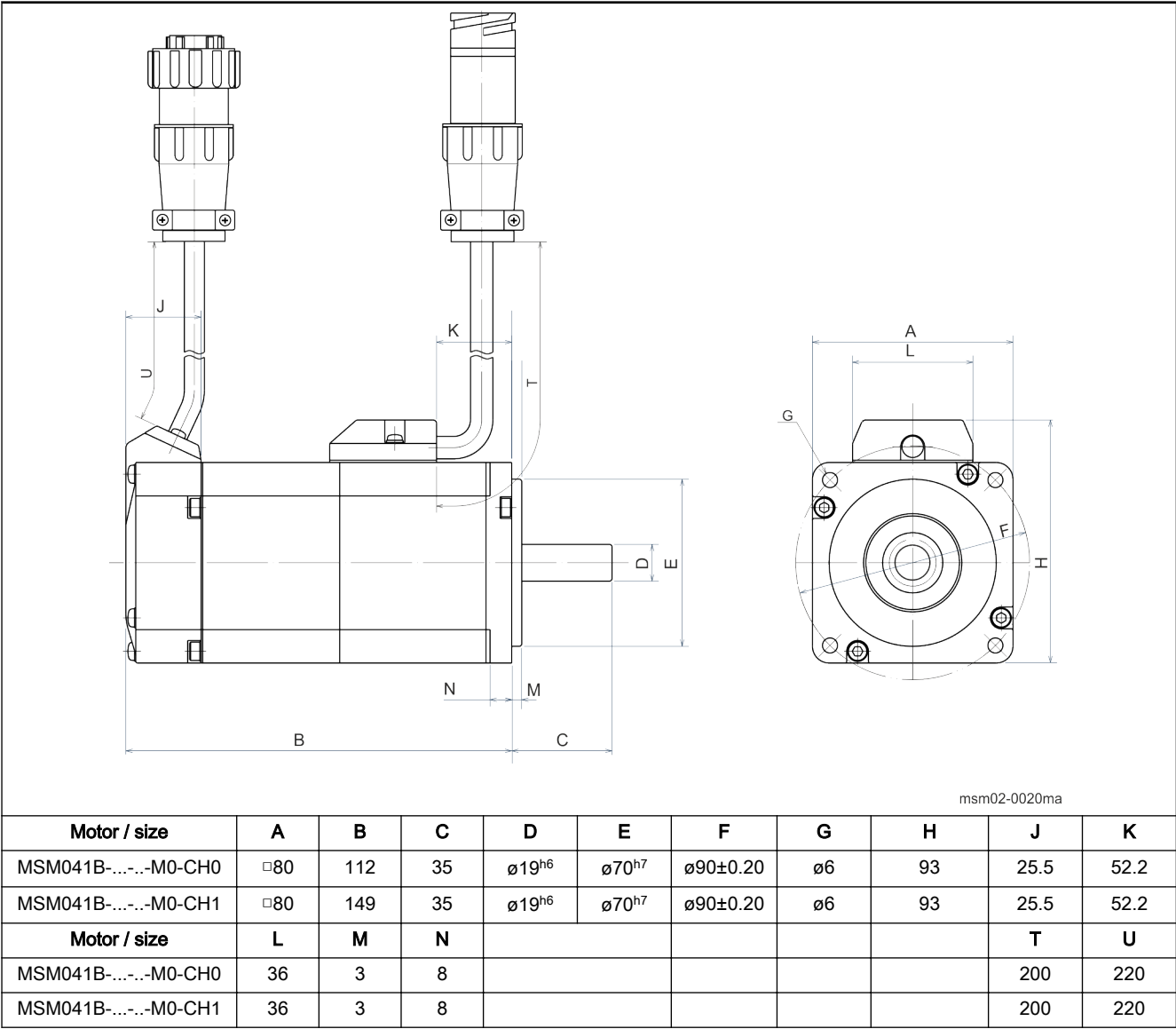
Latest amendment: 2019-02-14

Tab. 5-11: MSM041 Holding brakes - Technical data (optional)



\*) maximum permitted nominal line voltage 3x 230V  
Fig. 5-9: Speed-torque characteristic curves

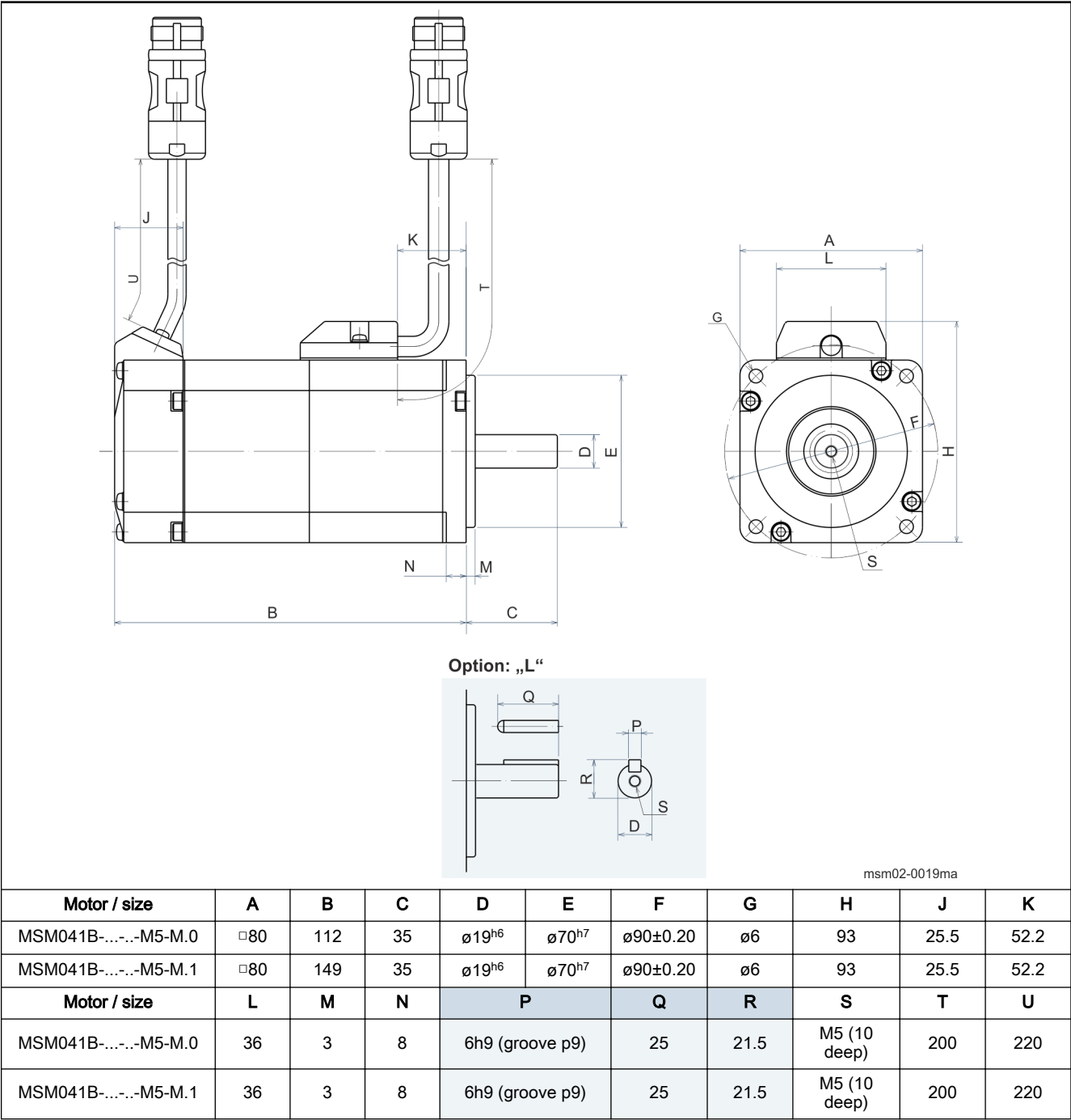
5.4.2 MSM041 Specifications  
MSM041...M0-C...



