

BMP

Synchronous motor

Motor manual

V1.00, 12.2012



Important information

This manual is part of the product.

Carefully read this manual and observe all instructions.

Keep this manual for future reference.

Hand this manual and all other pertinent product documentation over to all users of the product.

Carefully read and observe all safety instructions as well as chapter "2 Before you begin - safety information".

Some products are not available in all countries.

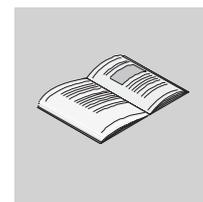
Please consult the latest catalog for information on the availability of products.

Subject to technical modifications without notice.

All details provided are technical data which do not constitute warranted qualities.

Most of the product designations are registered trademarks of their respective owners, even if this is not explicitly indicated.

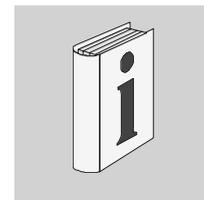
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About this manual



This manual is valid for BMP standard products. Chapter "1 Introduction" lists the type code for this product. The type code allows you to identify whether your product is a standard product or a customized version.

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

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

Corrections and suggestions We always try to further optimize our manuals. We welcome your suggestions and corrections.

Please get in touch with us by e-mail:

techcomm@schneider-electric.com.

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

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

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

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

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



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

SI units SI units are the original values. Converted units are shown in brackets behind the original value; they may be rounded.

Example:

Minimum conductor cross section: 1.5 mm² (AWG 14)

Glossary Explanations of special technical terms and abbreviations.

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

1 Introduction

1

1.1 Motor family

The motors are AC synchronous motors with a very high power density. A drive system consists of the AC synchronous motor and the appropriate drive. Maximum performance requires the motor and drive to be adapted to each other.

Features The AC synchronous motors excel with:

- High power density: the use of the latest magnetic materials and an optimized design result in motors with a shorter length at a comparable torque.
- High energy efficiency: due to optimized stator and rotor design with permanent magnets. Since these motors have a smaller size and operate without forced cooling, the surface temperature may be higher than that of an asynchronous motor.

1.2 Options and accessories

The motors are available with various options such as:

- Various lengths
- Various sizes
- Various winding versions

The options can be found in the type code section on page 10.

For accessories see chapter "7 Accessories and spare parts", page 63.

1.3 Nameplate

The nameplate contains the following data:

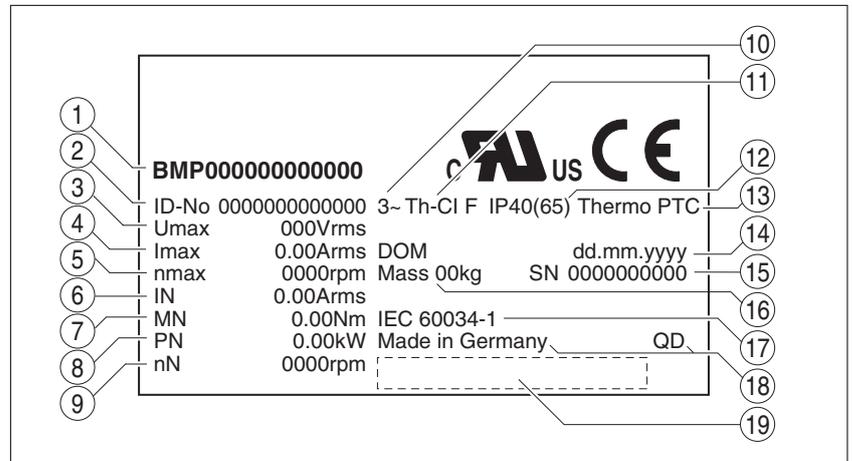


Figure 1: Nameplate

- (1) Motor type, see type code
- (2) Identification number
- (3) Maximum nominal value of supply voltage
- (4) Maximum current
- (5) Maximum speed of rotation
- (6) Nominal current
- (7) Nominal torque
- (8) Nominal power
- (9) Nominal speed of rotation
- (10) Number of motor phases
- (11) Thermal class
- (12) Degree of protection (housing without shaft bushing)
- (13) Temperature sensor
- (14) Date of manufacture
- (15) Serial number
- (16) Mass of the motor
- (17) Applied standard
- (18) Country of manufacture, site
- (19) Barcode

1.4 Type code

	BMP	070	1	C	3	N	A	2	A
Product family BMP: Synchronous motor - medium moment of inertia									
Size (housing) 070 = 70 mm flange 100 = 100 mm flange 140 = 140 mm flange									
Length 1 = 1 stack 2 = 2 stacks 3 = 3 stacks									
Winding C = 1500 min ⁻¹ (drive with 400 V _{ac} supply voltage) F = 1500/3000 min ⁻¹ (drive with 200/400 V _{ac} supply voltage) R = 3000 min ⁻¹ (drive with 200 V _{ac} supply voltage)									
Shaft and degree of protection 3 = Parallel key; degree of protection: shaft and housing IP65 ¹⁾									
Encoder system N = No encoder									
Holding brake A = Without holding brake									
Connection version 2 = Angular connector 90°, can be rotated									
Mechanical interface - mounting A = International IEC Standard									

1) In the case of mounting position IM V3 (drive shaft vertical, shaft end up), the motor only has degree of protection IP50.

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

Designation customized version

In the case of a customized version, position 8 of the type code is an "S". The subsequent number defines the customized version. Example: B•••••S1234

Contact your machine vendor if you have questions concerning customized versions.

1.5 Permissible product combinations

Drive	Motor	Supply voltage	Nominal power
		[V _{ac}]	[kW]
ATV32H037N4	BMP0701F	400	0.37
ATV32H037M2	BMP0701R	200	0.37
ATV32H055N4	BMP0702F	400	0.55
ATV32H055M2	BMP0702R	200	0.55
ATV32H075N4	BMP1001F	400	0.75
ATV32HU11N4	BMP1001F	400	0.75
ATV32H075M2	BMP1001R	200	0.75
ATV32HU15N4	BMP1002F	400	1.50
ATV32HU11M2	BMP1002R	200	1.10
ATV32HU15M2	BMP1002R	200	1.50
ATV32HU11N4	BMP1401C	400	1.10
ATV32HU15N4	BMP1401C	400	1.10
ATV32HU11M2	BMP1401F	200	1.10
ATV32HU15M2	BMP1401F	200	1.10
ATV32HU22N4	BMP1401F	400	2.00
ATV32HU22M2	BMP1401R	200	2.00
ATV32HU22N4	BMP1402C	400	2.20
ATV32HU22M2	BMP1402F	200	2.20
ATV32HU30N4	BMP1402F	400	3.00
ATV32HU40N4	BMP1402F	400	3.00

2 Before you begin - safety information

2

2.1 Qualification of personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used.

All persons working on and with the product must be fully familiar with all applicable standards, directives, and accident prevention regulations when performing such work.

2.2 Intended use

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

This product is not intended for use in cranes, elevators, vertical axes, applications with high moment of inertia or continuous regeneration conditions.

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

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

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

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

The product must NEVER be operated in explosive atmospheres (hazardous locations, Ex areas).

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

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

2.3 Hazard categories

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

Depending on the seriousness of the hazard, the safety instructions are divided into 4 hazard categories.

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

2.4 Basic information

⚠ ⚠ DANGER**HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**

- Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair and maintenance must be performed by qualified personnel.
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Supplement the motor cable grounding conductor with an additional protective ground conductor to the motor housing.
- Do not touch unshielded components or terminals with voltage present. Use only electrically insulated tools.
- The motor generates voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors in the motor cable.
- Do not short across the DC bus terminals or the DC bus capacitors.
- Before performing work on the drive system:
 - Disconnect all power, including external control power that may be present.
 - Place a "Do Not Turn On" label on all power switches.
 - Lock all power switches in the open position.
 - Wait for the DC bus capacitors to discharge (see the product manual for the power stage). Then measure the DC bus voltage and verify it is less than $< 42 V_{dc}$ (see the product manual for the power stage).
- Install and close all covers before applying voltage.

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

⚠ WARNING**MOVEMENT WITHOUT BRAKING EFFECT**

If power outage, functions or errors cause the power stage to be switched off, the motor is no longer decelerated in a controlled way.

- Secure the hazardous area so it cannot be accessed.
- If necessary, use a cushioned mechanical stop or a suitable brake.

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

▲ WARNING**LOSS OF CONTROL**

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical functions.
- System control paths may include communication links. Consideration must be given to the implication of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.¹⁾
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

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

1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems".

2.5 Standards and terminology

Technical terms, terminology and the corresponding descriptions in this manual are intended to use the terms or definitions of the pertinent standards.

In the area of drive systems, this includes, but is not limited to, terms such as "safety function", "safe state", "fault", "fault reset", "failure", "error", "error message", "warning", "warning message", etc.

Among others, these standards include:

- IEC 61800: "Adjustable speed electrical power drive systems"
- IEC 61158: "Digital data communications for measurement and control – Fieldbus for use in industrial control systems"
- IEC 61784: "Industrial communication networks – Profiles"
- IEC 61508: "Functional safety of electrical/electronic/programmable electronic safety-related systems"

Also see the glossary at the end of this manual.

3 Technical Data

3

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

3.1 General features

Motor type	AC synchronous motor	
Number of pairs of poles	5	
Degree of protection motor housing	IP65	As per IEC 60034-5
Degree of protection with IP67 kit	IP67 ¹⁾	As per IEC 60034-5
Thermal class	F (155 C°)	As per IEC 60034-1
Vibration grade	A	As per IEC 60034-14
Test voltage	> 2400 V _{ac}	As per IEC 60034-1
Maximum permissible winding voltage	BMP••••C 480 V _{ac} BMP••••F 480 V _{ac} BMP••••R 230 V _{ac}	
Temperature sensor	PTC, switching threshold 140°C	As per DIN 44081, DIN 44082
Maximum voltage to ground	280 V _{ac}	
Perpendicularity	normal class	As per IEC 60072-1, DIN 42955
Housing color	Black RAL 9005	
Overvoltage category	III	As per IEC 61800-5-1
Protection class ²⁾	I	As per IEC 61140, EN 50178

1) In the case of mounting position IM V3 (drive shaft vertical, shaft end upward), the motor only has degree of protection IP 50. The degree of protection only relates to the motor itself, not to mounted components such as, for example, a gearbox.