Tab. 5-12: Dimensions MSM041

Technical data

MSM041...M5-M...



Tab. 5-13: Dimensions MSM041

## 6 Motor encoder MSM

### 6.1 Motor encoder M0

Data sheet - Encoder

| Designation                  | Symbol                  | Unit              | Encoder M0 (MSM)    |                    |
|------------------------------|-------------------------|-------------------|---------------------|--------------------|
| Battery extern               |                         |                   | -                   | Yes                |
| Encoder design               | -                       | -                 | Singleturn absolute | Multiturn absolute |
| Distinguishable revolutions  | -                       | -                 | 1                   | 65536              |
| Incremental signals          | -                       | -                 | without             |                    |
| Resolution of encoder        | -                       | -                 | 17 bit              | 17+16 bit          |
| System accuracy              | -                       | “                 | tbd                 |                    |
| Maximum encoder speed        |                         | min <sup>-1</sup> | 6000                |                    |
| Supply voltage               | V <sub>CC</sub> Encoder | V                 | 4.75 ... 5.25       |                    |
| Max. current consumption     | I <sub>Encoder</sub>    | mA                | 70                  |                    |
| Latest amendment: 2009-07-07 |                         |                   |                     |                    |

" Angular seconds

Tab. 6-1: Encoder data

#### Singleturn absolute value encoder

The singleturn absolute value encoder serves for absolute indirect position detection within 1 motor revolution. For this encoder variant, the absolute axis position gets lost after switching-off the voltage.

#### Multiturn absolute value encoder

The multiturn absolute value encoder serves for absolute indirect position detection within 65536 motor revolutions. It replaces a separate absolute value encoder at the motor. The absolute axis position at this encoder variant is retained by the battery buffering even after switching-off the voltage. If the motor is disconnected from the batterybus, the information about absolute axis position gets lost after about 1 minute.

#### Details for multiturn signals

For using the multiturn option, the buffering memory via a necessary battery is necessary. Therefore, the following accessory is available:

#### Batterybox

| Designation            | Order number |
|------------------------|--------------|
| SUP-E01-MSM-BATTERYBOX | R911324240   |

#### Spare battery

| Designation            | Order number |
|------------------------|--------------|
| SUP-E03-DKC*CS-BATTERY | R911295648   |

## Motor encoder MSM

## 6.2 Motor encoder M5

### Data sheet - Encoder

| Designation                         | Symbol                 | Unit              | Encoder M5 (MSM)    |                    |
|-------------------------------------|------------------------|-------------------|---------------------|--------------------|
| Battery extern                      |                        |                   | -                   | Yes                |
| Encoder design                      | -                      | -                 | Singleturn absolute | Multiturn absolute |
| Distinguishable revolutions         | -                      | -                 | 1                   | 65536              |
| Incremental signals                 | -                      | -                 | without             |                    |
| Resolution of encoder               | -                      | -                 | 20 bit              | 20 + 16 bit        |
| System accuracy typical/<br>maximum | -                      | “                 | -170 / -240         |                    |
| Maximum encoder speed               |                        | min <sup>-1</sup> | 6000                |                    |
| Supply voltage                      | VCC <sub>Encoder</sub> | V                 | 4.5 ... 5.5         |                    |
| Max. current consumption            | I <sub>Encoder</sub>   | mA                | 70                  |                    |
| Latest amendment: 2017-09-21        |                        |                   |                     |                    |

“ Angular seconds

Tab. 6-2: Encoder data

#### Singleturn absolute value encoder

The singleturn absolute value encoder serves for absolute indirect position detection within 1 motor revolution. For this encoder variant, the absolute axis position gets lost after switching-off the voltage.

#### Multiturn absolute value encoder

The multiturn absolute value encoder serves for absolute indirect position detection within 65536 motor revolutions. The absolute axis position at this encoder variant is retained by the battery buffering even after switching-off the voltage. If the motor is disconnected from the batterybox, the information about absolute axis position gets lost after about 1 minute. It replaces a separate absolute value encoder at the motor.

#### Details for multiturn signals

For using the multiturn option, the buffering memory via a necessary battery is necessary. Therefore, the following accessory must be used:

#### Batterybox

| Designation                 | Order number | Length  |
|-----------------------------|--------------|---------|
| SUP-E02-MSM-BATTERYBOX-L010 | R911346063   | 1000 mm |
| SUP-E02-MSM-BATTERYBOX-L030 | R911346065   | 3000 mm |
| SUP-E02-MSM-BATTERYBOX-NNNN | R911346084   | 250 mm  |

#### Spare battery

| Designation         | Order number |
|---------------------|--------------|
| SUP-E02-MSM-BATTERY | R911369925   |

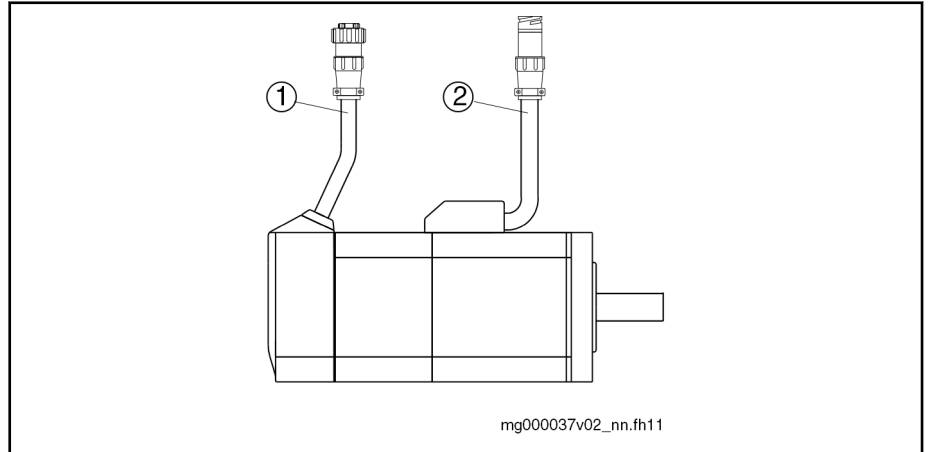
## 7 Connection technique

### 7.1 Electrical connection "C" cable connection

#### Bayonet locking IP54

The connections for power and encoder MSM motors are done via flexible connection lines with plug connectors (IP54) and bayonet fastening.

When connecting the connection cables, the bayonet fastening must engage.



1 Encoder connection

2 Power connection

Fig. 7-1: MSM motor connection

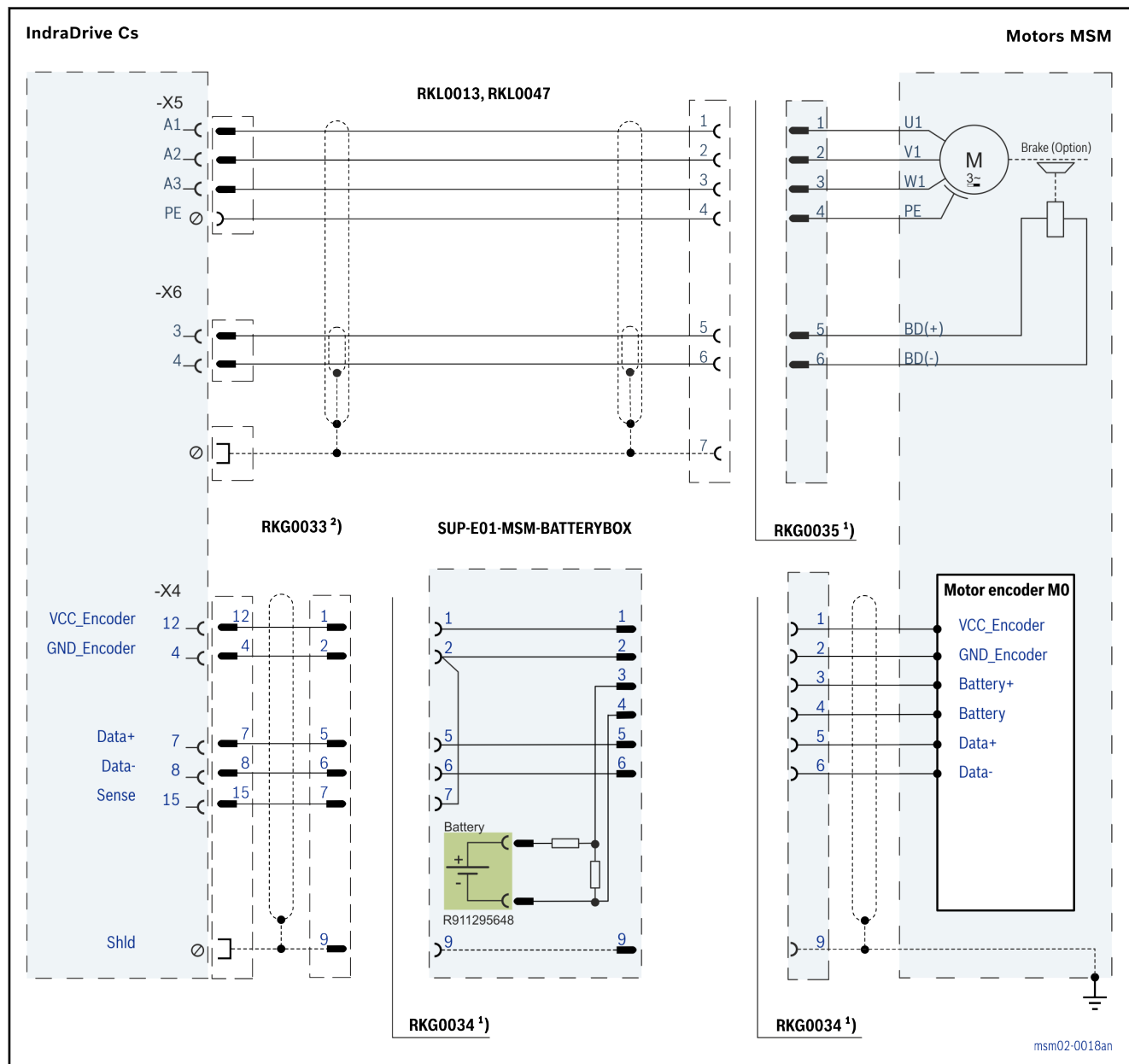
For the length of the flexible connection line, refer to the following table.

| Motor  | Length connection line and plug connector |                                        |
|--------|-------------------------------------------|----------------------------------------|
|        | Encoder                                   | Power                                  |
| MSM019 | 230 mm (+63 mm plug connector INS0758)    | 200 mm (+70 mm plug connector INS0757) |
| MSM031 | 220 mm (+63 mm plug connector INS0758)    |                                        |
| MSM041 |                                           |                                        |

Tab. 7-1: MSM motors: Length of connection line

## Connection technique

## Connection overview



1)

Optional extension cable

2)

In the case of Singleturn application, connect RKG033 directly with the cable connector INS0758 of the MSM motor.

□

Shield connection via housing

Fig. 7-2:

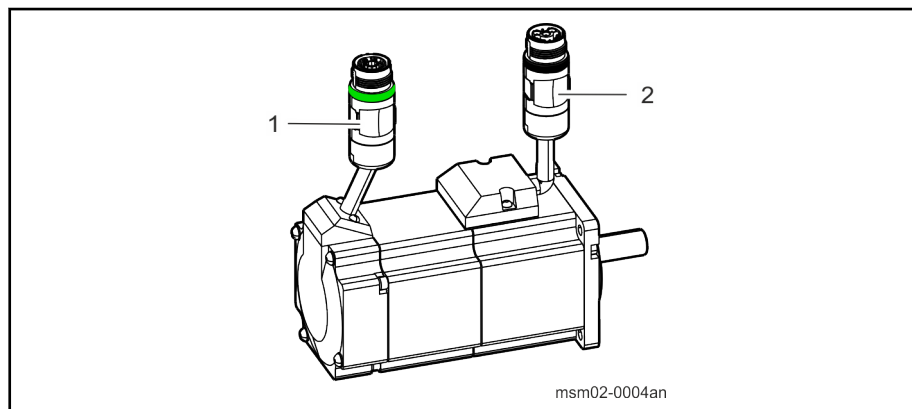
MSM connection plan with encoder M0 and battery box.

Mount the battery box near the motor. The maximum cable length between battery box and MSM motor (RKG0034) is 2.0 m.

## 7.2 Electrical connection "M" cable connection circular connector M17

SpeedCon quick lock IP67

The connections for power and encoder MSM motors are done via flexible connection lines with circular connector M17 (IP67) and Speedcon fastener.



1 Encoder connection (green code ring)

2 Power connection (black code ring)

Fig. 7-3: MSM SpeedCon motor connection

For the length of the flexible connection line, please refer to the following table.

| Motor  | Length connection line ("M" cable connection circular connector M17) |                                        |
|--------|----------------------------------------------------------------------|----------------------------------------|
|        | Encoder                                                              | Power                                  |
| MSM019 | 230 mm (+47 mm plug connector RGS1782)                               | 200 mm (+47 mm plug connector RLS1722) |
| MSM031 | 220 mm (+47 mm plug connector RGS1782)                               |                                        |
| MSM041 | 220 mm (+47 mm plug connector RGS1782)                               |                                        |

Tab. 7-2: MSM motors: Length of connection line ("M" cable connection circular connector M17)