2) The signals of the temperature sensor meet the PELV requirements.

The motor has been tested for compatibility with external substances according to the latest knowledge. However, it is impossible to follow up on all further developments of all substances such as lubricants or cleaning agents. Therefore, you must perform a compatibility test prior to using new substances.

Climatic environmental conditions transportation and storage

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

The storage time is primarily limited by the service life of the lubricants in the bearings; do not store the product for more than 36 months. It is recommended to periodically operate the motor.

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

Climatic environmental conditions operation

Ambient temperature ¹⁾ (no icing, non-condensing)	[°C]	-20 ... 40
Ambient temperature with current reduction of 1% per °C ¹⁾	[°C]	40 ... 60
Relative humidity (non-condensing)	[%]	5 ... 85
Class as per IEC 60721-3-3		3K3, 3Z12, 3Z2, 3B2, 3C1, 3M6
Installation altitude ²⁾	[m]	≤1000
Installation altitude with current reduction of 1% per 100 m at altitudes of more than 1000 m ²⁾	[m]	1000 ... 3000

- 1) Limit values with flanged motor (steel plate, height and width = 2.5 * motor flange, 10 mm thickness, centered hole.).
 2) The installation altitude is defined as altitude above mean sea level.

Vibration and shock

Vibration, sinusoidal	Type test with 10 runs as per IEC 60068-2-6 0.15 mm (von 10 Hz ... 60 Hz) 20 m/s ² (from 60 Hz ... 500 Hz)
Shock, semi-sinusoidal	Type test with 3 shocks in each direction as per IEC 60068-2-27 150 m/s ² (11 ms)

Service life

Nominal bearing service life L _{10h} ¹⁾	h	20000
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- 1) Operating hours at a probability of failure of 10%

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

The following operating conditions significantly reduce the service life:

- Installation altitude >1000 m above m.s.l.
- Rotary movements exclusively within a fixed angle of <100°
- Operation under vibration load >20 m/s²
- Allowing sealing rings to run dry
- Contact of the seals with aggressive media

Shaft sealing ring / degree of protection

The motors can be equipped with an optional shaft sealing ring. With a shaft sealing ring, they have degree of protection IP65. The shaft sealing ring limits the maximum speed of rotation to 4000 min⁻¹.

Note the following:

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

Compressed air connection Compressed air must also be available when the system is switched off, for example to maintain the required degree of protection during cleaning work. When the compressed air is switched off, the degree of protection is lost. The degree of protection only relates to the motor itself, not to mounted components such as, for example, a gearbox.

Special compressed air must be used:

Nominal pressure	[bar] [PSI]	0.1 ... 0.3 (1.45 ... 4.35)
Maximum air pressure	[bar] [PSI]	0.4 (5.8)
Permissible humidity	[%]	20 ... 30
Other properties of the compressed air		Free from dust, free from oil

Tightening torque and property class of screws used

Tightening torque of housing screws M3	[Nm] (lb•in)	1 (8.85)
Tightening torque of housing screws M4	[Nm] (lb•in)	1.5 (13.28)
Tightening torque of housing screws M5	[Nm] (lb•in)	5 (44.3)
Tightening torque protective ground conductor M4	[Nm] (lb•in)	2.9 (25.7)
Property class of the screws	H	8.8

Table 1: Tightening torques and property classes

Approved drives You may only use drives that are approved for the corresponding BMP motor. See "1.5 Permissible product combinations" for a list of permissible product combinations.

3.2 Motor-specific data

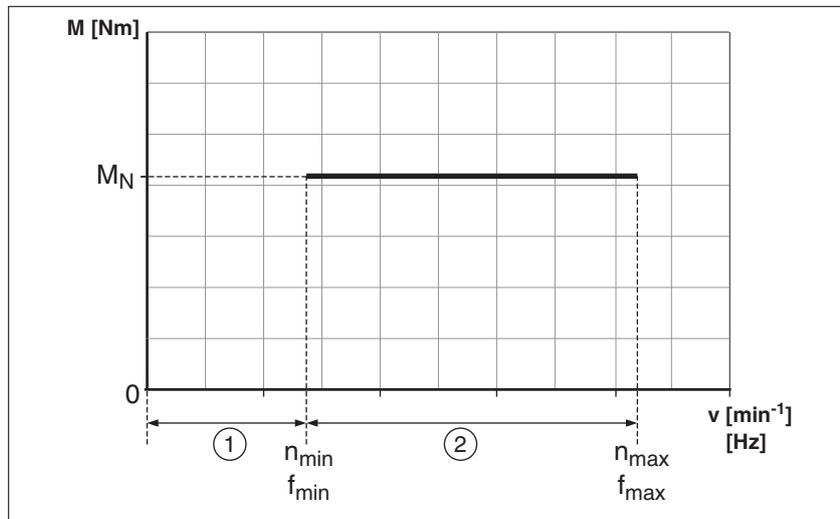


Figure 2: Characteristic curve BMP

- (1) The range is only permissible during acceleration phases and deceleration phases.
The range must be left as quickly as possible. Other ranges of the speed of rotation can be optimized by adjusting the default values in the configuration file, see "5 Commissioning".
- (2) Continuous operation with the default values from the configuration file.

3.2.1 Motor data per drive

Motor type			BMP0701F	BMP0701R
Drive			ATV32H037N4	ATV32H037M2
Nominal torque	M_N	[Nm]	1.18	1.18
Peak torque	M_{max}	[Nm]	3.16	3.70
Nominal current	I_N	[A _{rms}]	0.80	1.45
Maximum current	I_{max}	[A _{rms}]	2.30	5.00
Nominal speed of rotation	n_N	[min ⁻¹]	3000	3000
Maximum speed of rotation	n_{max}	[min ⁻¹]	3600	3600
Minimum speed of rotation	n_{min}	[min ⁻¹]	720	510
Nominal frequency	f_N	[Hz]	250	250
Maximum frequency	f_{max}	[Hz]	300	300
Minimum frequency	f_{min}	[Hz]	60	43
Nominal power	P_N	[kW]	0.37	0.37
Maximum winding voltage	U_{max}	[V _{ac}]	480	230
Torque constant	k_t	[Nm/A]	1.48	0.81
Winding resistance	R_{20}	[Ω]	17.75	5.37
Winding inductance	L_q	[mH]	40.03	12.15
Winding inductance	L_d	[mH]	40.03	12.15
Rotor inertia without holding brake	J_M	[kgcm ²]	0.59	0.59
Mass without holding brake	m	[kg]	1.60	1.60

Motor type			BMP0702F	BMP0702R
Drive			ATV32H055N4	ATV32H055M2
Nominal torque	M_N	[Nm]	1.75	1.75
Peak torque	M_{max}	[Nm]	4.24	4.54
Nominal current	I_N	[A _{rms}]	1.16	2.08
Maximum current	I_{max}	[A _{rms}]	2.90	5.60
Nominal frequency	f_N	[Hz]	250	250
Maximum frequency	f_{max}	[Hz]	300	300
Minimum frequency	f_{min}	[Hz]	25	25
Nominal speed of rotation	n_N	[min ⁻¹]	3000	3000
Maximum speed of rotation	n_{max}	[min ⁻¹]	3600	3600
Minimum speed of rotation	n_{min}	[min ⁻¹]	300	300
Nominal power	P_N	[kW]	0.55	0.55
Maximum winding voltage	U_{max}	[V _{ac}]	480	230
Torque constant	k_t	[Nm/A]	1.51	0.84
Winding resistance	R_{20}	[Ω]	6.96	2.19
Winding inductance	L_q	[mH]	20.70	6.45
Winding inductance	L_d	[mH]	20.70	6.45
Rotor inertia without holding brake	J_M	[kgcm ²]	1.13	1.13
Mass without holding brake	m	[kg]	1.80	1.80

Motor type			BMP1001F	BMP1001F
Drive			ATV32H075N4	ATV32HU11N4
Nominal torque	M_N	[Nm]	2.39	2.39
Peak torque	M_{max}	[Nm]	5.68	7.06
Nominal current	I_N	[A _{rms}]	1.40	1.40
Maximum current	I_{max}	[A _{rms}]	3.50	4.50
Nominal speed of rotation	n_N	[min ⁻¹]	3000	3000
Maximum speed of rotation	n_{max}	[min ⁻¹]	3600	3600
Minimum speed of rotation	n_{min}	[min ⁻¹]	300	300
Nominal frequency	f_N	[Hz]	250	250
Maximum frequency	f_{max}	[Hz]	300	300
Minimum frequency	f_{min}	[Hz]	25	25
Nominal power	P_N	[kW]	0.75	0.75
Maximum winding voltage	U_{max}	[V _{ac}]	480	480
Torque constant	k_t	[Nm/A]	1.71	1.71
Winding resistance	R_{20}	[Ω]	4.54	4.54
Winding inductance	L_q	[mH]	15.30	15.30
Winding inductance	L_d	[mH]	13.28	13.28
Rotor inertia without holding brake	J_M	[kgcm ²]	3.19	3.19
Mass without holding brake	m	[kg]	3.34	3.34