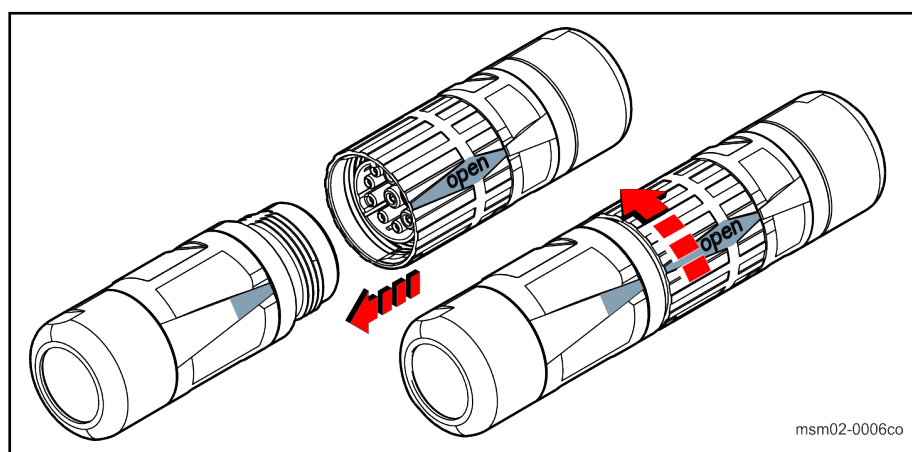
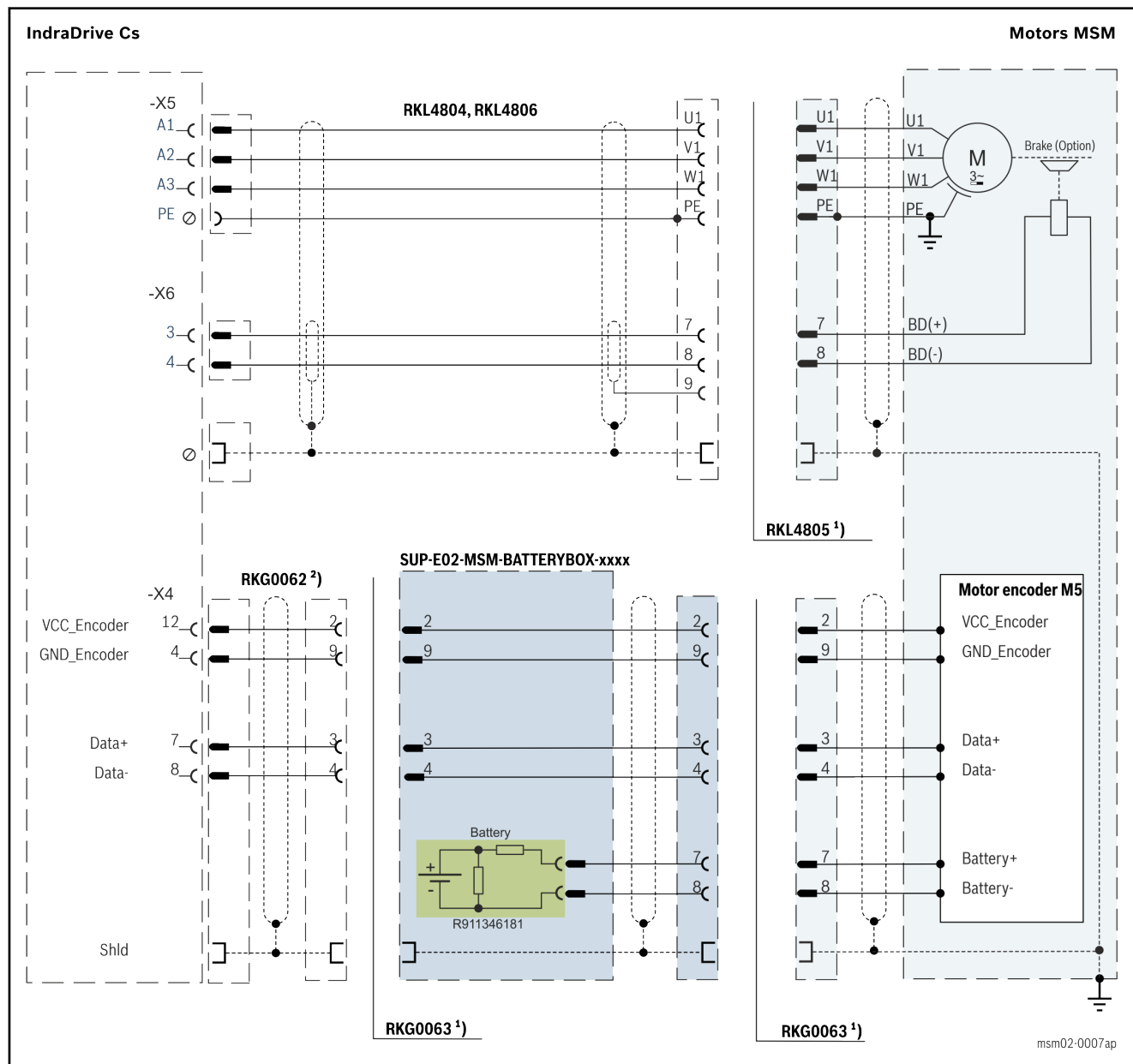


Fig. 7-4: SpeedCon quick lock

Rack the cable connector in "open" position and "manually" tighten the power connector with a rotation by approx. 90°.

## Connection technique

## Connection overview



## 7.3 Ready-made connection cables

### 7.3.1 Power cables

| Motor                  | Controller                                                                                               |                                  |                      |
|------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------|----------------------|
|                        | HCS01.1E-W0003<br>HCS01.1E-W0005<br>HCS01.1E-W0006<br>HCS01.1E-W0008<br>HCS01.1E-W0009<br>HCS01.1E-W0013 | HCS01.1E-W0018<br>HCS01.1E-W0028 | NYCe4000             |
| MSM019A-_300-NN-__-C__ | RKL0013<br>(RKL0035)                                                                                     | RKL0047<br>(RKL0035)             | -                    |
| MSM019B-_300-NN-__-C__ |                                                                                                          |                                  |                      |
| MSM031B-_300-NN-__-C__ |                                                                                                          |                                  |                      |
| MSM031C-_300-NN-__-C__ |                                                                                                          |                                  |                      |
| MSM041B-_300-NN-__-C__ |                                                                                                          |                                  |                      |
| MSM019A-_300-NN-__-M__ | RKL4804<br>(RKL4805)                                                                                     | RKL4806<br>(RKL4805)             | -                    |
| MSM019B-_300-NN-__-M__ |                                                                                                          |                                  |                      |
| MSM031B-_300-NN-__-M__ |                                                                                                          |                                  |                      |
| MSM031C-_300-NN-__-M__ |                                                                                                          |                                  |                      |
| MSM041B-_300-NN-__-M__ |                                                                                                          |                                  |                      |
| MSM019B-R300-NN-__-C__ | -                                                                                                        | -                                | RKL0044<br>(RKL0035) |
| MSM031B-R300-NN-__-C__ |                                                                                                          |                                  |                      |
| MSM031C-R300-NN-__-C__ |                                                                                                          |                                  |                      |
| MSM041B-R300-NN-__-C__ |                                                                                                          |                                  |                      |
| MSM019B-R300-NN-__-M__ | -                                                                                                        | -                                | RKL4807<br>(RKL4805) |
| MSM031B-R300-NN-__-M__ |                                                                                                          |                                  |                      |
| MSM031C-R300-NN-__-M__ |                                                                                                          |                                  |                      |
| MSM041B-R300-NN-__-M__ |                                                                                                          |                                  |                      |

(...)