Motor type			BMP1001R	BMP1002F
Drive			ATV32H075M2	ATV32HU15N4
Nominal torque	M_N	[Nm]	2.39	4.77
Peak torque	M_{max}	[Nm]	5.99	9.33
Nominal current	I_N	[A _{rms}]	2.70	3.05
Maximum current	I_{max}	[A _{rms}]	7.20	6.20
Nominal speed of rotation	n_N	[min ⁻¹]	3000	3000
Maximum speed of rotation	n_{max}	[min ⁻¹]	3600	3600
Minimum speed of rotation	n_{min}	[min ⁻¹]	300	300
Nominal frequency	f_N	[Hz]	250	250
Maximum frequency	f_{max}	[Hz]	300	300
Minimum frequency	f_{min}	[Hz]	25	25
Nominal power	P_N	[kW]	0.75	1.50
Maximum winding voltage	U_{max}	[V _{ac}]	230	480
Torque constant	k_t	[Nm/A]	0.884	1.56
Winding resistance	R_{20}	[Ω]	1.28	1.75
Winding inductance	L_q	[mH]	4.08	7.65
Winding inductance	L_d	[mH]	3.54	6.64
Rotor inertia without holding brake	J_M	[kgcm ²]	3.19	6.28
Mass without holding brake	m	[kg]	3.34	4.92

Motor type			BMP1002R	BMP1002R	BMP1401C
Drive			ATV32HU11M2	ATV32HU15M2	ATV32HU11N4
Nominal torque	M_N	[Nm]	3.50	4.77	7.00
Peak torque	M_{max}	[Nm]	8.43	9.60	13.49
Nominal current	I_N	[A _{rms}]	4.20	5.72	2.29
Maximum current	I_{max}	[A _{rms}]	10.40	12.00	4.50
Nominal speed of rotation	n_N	[min ⁻¹]	3000	3000	1500
Maximum speed of rotation	n_{max}	[min ⁻¹]	3600	3600	1800
Minimum speed of rotation	n_{min}	[min ⁻¹]	300	300	150
Nominal frequency	f_N	[Hz]	250	250	125
Maximum frequency	f_{max}	[Hz]	300	300	150
Minimum frequency	f_{min}	[Hz]	25	25	13
Nominal power	P_N	[kW]	1.10	1.50	1.10
Maximum winding voltage	U_{max}	[V _{ac}]	230	230	480
Torque constant	k_t	[Nm/A]	0.83	0.83	3.06
Winding resistance	R_{20}	[Ω]	0.53	0.53	2.56
Winding inductance	L_q	[mH]	2.18	2.18	23.33
Winding inductance	L_d	[mH]	1.89	1.89	19.40
Rotor inertia without holding brake	J_M	[kgcm ²]	6.28	6.28	16.46
Mass without holding brake	m	[kg]	4.92	4.92	8.00

Motor type			BMP1401C	BMP1401F	BMP1401F
Drive			ATV32HU15N4	ATV32HU11M2	ATV32HU15M2
Nominal torque	M_N	[Nm]	7.00	7.00	7.00
Peak torque	M_{max}	[Nm]	18.05	15.95	18.15
Nominal current	I_N	[A _{rms}]	2.29	4.42	4.42
Maximum current	I_{max}	[A _{rms}]	6.20	10.40	12.00
Nominal speed of rotation	n_N	[min ⁻¹]	1500	1500	1500
Maximum speed of rotation	n_{max}	[min ⁻¹]	1800	1800	1800
Minimum speed of rotation	n_{min}	[min ⁻¹]	150	150	150
Nominal frequency	f_N	[Hz]	125	125	125
Maximum frequency	f_{max}	[Hz]	150	150	150
Minimum frequency	f_{min}	[Hz]	13	13	13
Nominal power	P_N	[kW]	1.10	1.10	1.10
Maximum winding voltage	U_{max}	[V _{ac}]	480	230	230
Torque constant	k_t	[Nm/A]	3.06	1.58	1.58
Winding resistance	R_{20}	[Ω]	2.56	0.70	0.70
Winding inductance	L_q	[mH]	23.33	6.23	6.23
Winding inductance	L_d	[mH]	19.40	5.18	5.18
Rotor inertia without holding brake	J_M	[kgcm ²]	16.46	16.46	16.46
Mass without holding brake	m	[kg]	8.00	8.00	8.00

Motor type			BMP1401F	BMP1401R	BMP1402C
Drive			ATV32HU22N4	ATV32HU22M2	ATV32HU22N4
Nominal torque	M_N	[Nm]	6.37	6.37	14.01
Peak torque	M_{max}	[Nm]	12.65	13.28	23.51
Nominal current	I_N	[A _{rms}]	4.12	7.74	4.83
Maximum current	I_{max}	[A _{rms}]	8.30	16.50	8.30
Nominal speed of rotation	n_N	[min ⁻¹]	3000	3000	1500
Maximum speed of rotation	n_{max}	[min ⁻¹]	3600	3600	3600
Minimum speed of rotation	n_{min}	[min ⁻¹]	150	300	150
Nominal frequency	f_N	[Hz]	250	250	125
Maximum frequency	f_{max}	[Hz]	300	300	300
Minimum frequency	f_{min}	[Hz]	25	25	13
Nominal power	P_N	[kW]	2.00	2.00	2.20
Maximum winding voltage	U_{max}	[V _{ac}]	480	230	480
Torque constant	k_t	[Nm/A]	1.55	0.82	2.90
Winding resistance	R_{20}	[Ω]	0.70	0.20	1.24
Winding inductance	L_q	[mH]	6.23	1.76	15.52
Winding inductance	L_d	[mH]	5.18	1.47	13.86
Rotor inertia without holding brake	J_M	[kgcm ²]	16.46	16.46	32.00
Mass without holding brake	m	[kg]	8.00	8.00	12.00

Motor type			BMP1402F	BMP1402F	BMP1402F
Drive			ATV32HU22M2	ATV32HU30N4	ATV32HU40N4
Nominal torque	M_N	[Nm]	14.01	9.55	9.55
Peak torque	M_{max}	[Nm]	24.34	15.84	20.83
Nominal current	I_N	[A _{rms}]	9.24	6.45	6.45
Maximum current	I_{max}	[A _{rms}]	16.50	10.70	14.30
Minimum speed of rotation	n_{min}	[min ⁻¹]	150	300	300
Nominal speed of rotation	n_N	[min ⁻¹]	1500	3000	3000
Maximum speed of rotation	n_{max}	[min ⁻¹]	1800	3600	3600
Minimum frequency	f_{min}	[Hz]	13	25	25
Nominal frequency	f_N	[Hz]	125	250	250
Maximum frequency	f_{max}	[Hz]	150	300	300
Nominal power	P_N	[kW]	2.20	3.00	3.00
Maximum winding voltage	U_{max}	[V _{ac}]	230	480	480
Torque constant	k_t	[Nm/A]	1.52	1.48	1.48
Winding resistance	R_{20}	[Ω]	0.34	0.34	0.34
Winding inductance	L_q	[mH]	4.23	4.23	4.23
Winding inductance	L_d	[mH]	3.78	3.78	3.78
Rotor inertia without holding brake	J_M	[kgcm ²]	32.00	32.00	32.00
Mass without holding brake	m	[kg]	12.00	12.00	12.00