Tab. 7-3:

Extension (optional)

MSM Power cable

## Connection technique

## 7.3.2 Encoder cable

| Motor                  | Controller           |                                                                                                                                              |                                   |                      |
|------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------|
|                        |                      | HCS01.1E-W0003<br>HCS01.1E-W0005<br>HCS01.1E-W0006<br>HCS01.1E-W0008<br>HCS01.1E-W0009<br>HCS01.1E-W0013<br>HCS01.1E-W0018<br>HCS01.1E-W0028 |                                   | NYCe4000             |
|                        | Singelturm           | Multiturn + Battery box                                                                                                                      | Multiturn + battery on controller |                      |
| MSM019A-_300-NN-__-C__ | RKG0033<br>(RKG0034) | RKG0033                                                                                                                                      | RKG0041<br>(RKG0034)              | -                    |
| MSM019B-_300-NN-__-C__ |                      | +                                                                                                                                            |                                   |                      |
| MSM031B-_300-NN-__-C__ |                      | SUP-E01-MSM-BAT-                                                                                                                             |                                   |                      |
| MSM031C-_300-NN-__-C__ |                      | TERYBOX                                                                                                                                      |                                   |                      |
| MSM041B-_300-NN-__-C__ |                      | +                                                                                                                                            |                                   |                      |
|                        |                      | RKG0034                                                                                                                                      |                                   |                      |
| MSM019A-_300-NN-__-M__ | RKG0062<br>(RKG0063) | RKG0062                                                                                                                                      | RKG0065<br>(RKG0063)              | -                    |
| MSM019B-_300-NN-__-M__ |                      | +                                                                                                                                            |                                   |                      |
| MSM031B-_300-NN-__-M__ |                      | SUP-E02_MSM-BAT-                                                                                                                             |                                   |                      |
| MSM031C-_300-NN-__-M__ |                      | TERYBOX-xxxx                                                                                                                                 |                                   |                      |
| MSM041B-_300-NN-__-M__ |                      | +                                                                                                                                            |                                   |                      |
|                        |                      | RKG0063                                                                                                                                      |                                   |                      |
| MSM019B-R300-NN-__-C__ | -                    | -                                                                                                                                            | -                                 | RKG0040<br>(RKG0034) |
| MSM031B-R300-NN-__-C__ |                      |                                                                                                                                              |                                   |                      |
| MSM031C-R300-NN-__-C__ |                      |                                                                                                                                              |                                   |                      |
| MSM041B-R300-NN-__-C__ |                      |                                                                                                                                              |                                   |                      |
| MSM019B-R300-NN-__-M__ | -                    | -                                                                                                                                            | -                                 | RKG0064<br>(RKG0063) |
| MSM031B-R300-NN-__-M__ |                      |                                                                                                                                              |                                   |                      |
| MSM031C-R300-NN-__-M__ |                      |                                                                                                                                              |                                   |                      |
| MSM041B-R300-NN-__-M__ |                      |                                                                                                                                              |                                   |                      |

(...)

Extension (optional)

Tab. 7-4:

MSM power cable

## 8 Transport and storage

### 8.1 Transport of motors

#### Environmental and operating conditions - Transport

| Designation             | Symbol        | Unit             | Value       |
|-------------------------|---------------|------------------|-------------|
| Temperature range       | $T_{a\_tran}$ | °C               | -20 ... +80 |
| Relative air humidity   |               | %                | 5 ... 95    |
| Absolute air humidity   |               | g/m <sup>3</sup> | 1 ... 60    |
| Climatic class (IEC721) |               |                  | 2K3         |
| Condensation            |               |                  | not allowed |
| Icing                   |               |                  | not allowed |

Tab. 8-1: Environmental and operating conditions - Transport

### 8.2 Storage of motors

#### Environmental and operating conditions - Storage

| Designation             | Symbol         | Unit             | Value       |
|-------------------------|----------------|------------------|-------------|
| Temperature range       | $T_{a\_store}$ | °C               | -20 ... +60 |
| Relative air humidity   |                | %                | 5 ... 95    |
| Absolute air humidity   |                | g/m <sup>3</sup> | 1 ... 29    |
| Climatic class (IEC721) |                |                  | 1K3         |
| Condensation            |                |                  | not allowed |
| Icing                   |                |                  | not allowed |

Tab. 8-2: Environmental and operating conditions - Storage



## 9 Assembly accessory

### 9.1 Flange fastening

The screw connection must be adjusted to the installation situation (screw-length, property class, screw-in depth, material, ...). The dimensioning of the screw connection is in the responsibility of the customer.

To attach the motors properly and safely to the machine, Bosch Rexroth recommends the following screws and washers for attachment.

#### Mounting screws: MSM Motors

| Hole<br>ø [mm] | Screw 8.8<br>DIN EN ISO 4762<br>DIN EN ISO 4014 | Tightening torque<br>$M_A$ [Nm] at $\mu_K = 0.12$ | Washer<br>DIN EN ISO 28738 |
|----------------|-------------------------------------------------|---------------------------------------------------|----------------------------|
| 3.4            | M3 × 16                                         | 1.3                                               | -                          |
| 4.5            | M4 × 20                                         | 3.1                                               | -                          |
| 6              | M5 × 20                                         | 6.1                                               | -                          |

Tab. 9-1: Tightening torque of mounting screws



The screwed connections must be able to take up both the force due to the weight of the motor and the forces acting during operation.

If the screws and washers used do not comply with this recommendation, the property class of the screws and the hardness class must be equivalent in order to transmit the required tightening torques.

MSM motors are produced for flange mounting (B05). Details on the mounting holes are given in the corresponding dimension sheet.

## Assembly accessory

## 9.2 Battery box SUP-E01-MSM-BATTERYBOX

**Use** The battery box "SUP-E01-MSM-BATTERYBOX" is an set of accessories for operation of MSM motors with absolute encoder (M0) and is used for buffering of the encoder data in case of power shut off.

### Scope of delivery

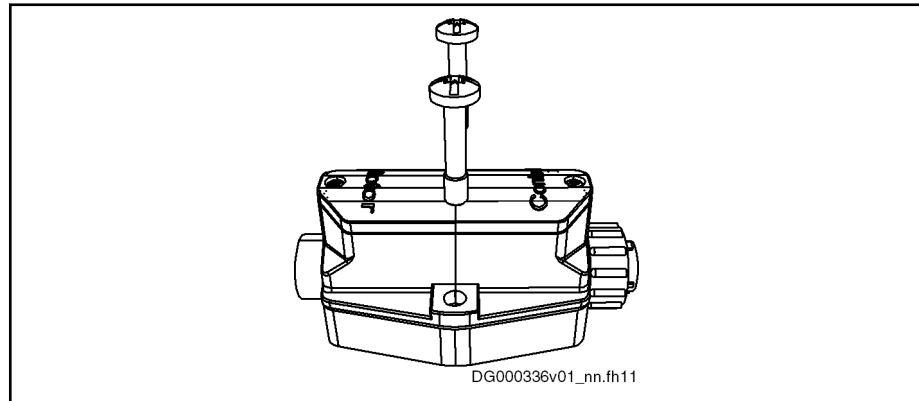


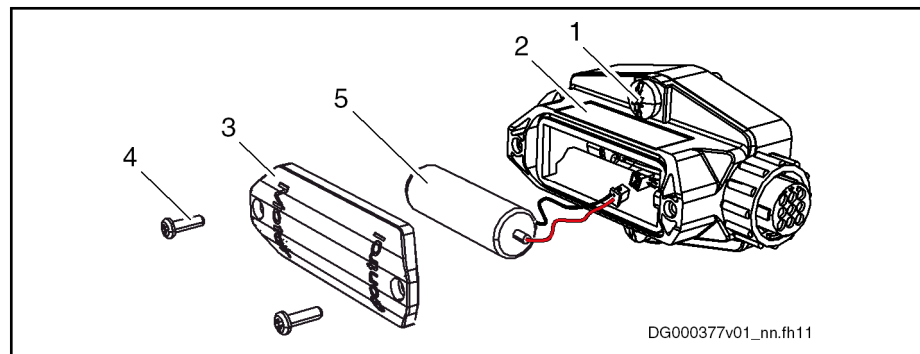
Fig. 9-1: Battery box

### Battery box complete with

- **Battery:** Type: ER6C, 3.6 V; 1800 mA, lithium; lifetime: up to 10 years, depending on use and ambient temperature
- **Assembly screws:** M6×30; screw head: Torx and slot

The battery box "SUP-E01-MSM-BATTERYBOX" is delivered in ready-for-use state with battery.

### Components:



- |   |                                                                        |
|---|------------------------------------------------------------------------|
| 1 | Assembly screw                                                         |
| 2 | Housing                                                                |
| 3 | Housing lid                                                            |
| 4 | Housing lid screw (self-shaping screw 30×10; tightening torque 0.8 Nm) |
| 5 | Battery                                                                |

Fig. 9-2: Components of battery box

# Assembly accessory

## Dimensions

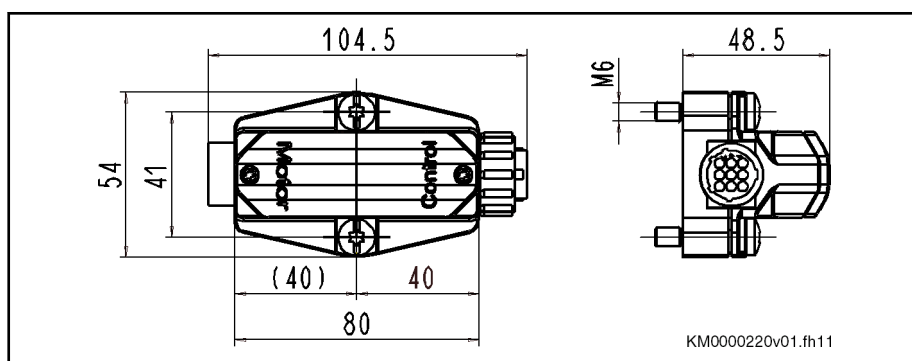


Fig. 9-3: Dimensions

Weight 120 g

## Mounting



Install the battery box in the immediate vicinity of the motor.

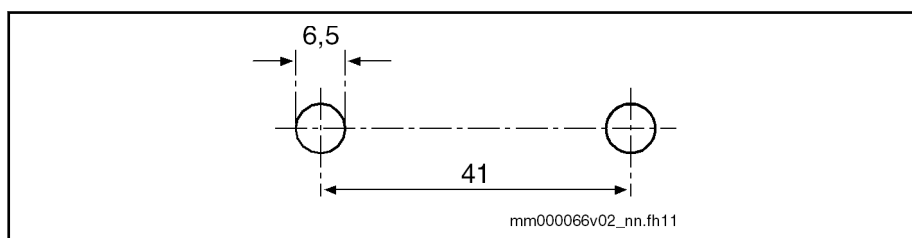
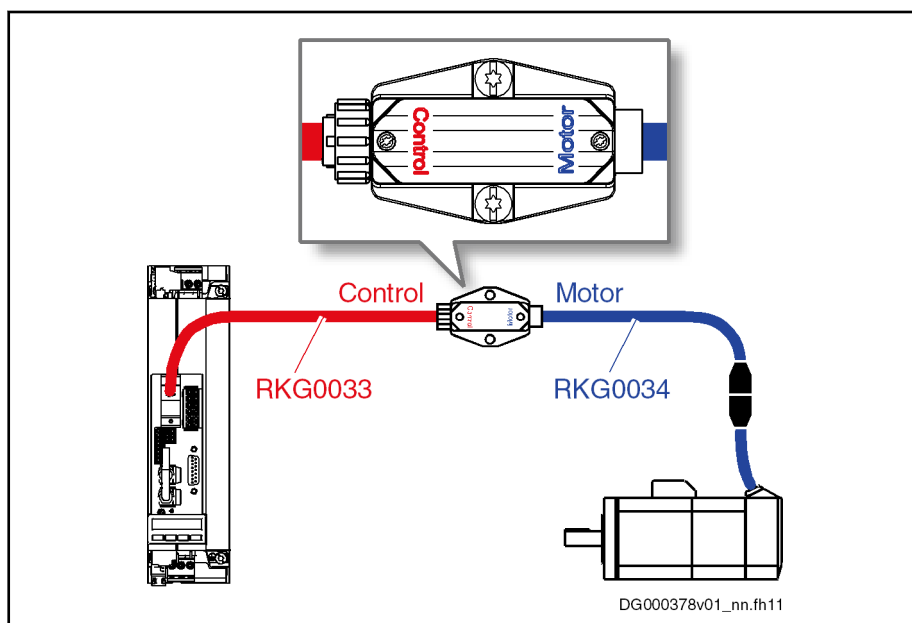


Fig. 9-4: Drilling diagram for battery box

- Assembly screws: M6×30
- Tightening torque  $M_A$ : 3 Nm

## Cabling



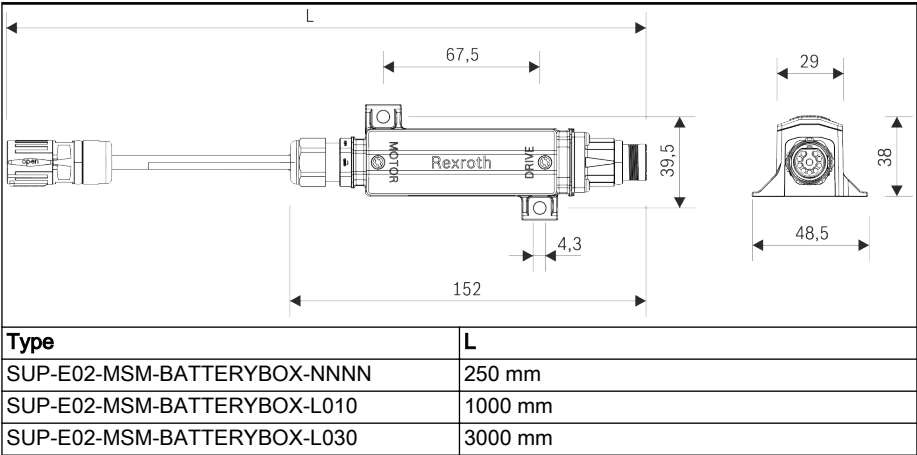
RKG0033 Encoder cable  
RKG0034 Extension cable (optional)

Fig. 9-5: Cabling of battery box

9.3 Battery box SUP-E02-MSM-BATTERYBOX-xxxx

**Use** When operating MSM motors with absolute value encoder (M5), the battery box serves for buffering the encoder data when disconnecting the voltage.