3.3 Dimensions

Dimensions BMP070

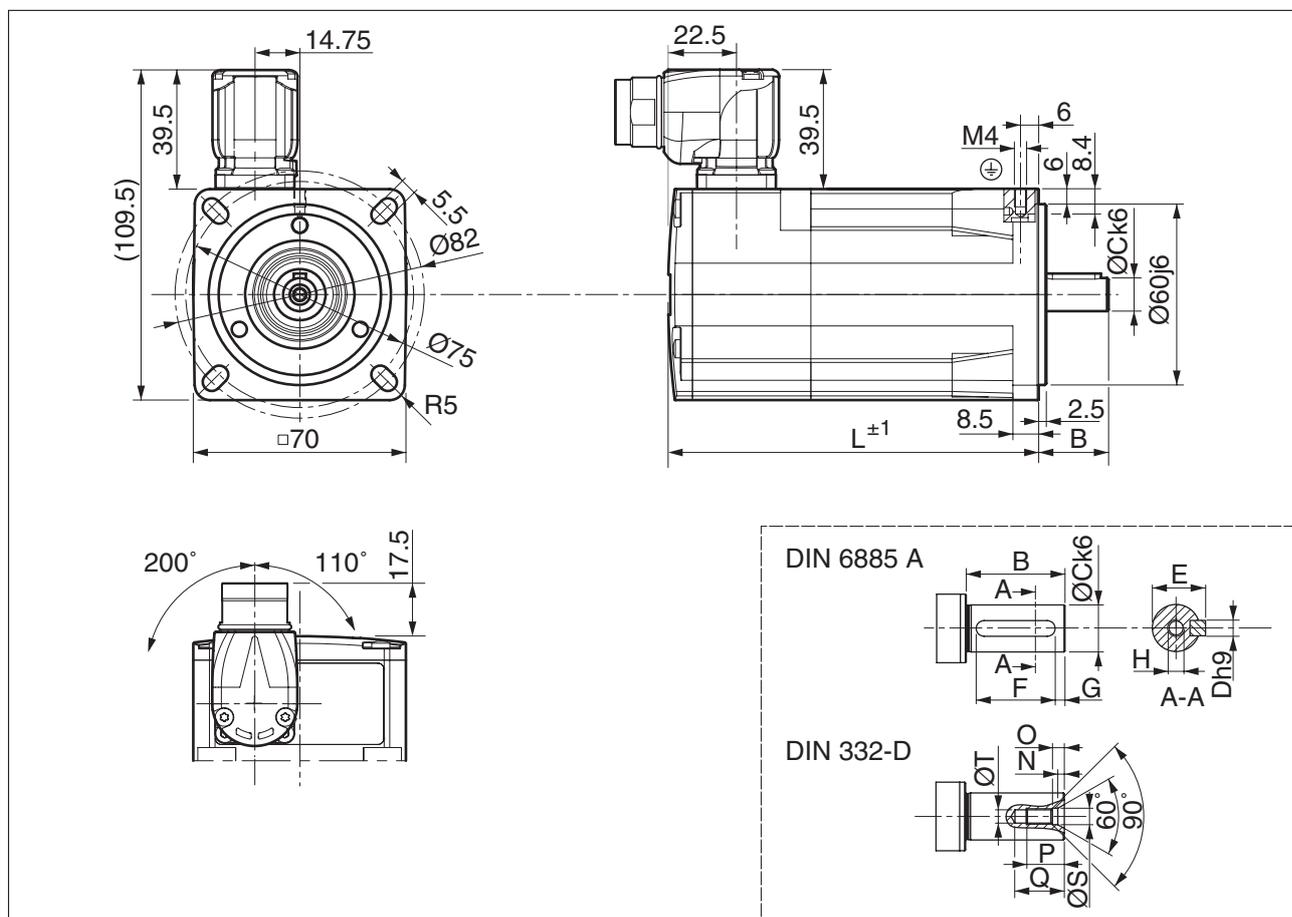


Figure 3: Dimensions BMP070

			BMP0701	BMP0702	BMP0703
L	Length	[mm]	122	154	186
B	Shaft length	[mm]	23	23	30
C	Shaft diameter	[mm]	11	11	14
D	Width of parallel key	[mm]	4	4	5
E	Shaft width with parallel key	[mm]	12.5	12.5	16
F	Length of parallel key	[mm]	18	18	20
G	Distance parallel key to shaft end	[mm]	2.5	2.5	5
	Parallel key		DIN 6885-A4x4x18	DIN 6885-A4x4x18	DIN 6885-A4x4x20
H	Female thread of shaft		M4	M4	M5
N		[mm]	2.1	2.1	2.4
O		[mm]	3.2	3.2	4
P		[mm]	10	10	12.5
Q		[mm]	14	14	17
S		[mm]	4.3	4.3	5.3
T		[mm]	3.3	3.3	4.2

Dimensions BMP100

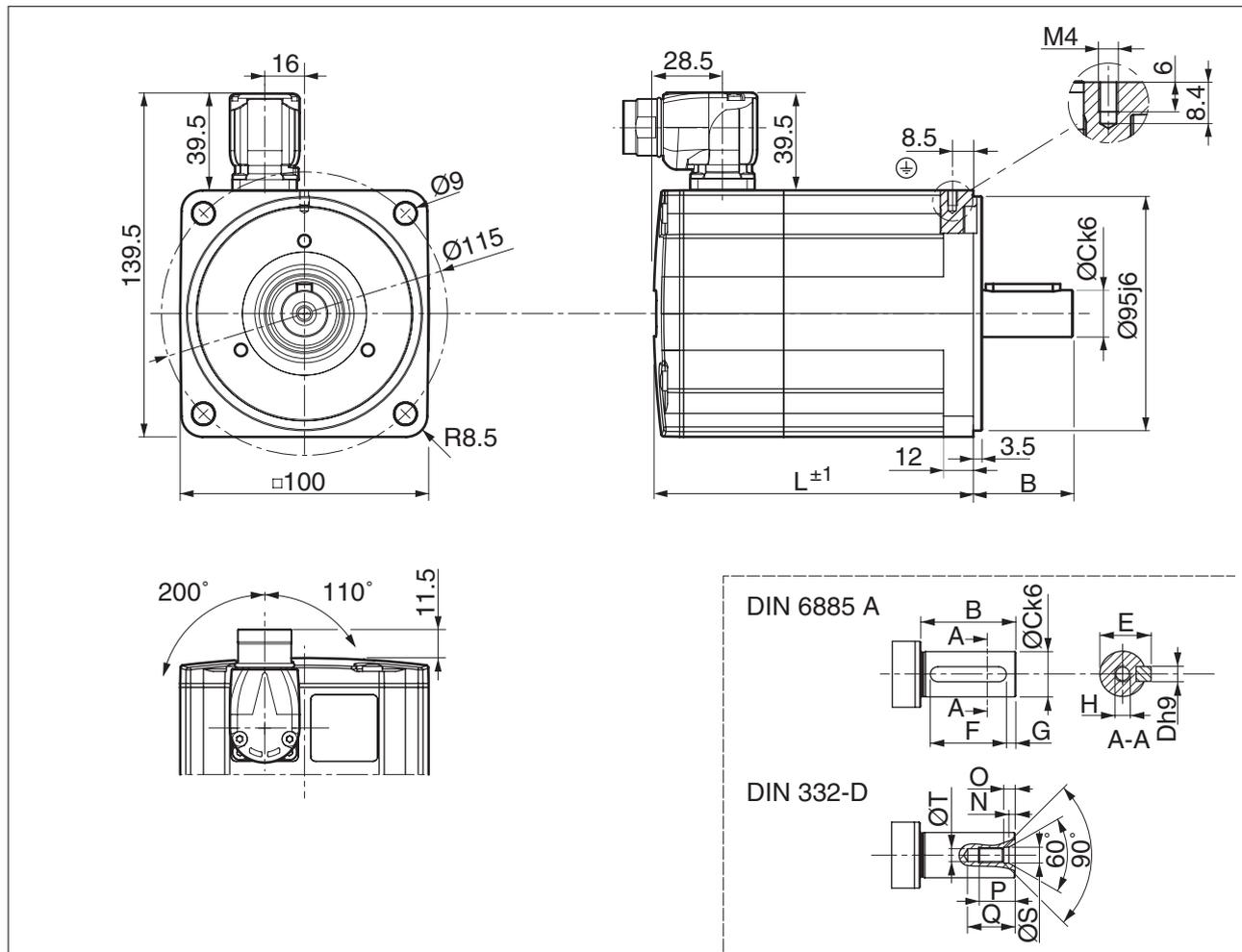


Figure 4: Dimensions BMP100

			BMP1001	BMP1002	BMP1003
L	Length	[mm]	128.6	160.6	192.6
B	Shaft length	[mm]	40	40	40
C	Shaft diameter	[mm]	19	19	19
D	Width of parallel key	[mm]	6	6	6
E	Shaft width with parallel key	[mm]	21.5	21.5	21.5
F	Length of parallel key	[mm]	30	30	30
G	Distance parallel key to shaft end	[mm]	5	5	5
	Parallel key		DIN 6885-A6x6x30	DIN 6885-A6x6x30	DIN 6885-A6x6x30
H	Female thread of shaft		M6	M6	M6
N		[mm]	2.8	2.8	2.8
O		[mm]	5	5	5
P		[mm]	16	16	16
Q		[mm]	21	21	21
S		[mm]	6.4	6.4	6.4
T		[mm]	5	5	5