**Scope of delivery**



Tab. 9-2: Battery box measures

**Battery box complete with**

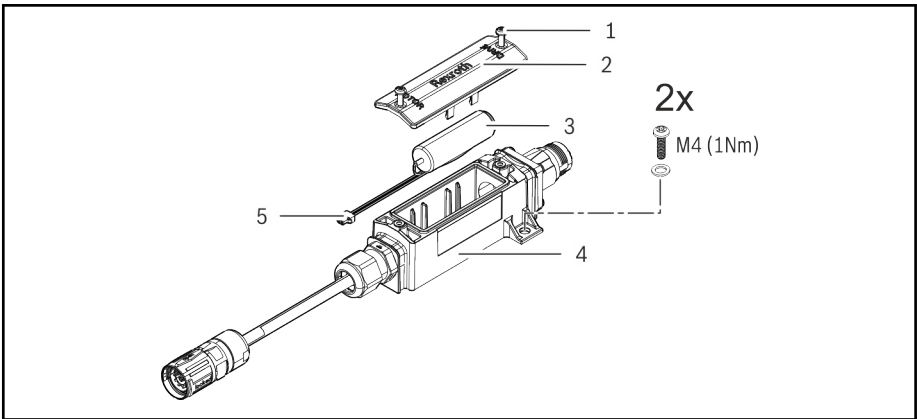
- **Battery:** Type PRM1-03V6-2600C-D2-LITH-ZNR-50, 3.6 V; 2600 mAh, Lithium; Lifetime: up to 10 years, dependet from stress and environmental temperature

When the "SUP-E02-MSM-BATTERYBOX-xxxx" battery box is delivered, it is ready to use.

Recommendation Battery change after 5 years

Order number spare battery **R911369925** SUP-E02-MSM-BATTERY

Components:



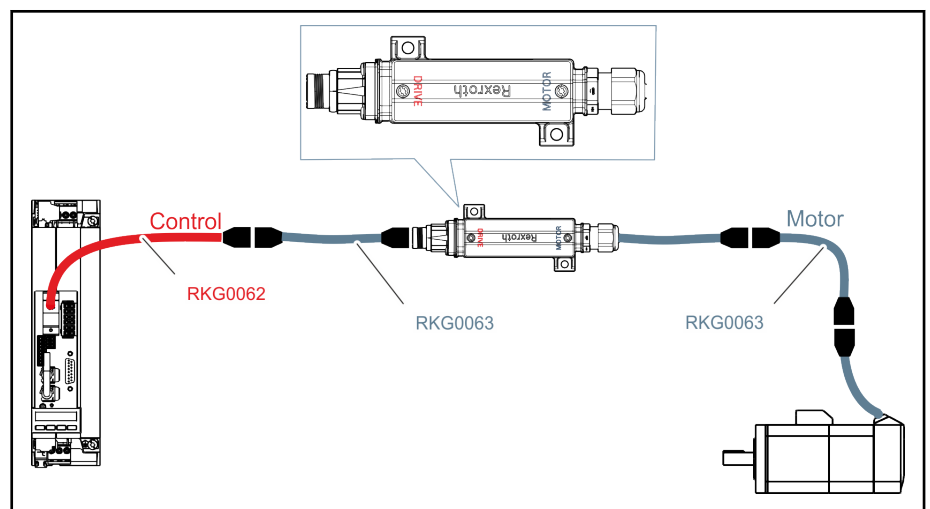
- 1 Housing screw (M<sub>A</sub> 0.7 Nm)
- 2 Housing lid
- 3 Battery
- 4 Housing
- 5 Battery connector

Fig. 9-6: Components of a battery box

For fastening the battery box, use 2xM4 mounting screws mit washer and screw locking. The fastening screws are not included in the scope of delivery and must be customized onto the required mounting situation. Tightening torque of fastening screws 1 Nm.

Assembly accessory

Cabling



RKG0062 Encoder cable  
RKG0063 Extension cable (optional)  
*Fig. 9-7: Battery box cabling*

## Assembly accessory

## 9.4 Shaft sealing ring

Shaft sealing rings are available as accessory. The shaft sealing rings increase the IP protection within the output shaft.

Retrofitting must be done on the customer side. The proper function requires proper mounting.

| Motor  | Order no.  | Designation            |
|--------|------------|------------------------|
| MSM019 | R911311237 | SUP-M01-MSM020-OILSEAL |
| MSM031 | R911311238 | SUP-M01-MSM030-OILSEAL |
| MSM041 | R911311239 | SUP-M01-MSM040-OILSEAL |

Tab. 9-3: Accessories MSM Shaft sealing ring

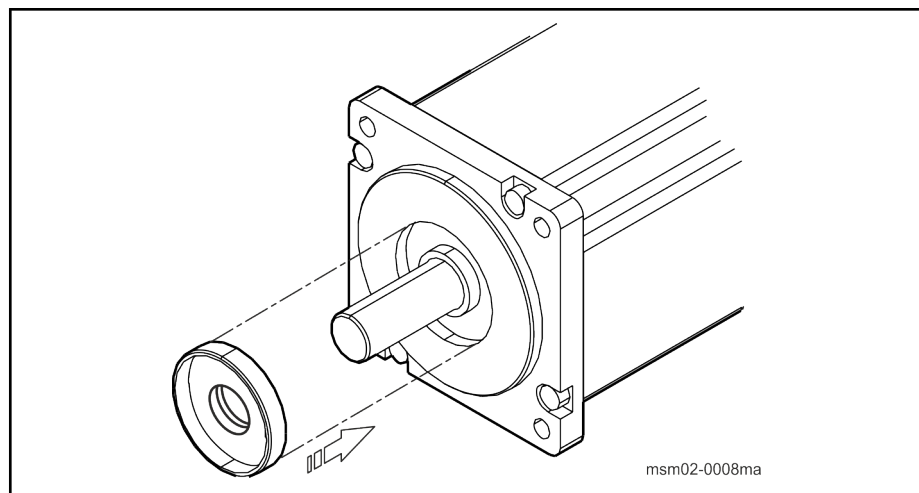


Fig. 9-8: Mounting accessories radial shaft sealing ring MSM

### Mounting notes:

- Clean the place of the radial shaft sealing ring.
- Slide the radial shaft sealing ring over the shaft and observe that the key does not damage the sealing lip.
- Slowly slight the radial shaft sealing ring by means of mounting tools on-to the motor.
- Grease the radial shaft sealing ring.

## 10 Environmental protection and disposal

### 10.1 Environmental protection

|                                           |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                 |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Production processes</b>               | The products are manufactured in energy- and resource-optimized production processes which allow re-using and recycling the resulting waste. We regularly try to replace pollutant-loaded raw materials and supplies by more environment-friendly alternatives. |                                                                                                                                                                                                                 |
| <b>No release of hazardous substances</b> | Our products do not contain any hazardous substances which may be released in case of appropriate use. Normally, our products will not have any negative influences on the environment.                                                                         |                                                                                                                                                                                                                 |
| <b>Significant components</b>             | Significant components of our products are:                                                                                                                                                                                                                     |                                                                                                                                                                                                                 |
|                                           | <b>Electronic devices</b> <ul style="list-style-type: none"> <li>• Steel</li> <li>• Aluminum</li> <li>• Copper</li> <li>• Plastics</li> <li>• Electronic components</li> </ul>                                                                                  | <b>Motors</b> <ul style="list-style-type: none"> <li>• Steel / Stainless steel</li> <li>• Aluminum</li> <li>• Copper</li> <li>• Brass</li> <li>• Magnetic materials</li> <li>• Elektronic components</li> </ul> |

### 10.2 Disposal

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Return of products</b>         | <p>Our products can be returned to us for disposal free of charge. However, this requires that the products be free from oil, grease or other dirt.</p> <p>Furthermore, the products returned for disposal may not contain any undue foreign material or foreign components.</p> <p>Deliver the products "free domicile" to the following address:</p> <p style="text-align: center;">Bosch Rexroth AG<br/>Electric Drives and Controls<br/>Buergermeister-Dr.-Nebel-Straße 2<br/>97816 Lohr am Main, Germany</p>                                                                                                                                                                                                                                                                                                                                         |
| <b>Packaging</b>                  | <p>Packaging materials consist of cardboard, wood and polystyrene. They can be recycled anywhere without any problem.</p> <p>For ecological reasons, please refrain from returning the empty packages to us.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Batteries and accumulators</b> | <p>Batteries and accumulators can be labeled with this symbol.</p> <div style="text-align: center;">  </div> <p>The symbol indicating "separate collection" for all batteries and accumulators is the crossed-out wheeled bin.</p> <p>End users in the EU are legally bound to return used batteries and accumulators. Outside the validity of the EU Directive 2006/66/EC, the particularly applicable regulations must be followed.</p> <p>Batteries and accumulators can contain hazardous substances which can harm the environment or people's health when improperly stored or disposed of.</p> <p>After use, the batteries or accumulators contained in Rexroth products must be properly disposed of according to the country-specific collection systems.</p> |

## Environmental protection and disposal

**Recycling** Most of the products can be recycled due to their high content of metal. In order to recycle the metal in the best possible way, the products must be disassembled into individual assemblies.