Dimensions BMP140

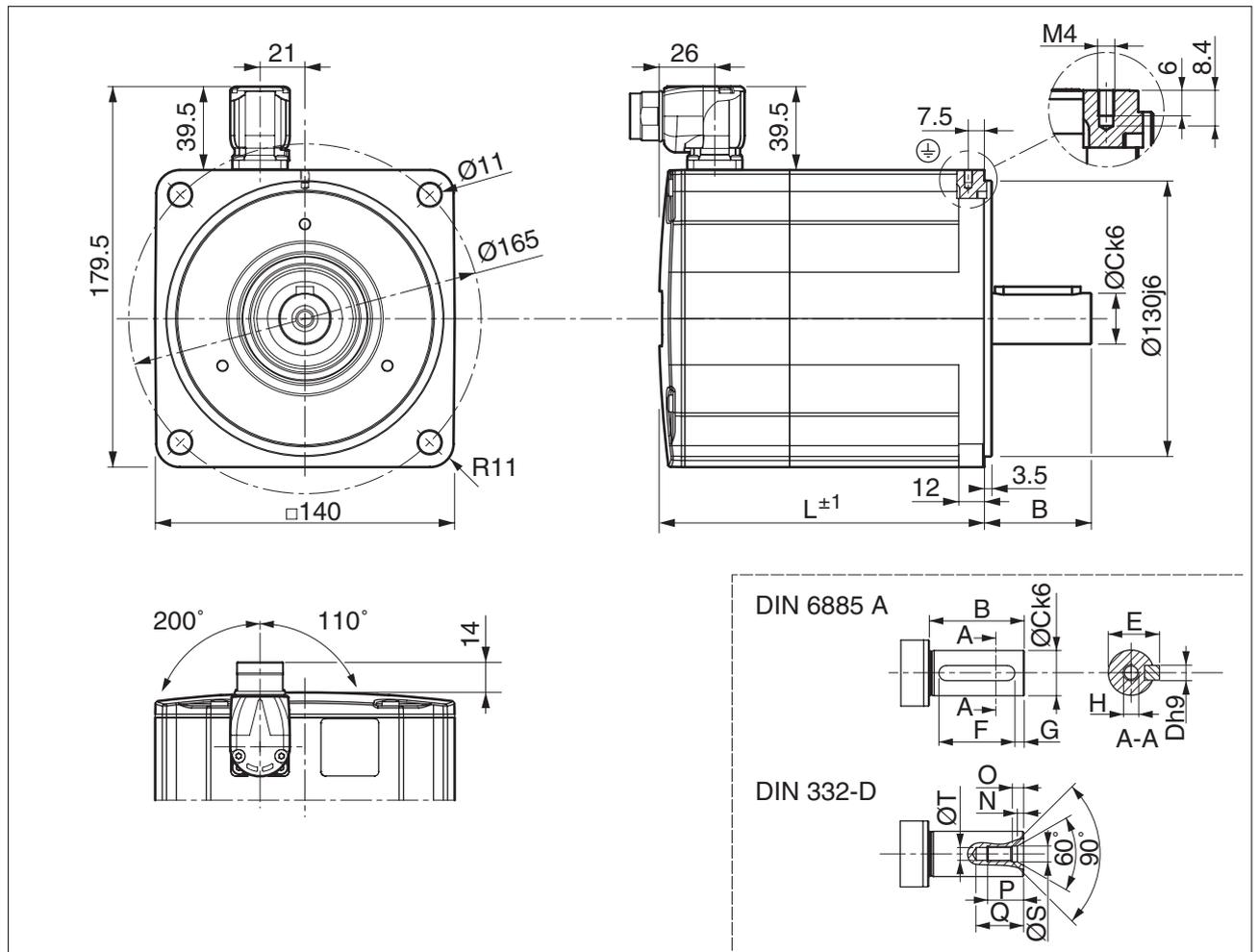


Figure 5: Dimensions BMP140

			BMP1401	BMP1402	BMP1403
L	Length	[mm]	152	192	232
B	Shaft length	[mm]	50	50	50
C	Shaft diameter	[mm]	24	24	24
D	Width of parallel key	[mm]	8	8	8
E	Shaft width with parallel key	[mm]	27	27	27
F	Length of parallel key	[mm]	40	40	40
G	Distance parallel key to shaft end	[mm]	5	5	5
	Parallel key		DIN 6885-A8x7x40	DIN 6885-A8x7x40	DIN 6885-A8x7x40
H	Female thread of shaft		M8	M8	M8
N		[mm]	3.3	3.3	3.3
O		[mm]	6	6	6
P		[mm]	19	19	19
Q		[mm]	25	25	25
S		[mm]	8.4	8.4	8.4
T		[mm]	6.8	6.8	6.8

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3.4 Shaft-specific data

▲ WARNING

UNINTENDED BEHAVIOR CAUSED BY MECHANICAL DAMAGE TO THE MOTOR

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

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

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

3.4.1 Force for pressing on

Maximum force during pressing on

The force applied during pressing on must not exceed the maximum permissible axial force, see chapter "3.4.2 Shaft load". Applying assembly paste (such as Klüberpaste 46 MR 401) to the shaft and the component to be mounted reduces friction and mechanical impact on the surfaces.

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

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

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

BMP...		070	100	140
	[N] (lb)	80 (18)	160 (36)	300 (65)

3.4.2 Shaft load

The following conditions apply:

- The permissible force applied during pressing on must not be exceeded.
- Radial and axial limit loads must not be applied simultaneously
- Nominal bearing service life in operating hours at a probability of failure of 10% ($L_{10h} = 20000$ hours)
- Mean speed of rotation $n = 4000 \text{ min}^{-1}$
- Ambient temperature = $40 \text{ }^{\circ}\text{C}$
- Peak torque = Duty types S3 - S8, 10% duty cycle
- Nominal torque = Duty type S1, 100% duty cycle

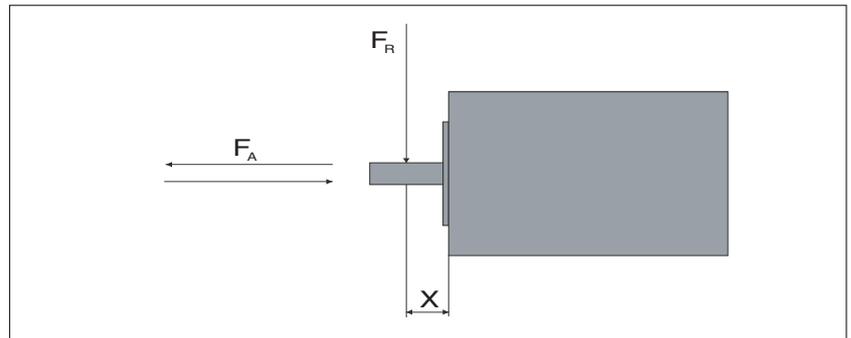


Figure 6: Shaft load

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

Motor version		Values for "X"
BMP0701 and BMP0702	[mm]	11.5
BMP0703	[mm]	15
BMP100	[mm]	20
BMP140	[mm]	25

The following table shows the maximum radial shaft load F_R .

BMP...		070 1	070 2	070 3	100 1	100 2	100 3	140 1	140 2	140 3
1000 min ⁻¹	[N]	660	710	730	900	990	1050	1930	2240	2420
2000 min ⁻¹	[N]	520	560	580	720	790	830	1530	1780	1920
3000 min ⁻¹	[N]	460	490	510	630	690	730	1340	1550	1670
4000 min ⁻¹	[N]	410	450	460	570	620	660	-	-	-

The following table shows the maximum axial shaft load F_A .

BMP...		070 1	070 2	070 3	100 1	100 2	100 3	140 1	140 2	140 3
1000 min ⁻¹	[N]	132	142	146	180	198	210	386	448	484
2000 min ⁻¹	[N]	104	112	116	144	158	166	306	356	384
3000 min ⁻¹	[N]	92	98	102	126	138	146	268	310	334
4000 min ⁻¹	[N]	82	90	92	114	124	132	-	-	-

3.5 Conditions for UL 1004

PELV power supply Use only power supply units that are approved for overvoltage category III.

Wiring Use at least 60/75 °C copper conductors.

3.6 Certifications

Product certifications:

Certified by	Assigned number	Validity
UL	File E 208613	-

3.7 Declaration of conformity



SCHNEIDER ELECTRIC MOTION DEUTSCHLAND GmbH
Breslauer Str. 7 D-77933 Lahr

EC DECLARATION OF CONFORMITY
YEAR 2011

according to EC Directive on Machinery 2006/42/EC
 according to EC Directive EMC 2004/108/EC
 according to EC Directive Low Voltage 2006/95/EC

We hereby declare that the products listed below meet the requirements of the EC Directives indicated with respect to design, construction and version distributed by us. This declaration becomes invalid in the case of any modification to the products not authorized by us.

Designation:	AC Synchronous motor
Type:	BMP070, BMP100, BMP140
Applied harmonized standards, especially:	EN 60034-1:2004 Thermal class 155 EN 60034-5:2001 Degree of protection according product documentation EN 61800-5-1:2007
Applied national standards and technical specifications, especially:	UL 1004 Product documentation

Schneider Electric Motion Deutschland GmbH

Company stamp: **Postfach 11 80 • D-77901 Lahr
Breslauer Str. 7 • D-77933 Lahr**

Date/Signature: 17 October 2011 

Name/Department: Michael Kunz/R & D

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4 Installation

4

⚠ WARNING

GREAT MASS OR FALLING PARTS

The motor can have an unexpectedly great mass.

- Consider the mass of the motor when mounting it. It may be necessary to use a suitable crane.
- Use personal protective equipment (for example, safety shoes and protective gloves).
- Mount the motor in such a way (tightening torque, securing screws) that it cannot come loose even in the case of fast acceleration or continuous vibration.

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

⚠ WARNING

STRONG ELECTROMAGNETIC FIELDS

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

- Keep persons with implants such as pacemakers away from the motor.
- Do not place any sensitive devices close to the motor.

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

⚠ WARNING

UNEXPECTED BEHAVIOR CAUSED BY DAMAGE OR FOREIGN OBJECTS

Damage to the product as well as foreign objects, deposits or humidity can cause unexpected behavior.

- Do not use damaged products.
- Keep foreign objects from getting into the product.
- Verify correct seat of seals and cable entries.

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

▲ WARNING**HOT SURFACES**

The heat sink at the product may heat up to over 100°C (212°F) during operation.

- Avoid contact with the hot heat sink.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity.
- Consider the measures for heat dissipation described.

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

▲ CAUTION**DAMAGE CAUSED BY IMPROPER APPLICATION OF FORCES**

If the motor is improperly subjected to loads, it can be damaged or fall down.

- Do not step onto the motor.
- Avoid improper use by means of safeguards at the machine or safety instructions.

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

4.1 Overview of procedure

Chapter	Page
"4.2 Electromagnetic compatibility, EMC"	41
"4.3 Before mounting"	43
"4.4 Mounting the motor "	48

- ▶ Finally, verify proper installation.

4.2 Electromagnetic compatibility, EMC

⚠ WARNING

SIGNAL AND DEVICE INTERFERENCE

Signal interference can cause unexpected responses of the device.

- Install the wiring in accordance with the EMC requirements.
- Verify compliance with the EMC requirements.

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



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

EMC requirement: Route motor cable separately

When planning the wiring, take into account the fact that the motor cable must be routed separately. The motor cable must be separate from the mains cable or the signal wires.

Motor cables In terms of EMC, motor cables are especially critical. Use only pre-assembled cables or cables that comply with the specifications and implement the EMC measures described below.

EMC measures	Effect
Keep cables as short as possible. Do not install unnecessary cable loops, use short cables from the central grounding point in the control cabinet to the external ground connection.	Reduces capacitive and inductive interference.
Ground the product via the motor flange or with a ground strap to the ground connection at the cover of the connector housing.	Reduces emissions, increases immunity.
Connect large surface areas of cable shields, use cable clamps and ground straps.	Reduces emissions.
Do not install switching elements in motor cables.	Reduces interference.
Route the motor cable at a distance of at least 20 cm from the signal cable or use shielding plates between the motor cable and signal cable.	Reduces mutual interference
Route the motor cable without cutting it. ¹⁾	Reduces emission.

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

Pre-assembled connection cables (accessories) Use pre-assembled cables to reduce the risk of wiring errors, see chapter "7 Accessories and spare parts".

Place the female connector of the motor cable onto the motor connector and tighten the union nut. Connect the motor cable to the drive according to the wiring diagram of the drive.

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

The equipotential bonding conductor must be rated for the maximum current flowing. Practical experience has shown that the following conductor cross sections can be used:

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

4.3 Before mounting

Checking for damage Damaged products must neither be installed nor operated.

- ▶ Prior to mounting, check the product for visible damage.

Cleaning the shaft The shaft extensions are factory-treated with an anti-corrosive. If output components are glued to the shaft, the anti-corrosive must be removed and the shaft cleaned. If required, use a grease removal agent as specified by the glue manufacturer. If the glue manufacturer does not provide information on grease removal, it is recommended to use acetone.

- ▶ Remove the anti-corrosive. Avoid direct contact of the skin and the sealing material with the anti-corrosive or the cleaning agent.

Mounting surface for flange The mounting surface must be stable, clean, deburred and low-vibration.

- ▶ Verify that the system side meets all requirements in terms of dimensions and tolerances.

Heat dissipation Since these motors have a smaller size and operate without forced cooling, the surface temperature may be higher than that of an asynchronous motor.

- ▶ Provide good heat dissipation (flange, free convection).

Conductor cross sections according to method of installation

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

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

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

1) See chapter "7 Accessories and spare parts" for available cables.

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

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

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

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

Conductor cross sections according to product combination

Drive	Motor	Supply voltage	Power	Cross section ¹⁾
		[V _{ac}]	[kW]	[mm ²]
ATV32H037N4	BMP0701F	400	0.37	1.5
ATV32H037M2	BMP0701R	200	0.37	1.5
ATV32H055N4	BMP0702F	400	0.55	1.5
ATV32H055M2	BMP0702R	200	0.55	1.5
ATV32H075N4	BMP1001F	400	0.75	1.5
ATV32HU11N4	BMP1001F	400	0.75	1.5
ATV32H075M2	BMP1001R	200	0.75	1.5
ATV32H075N4	BMP1002C	400	1.50	1.5
ATV32H075M2	BMP1002F	200	1.10	1.5
ATV32HU15M2	BMP1002R	200	1.50	1.5
ATV32HU11N4	BMP1401C	400	1.10	1.5
ATV32HU15N4	BMP1401C	400	1.10	1.5
ATV32HU11M2	BMP1401F	200	1.10	1.5
ATV32HU15M2	BMP1401F	200	1.10	1.5
ATV32HU22N4	BMP1401F	400	2.00	1.5
ATV32HU22M2	BMP1401R	200	2.00	1.5
ATV32HU22N4	BMP1402C	400	2.20	2.5
ATV32HU22M2	BMP1402F	200	2.20	2.5
ATV32HU30N4	BMP1402F	400	3.00	2.5
ATV32HU40N4	BMP1402F	400	3.00	2.5

1) See chapter "7 Accessories and spare parts" for available cables.

Cable specifications Use pre-assembled cables to reduce the risk of wiring errors. See chapter "7 Accessories and spare parts".

The genuine accessories have the following properties:

Cables with connectors		VW3M5501R•••	VW3M5502R•••
Cable jacket, insulation		PVC orange (RAL 2003), polypropylene (PP)	
Capacitance	[pF/m]	1.5 mm ² = approx. 80 (wire/wire) 1.5 mm ² = approx. 120 (wire/shield) 1 mm ² = approx. 75 (wire/wire) 1 mm ² = approx. 110 (wire/shield) 0.14 mm ² = approx. 50 (wire/wire) 0.14 mm ² = approx. 80 (wire/shield)	2.5 mm ² = approx. 85 (wire/wire) 2.5 mm ² = approx. 130 (wire/shield) 1 mm ² = approx. 70 (wire/wire) 1 mm ² = approx. 100 (wire/shield) 0.14 mm ² = approx. 50 (wire/wire) 0.14 mm ² = approx. 80 (wire/shield)
Number of contacts (shielded ¹⁾)		[(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)]	[(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²) ¹⁾]
Connection version		Motor end 8-pin circular connector M23, other cable end open	
Cable diameter	[mm]	12.4 ± 0.2	14.4 ± 0.3
Minimum bend radius	[mm]	5 times the cable diameter with permanently installed connection 12 times the cable diameter with flexible installation	
Nominal voltage Power wires Signal wires	[V]	600 300	
Maximum orderable length	[m]	50 ²⁾	
Permissible temperature range during operation	[°C]	-40 ... 80 (fixed) -20 ... 80 (moving)	
Certifications / declaration of conformity		UL, cUL, DESINA / CE	

1) The wires for the temperature sensor have an additional shield.

2) Contact your Schneider Electric sales office for longer cables.

Space for connectors

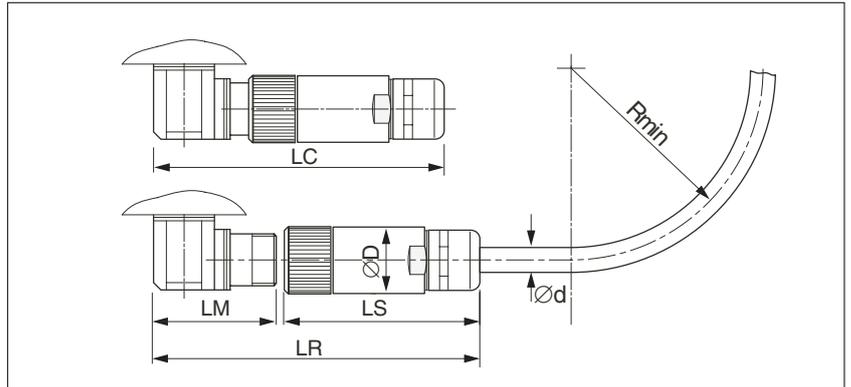


Figure 7: Connector installation space

Dimensions		Motor connectors angular BMP070 ... 140
D	[mm]	28
LS	[mm]	76
LR	[mm]	132
LC	[mm]	114
LM	[mm]	55

Dimensions		Motor cables BMP070 ... 140
d	[mm]	approximately 12 / 14
R _{min}	[mm]	90

4.4 Mounting the motor

WARNING

UNEXPECTED MOVEMENT

If the permissible ambient conditions are exceeded, external substances from the environment may penetrate and cause unexpected movement or equipment damage.

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

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

WARNING

UNINTENDED BEHAVIOR CAUSED BY MECHANICAL DAMAGE TO THE MOTOR

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

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

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

WARNING

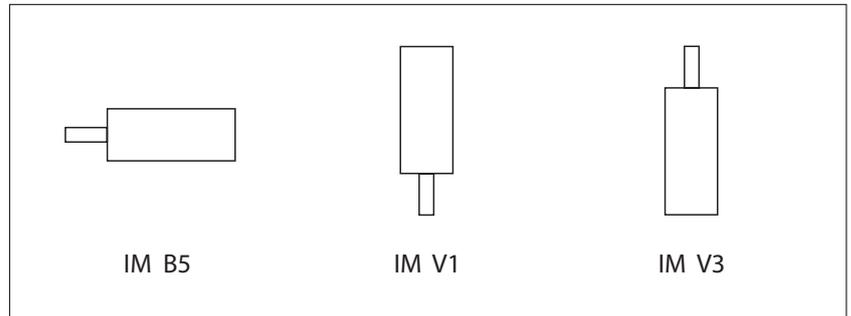
HOT SURFACES

The heat sink at the product may heat up to over 100°C (212°F) during operation.

- Avoid contact with the hot heat sink.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity.
- Consider the measures for heat dissipation described.

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

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



Mounting When the motor is mounted to the mounting surface, it must be accurately aligned (axially and radially) and evenly contact the surface. All mounting screws must be tightened with the specified torque. There must be no tension. See chapter "3 Technical Data" for data, dimensions and degrees of protection.

Mounting output components If output components are not properly mounted, the motor may be damaged. Output components such as pulleys, couplings must be mounted with suitable equipment and tools. The maximum axial and radial forces acting on the shaft must not exceed the maximum shaft load values specified, see "3.4.2 Shaft load".

Observe the mounting instructions provided by the manufacturer of the output component. Motor and output component must be accurately aligned both axially and radially. Failure to follow the instructions will cause runout, damage to the rolling bearings and premature wear.

4.4.1 Installation and connection of IP67 kit (accessory)

The IP67 kit is used to connect compressed air to the motor. Degree of protection IP65 is a prerequisite for the use of the IP67 kit. The compressed air generates a permanent overpressure inside the motor. This overpressure inside the motor is used to obtain degree of protection IP67.

Note the special requirements in terms of the compressed air in chapter "3 Technical Data".

Installation procedure

When the IP67 kit is installed, the existing cover is replaced by the cover of the IP67 kit. The O-ring is also replaced (shipped with the IP67 kit).

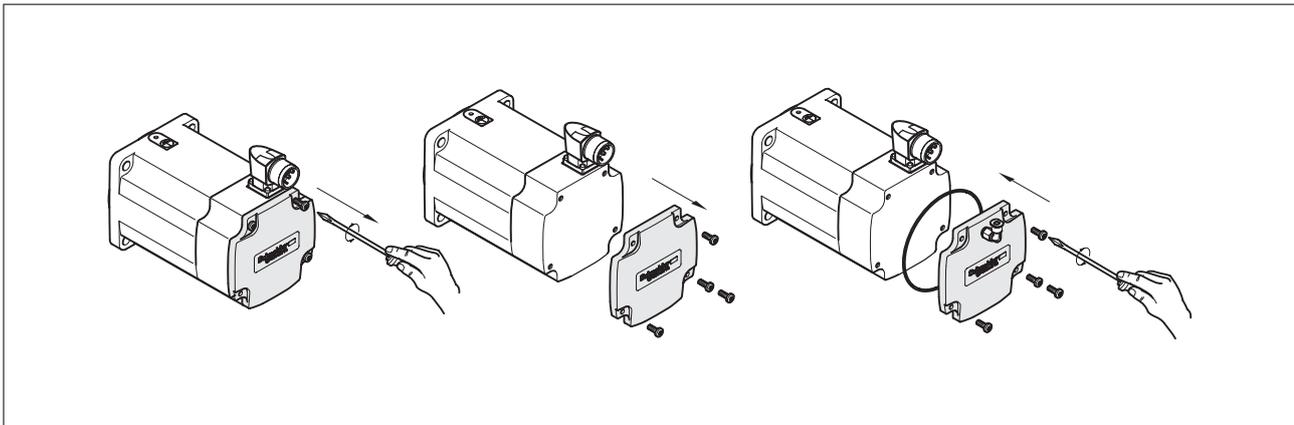


Figure 8: Installation IP67 Kit

- ▶ Loosen the 4 housing screws of the cover.
- ▶ Remove the cover and the O-ring
- ▶ Verify proper seat of the O-ring in the cover of the IP67 kit.