Metals contained in electric and electronic assemblies can also be recycled by means of special separation processes.

Plastic parts of the products may contain flame retardants. These plastic parts are labeled according to EN ISO 1043. They have to be recycled separately or disposed of according to the applicable legal provisions.

# 11 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

**Service Germany** Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

Phone: **+49 9352 40 5060**  
Fax: **+49 9352 18 4941**  
E-mail: [service.svc@boschrexroth.de](mailto:service.svc@boschrexroth.de)  
Internet: <http://www.boschrexroth.com>

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

**Service worldwide** Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

**Preparing information** To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances
- Type plate specifications of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your e-mail address)



## 12 Appendix

### 12.1 EU-Declaration of conformity

Acc. to **Low Voltage Directive 2006/95/EC** (valid from April 19, 2016)

Acc. to **Low Voltage Directive 2014/35/EU** (valid from April 20, 2016)

**Bosch Rexroth AG**

**Buurgermeister-Dr.-Nebel-Straße 2**

**97816 Lohr a. Main / Germany**

The sole responsibility for drawing up this declaration of conformity lies with the manufacturer.

We declare that the following products

#### **3-PHASE SYNCHRONOUS PM -MOTOR**

|           |           |            |
|-----------|-----------|------------|
| MSM019... | MSM020... | MSM030...  |
| MSM031... | MSM040... | MSM0419... |

from the date of manufacture 2015-03-26 were developed, designed and manufactured in compliance with the above-mentioned EU directives.

Applied harmonized standards:

| Standard                    | Title                                                                                                                                                            | Edition                                                |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| EN 60034-1<br>(IEC 60034-1) | Rotating electrical machines - Part 1:<br>Rating and performance                                                                                                 | 2010 + Cor.:2010 (2010, modified)                      |
| EN 60034-5<br>(IEC 60034-5) | Rotating electrical machines - Part 5:<br>Degrees of protection provided by in-<br>tegral design of rotating electrical ma-<br>chines (IP-Code) - Classification | 2001 + A1:2007 (2000 + Corrigen-<br>dum 2001 + A1:2006 |

Further explanations: None

## Appendix

**EU-Konformitätserklärung - Original**

Dok.-Nr.: DCTC-30321-001

Datum: 2017-06-01

- ☐ nach Maschinenrichtlinie 2006/42/EG  
☒ nach Niederspannungsrichtlinie 2006/95/EG (gültig bis 19. April 2016)  
☒ nach Niederspannungsrichtlinie 2014/35/EU (gültig ab 20. April 2016)  
☐ nach EMV-Richtlinie 2014/30/EU  
☐ nach ATEX-Richtlinie 2014/34/EU

Hersteller:  
 Bosch Rexroth AG  
 Bürgermeister-Dr.-Nebel-Straße 2  
 97816 Lohr am Main / Germany,

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

Wir erklären, dass die nachstehenden Produkte

Bezeichnung: 3-PHASE SYNCHRONOUS PM-MOTOR

Baureihen: MSM019... MSM020... MSM030...  
 MSM031... MSM040... MSM041...

ab Herstelldatum: 2015-03-26

in Übereinstimmung mit den oben genannten EU-Richtlinien entwickelt, konstruiert und gefertigt wurden.

Angewandte harmonisierte Normen:

| Norm                        | Titel                                                                                                                                       | Ausgabe                                                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| EN 60034-1<br>(IEC 60034-1) | Drehende elektrische Maschinen – Teil 1: Bemessung und Betriebsverhalten                                                                    | 2010 + Cor.:2010<br>(2010, modifiziert)                  |
| EN 60034-5<br>(IEC 60034-5) | Drehende elektrische Maschinen – Teil 5: Schutzarten aufgrund der Gesamtstruktur von drehenden elektrischen Maschinen (IP-Code) –Einteilung | 2001 + A1:2007<br>(2000 + Corrigendum<br>2001 + A1:2006) |

Lohr am Main , den

Ort

2017-06-01

Datum

i.V.

Daniel Voegeli  
 Leitung Vertriebsliches  
 Produktmanagement

i.V.

Thomas Laux  
 Entwicklungsbereichsleiter Antriebe

Änderungen im Inhalt der EU-Konformitätserklärung sind vorbehalten. Derzeit gültige Ausgabe auf Anfrage.



Seite 1 / 1

Fig. 12-1: EU-Declaration of conformity - origin, German



## EU declaration of conformity - original

Doc. No.: DCTC-30321-001

Date: 2017-06-01

- ☐ in accordance with Machinery Directive 2006/42/EC
- ☒ in accordance with Low Voltage Directive 2006/95/EC (valid until 19<sup>th</sup> April, 2016)
- ☒ in accordance with Low Voltage Directive 2014/35/EU (valid from 20<sup>th</sup> April, 2016)
- ☐ in accordance with EMC Directive 2014/30/EU
- ☐ in accordance with ATEX Directive 2014/34/EU

Manufacturer:  
Bosch Rexroth AG  
Bürgermeister-Dr.-Nebel-Straße 2  
97816 Lohr am Main / Germany

This declaration of conformity is issued under the sole responsibility of the manufacturer.

We hereby declare that the products below

Name: 3-PHASE SYNCHRONOUS PM-MOTOR

Series: MSM019... MSM020... MSM030...  
MSM031... MSM040... MSM041...

from the date of manufacture: 2015-03-26

were developed, designed and manufactured in compliance with the above-mentioned EU directives.

Harmonized Standards applied:

| Standard                    | Title                                                                                                                                               | Edition                                                  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| EN 60034-1<br>(IEC 60034-1) | Rotating electrical machines – Part 1: Rating and performance                                                                                       | 2010 + Cor.:2010<br>(2010, modified)                     |
| EN 60034-5<br>(IEC 60034-5) | Rotating electrical machines – Part 5: Degrees of protection provided by integral design of rotating electrical machines (IP code) - Classification | 2001 + A1:2007<br>(2000 + Corrigendum<br>2001 + A1:2006) |

Lohr am Main , dated 2017-06-01  
Place Date

i.V.   
Daniel Voegeli  
Manager Sales Product Management

i.V.   
Thomas Laux  
Head of Development Drives Solutions

We reserve the right to make changes to the content of the EU Declaration of Conformity. Current issue on request.



Appendix

## 12.2 China RoHS 2

[www.boschrexroth.com.cn/zh/cn/home\\_2/china\\_rohs2](http://www.boschrexroth.com.cn/zh/cn/home_2/china_rohs2)

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