To facilitate mounting of the new O-ring, you may slightly grease the O-ring to hold it in place.

- ▶ Fasten the cover of the IP67 kit with the 4 housing screws. Use the required tightening torque. (Table 1)
- ▶ Verify the tightening torque of the compressed air connection:

Tightening torque compressed air connection	[Nm] (lb•in)	0.6 (5.31)
---	--------------	------------

Compressed air connection

The compressed air connection of the L-shaped push-in fitting is designed for compressed air hoses made of standard plastic with an outside diameter of 4 mm.

Compressed air monitoring

It is recommended to use a compressed air monitor.

4.5 Electrical installation

4.5.1 Connectors and connector assignments

CN1 motor connection M23 Motor connector for connection of the motor phases and the temperature sensors.

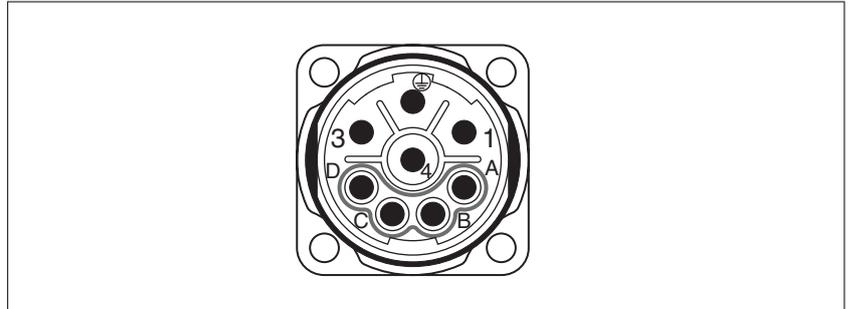


Figure 9: Pin assignment motor connection M23

See chapter "7.2 Connectors" for suitable mating connectors.

The signals of the temperature sensor meet the PELV requirements.

Pin	Assignment	Meaning	Colour ¹⁾
1	U	Motor phase U	BK
⊕	PE	Protective ground conductor	YE
3	W	Motor phase W	BK
4	V	Motor phase V	BK
A	Reserved	Reserved	WH
B	Reserved	Reserved	GY
C	PTC	Temperature sensor ²⁾	BU
D	PTC	Temperature sensor ²⁾	RD
	SHLD	Shield (to connector housing)	-

1) As per IEC 757

2) Additional shield required.

4.5.2 Power connection

⚠ ⚠ DANGER**ELECTRIC SHOCK**

High voltages at the motor connection may occur unexpectedly.

- The motor generates voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors in the motor cable.
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment. Supplement the motor cable grounding conductor with an additional protective ground conductor to the motor housing.

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

⚠ WARNING**UNEXPECTED MOVEMENT**

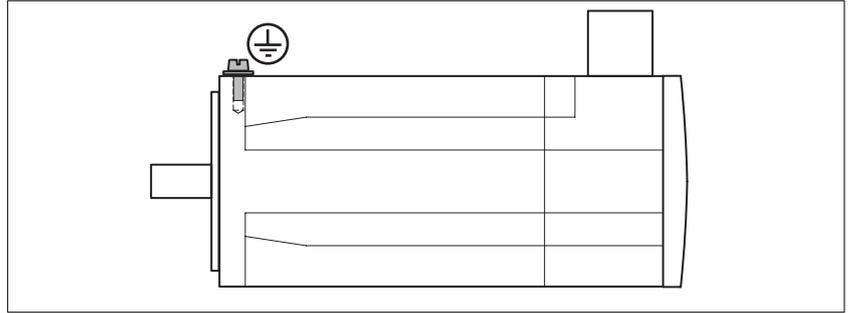
Drive systems may perform unexpected movements because of incorrect connection or other errors.

- Operate the motor with approved power stages only. Even if the connectors of a different power stage match, this does not imply compatibility.
- Verify proper wiring.
- Only start the system if there are no persons or obstructions in the hazardous area.
- Perform the first test runs without coupled loads.
- Do not touch the motor shaft or the mounted output components.

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

The motors are not suitable for direct connection to mains power. The motors must be operated with a suitable power stage.

Protective ground conductor connection



- ▶ Ground the motor via a grounding screw if grounding via the flange and the protective ground conductor of the motor cable is not sufficient. Use parts with suitable corrosion protection. Note the required tightening torque and the property class of the grounding screw, see Table 1 in chapter 21.

Assembling cables Insulate unused wires individually.

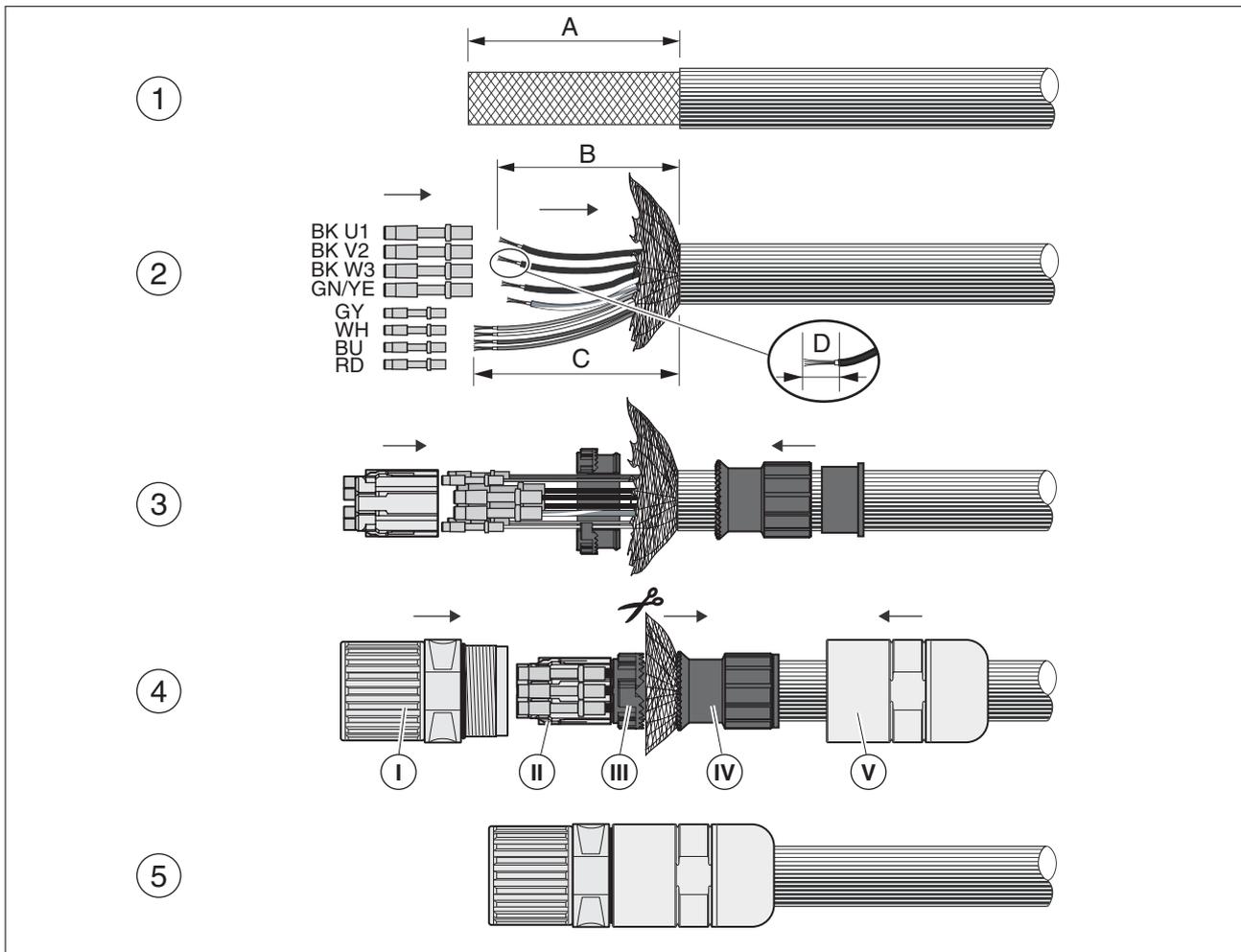


Figure 10: Assembling motor cables with M23 motor connector

- ▶ (1) Strip the cable jacket; length as specified (see Table 2).
- ▶ Open the shield braiding and slide it back over the outer cable jacket.
- ▶ Shorten the inner cable jacket.
- ▶ (2) Shorten the wires to the specified length (see Table 2) and crimp them to the connector.

If possible, also connect unused wires. This improves EMC. Wires that are not connected must be insulated at both ends.

- ▶ (3) Push part (IV) and part (III) onto the cable. Snap the contacts into part (II). Open the side of part (III) and enclose the wires using this part.
- ▶ (4) Slide part (III) behind the shield braiding and insert part (II) into part (I). Arrange the shield braiding as shown. Push part (I) and part (III) together and shorten the shield braiding.
- ▶ Screw part (IV) onto part (I) all the way to the stop.

	Signal wires 0.14 mm ² Verify values	Power wire 1.5 mm ²	Power wire 2.5 mm ²
Stripping length A	40 mm	40 mm	40 mm
Stripping length B	-	36 mm	36 mm
Stripping length C	40 mm	-	-
Stripping length D	4.5 mm	8 mm	8 mm
Crimping tool	SF-Z0007	SF-Z0008	SF-Z0008
Positioner type	SF-Z2002	SF-Z0012	SF-Z0012
Parameters positioner	Fixed	-2	-2
Parameters eccentric	6	4	6

Table 2: Dimensions for crimping and assembling

*Connecting the cables***⚡ ⚠ DANGER****ELECTRIC SHOCK AND FIRE CAUSED BY INCORRECT INSTALLATION OF THE CABLE**

Incorrect installation of the cable may destroy the insulation. Broken conductors in the cable or improperly connected connectors may be melted by arcs.

- Avoid impermissible movements of the cable.
- Avoid forces or movements of the cable at the cable entry.
- Verify that the connector is properly plugged in and locked.

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

- ▶ Place the female connector of the motor cable onto the motor connector and tighten the union nut.
Keep the connection cables from being twisted when tightening the union nut.
- ▶ Connect the motor cable to the drive according to the wiring diagram of the drive.
- ▶ Ground the shield to a large surface area. See the product manual of the drive for information on connecting the shield.

5 Commissioning

5

WARNING

ROTATING PARTS

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

- Verify correct mounting and installation of all rotating parts.
- Use a suitable cover.

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

WARNING

FALLING PARTS

The motor may move, tip and crash down as a result of the reaction torque.

- Mount the motor securely so it will not break loose during strong acceleration.

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

WARNING

HOT SURFACES

The heat sink at the product may heat up to over 100°C (212°F) during operation.

- Avoid contact with the hot heat sink.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity.
- Consider the measures for heat dissipation described.

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

NOTICE**DESTRUCTION DUE TO INCORRECT CONFIGURATION**

Incorrect configuration can cause immediate or later destruction of the product.

- Do not activate the frequency inverter unless you have completed the configuration.
- Load the correct configuration file. (The configuration file also contains internal parameters.)
- When replacing the motor, also verify that you use the correct configuration file.
- Check the accessible parameters.

Failure to follow these instructions can result in equipment damage.

Verifying correct installation

The installation must be checked prior to commissioning.

- ▶ Check the mechanical installation.
- ▶ Check the electrical installation.
- Did you connect all protective ground conductors?
- Did you properly connect and install all cables and connectors?
- Did you tighten the cable glands properly?
- ▶ Check the ambient conditions.
- Does the installation meet the ambient conditions specified?
- ▶ Check the output components.
- Have the installed output components been balanced and accurately aligned?
- ▶ Check the parallel key at the shaft end of the motor.

If you have a motor with a parallel key groove and parallel key, the parallel key must not be inserted during commissioning without output component or it must be appropriately secured.

Prerequisites for commissioning

The bundle ATV32 and BMP can only be configured with the SoMove commissioning software. Prerequisites for commissioning include:

- ATV32 with firmware version $\geq 1.5IE08$
- SoMove with software version $\geq V1.6.0.2$

Commissioning

- ▶ Observe the information ATV32 programming manual of the drive.
- ▶ Load the correct configuration file into the drive. The procedure is described in the online help of the SoMove commissioning software. The SoMove commissioning software and the configuration file can be downloaded at:

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

The configuration file contains internal parameters and accessible parameters required for correct operation of the motor. The internal parameters can only be loaded via the configuration file.

- ▶ After you have loaded the configuration file, you can adjust the accessible parameters. See Table 3 for the default values of the accessible parameters.
- ▶ Perform tuning when the motor is cold.
- ▶ Test the motor under full load (continuous load). Run the test until the temperature of the motor no longer increases.
- ▶ Verify that the motor accelerates and decelerates under all conditions.

5.1 Default values of the accessible parameters

The temperature sensor must be connected. The parameter for the temperature sensor must remain activated, DRI- > CONF > FULL > FLT > PtC- > PtCL > AS and SW2 = PTC.

Drive	Motor	NSPS ¹⁾ n_nom	TFR ¹⁾	TQS ¹⁾	NCRS ¹⁾	SFR ¹⁾	PHS ¹⁾	FAB ¹⁾	BOO ¹⁾
		[min ⁻¹]	[Hz]	[Nm]	[A _{rms}]	[kHz]	[mV _{rms} /mi n ⁻¹]	[Hz]	[%]
ATV32H037N4	BMP0701F	3000	300	1.18	0.80	8	78.00	100	100
ATV32H037M2	BMP0701R	3000	300	1.18	1.45	8	43.50	60	100
ATV32H055N4	BMP0702F	3000	300	1.75	1.16	8	80.00	100	100
ATV32H055M2	BMP0702R	3000	300	1.75	2.08	12	45.50	60	100
ATV32H075N4	BMP1001F	3000	300	2.39	1.40	12	87.50	50	50
ATV32HU11N4	BMP1001F	3000	300	2.39	1.40	12	87.50	50	50
ATV32H075M2	BMP1001R	3000	300	2.39	2.70	12	44.50	60	70
ATV32HU15N4	BMP1002F	3000	300	4.77	3.05	12	85.50	40	100
ATV32HU11M2	BMP1002R	3000	300	3.50	4.20	12	45.00	40	50
ATV32HU15M2	BMP1002R	3000	300	4.77	5.72	12	45.00	40	50
ATV32HU11N4	BMP1401C	1500	150	7.00	2.29	8	145.00	40	70
ATV32HU15N4	BMP1401C	1500	150	7.00	2.29	8	145.00	40	70
ATV32HU11M2	BMP1401F	1500	150	7.00	4.42	8	76.50	40	50
ATV32HU15M2	BMP1401F	1500	150	7.00	4.42	8	77.00	40	50
ATV32HU22N4	BMP1401F	3000	300	6.37	4.12	8	79.50	40	40
ATV32HU22M2	BMP1401R	3000	300	6.37	7.74	8	44.00	40	30
ATV32HU22N4	BMP1402C	1500	150	14.01	4.83	8	164.00	40	50
ATV32HU22M2	BMP1402F	1500	150	14.01	9.24	8	86.00	20	20
ATV32HU30N4	BMP1402F	3000	300	9.55	6.45	8	86.00	20	30
ATV32HU40N4	BMP1402F	3000	300	9.55	6.45	8	86.00	20	30

1) See ATV32 programming manual

Table 3: Default values of the accessible parameters

6 Diagnostics and troubleshooting

6

6.1 Mechanical problems

Error	Cause	Troubleshooting
Excessive heat	Overload Heavy pollution	Reduce load Clean the motor
Whistling or knocking noise	Rolling bearings	Contact service
Grinding noise	Rotating output component grinds	Align output component
Radial oscillation	Poor alignment of output component Output component out of balance Shaft bent Resonance with mounting elements	Align output component Balance output component Contact service Check the stiffness of the motor mounting
Axial oscillation	Poor alignment of output component Shocks of the output component Resonance with mounting elements	Align output component Check output component Check the stiffness of the motor mounting

6.2 Electrical problems

Error	Cause	Troubleshooting
Motor does not start or starts with problems	Overload Unsuitable settings for the drive Cable damaged	Reduce load Check drive settings Check cables and connections
Excessive heat	Overload	Reduce power
Heat at the connection terminals	Connector loose or not tightened	Tighten connector

7 Accessories and spare parts

7

7.1 IP67 Kit

Degree of protection IP65 is a prerequisite for the use of the IP67 kit (shaft sealing ring).

Description	Order no.
IP67 kit for size 070, cover with compressed air connection, O-ring, 4 screws	VW3M2301
IP67 kit for size 100, cover with compressed air connection, O-ring, 4 screws	VW3M2302
IP67 kit for size 140, cover with compressed air connection, O-ring, 4 screws	VW3M2303

7.2 Connectors

Description	Order no.
Motor connector (cable end) M23, 1.5 ... 2.5 mm ² , 5 pcs	VW3M8215

Tools The tools required for cable assembly can be ordered directly from the manufacturer.

- Crimping tool for power connector M23:
Coninvers SF-Z0007, SF-Z0008
www.coninvers.com

7.3 Motor cables

7.3.1 Motor cables 1.5 mm²

Description	Order no.
Motor cable 3 m, [(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5501R30
Motor cable 5 m, [(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5501R50
Motor cable 10 m, [(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5501R100
Motor cable 15 m, [(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5501R150
Motor cable 20 m, [(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5501R200
Motor cable 25 m, [(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5501R250
Motor cable 50 m, [(4 x 1.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5501R500

7.3.2 Motor cables 2.5 mm²

Description	Order no.
Motor cable 3 m, [(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5502R30
Motor cable 5 m, [(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5502R50
Motor cable 10 m, [(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5502R100
Motor cable 15 m, [(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5502R150
Motor cable 20 m, [(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5502R200
Motor cable 25 m, [(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5502R250
Motor cable 50 m, [(4 x 2.5 mm ²) + (2 x 1 mm ²) + (2 x 0.14 mm ²)] shielded; motor end 8-pin circular connector M23, other cable end open	VW3M5502R500

8 Service, maintenance and disposal

8

8.1 Service address



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

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

8.2 Storage

The motors must be transported and stored in a dry, dust-free and vibration-free environment. The ambient conditions and application conditions specified in chapter "3.1 General features" must be met; in case of doubt you must air-condition the storage location.

The storage time is primarily limited by the service life of the lubricants; do not store the product for more than 36 months. It is recommended to periodically operate the drive solution to maintain its operability.

8.3 Maintenance

Repairs may only be made by the manufacturer. No warranty or liability is accepted for repairs made by unauthorized persons.

Repairs cannot be made with the device installed.



Prior to any type of work on the drive system, consult the chapters on Installation and Commissioning for information on the precautions and processes to be observed.

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

Connections and fastening

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

Lubricating the shaft sealing ring

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

*Cleaning***▲ WARNING****UNEXPECTED MOVEMENT**

If the permissible ambient conditions are exceeded, external substances from the environment may penetrate and cause unexpected movement or equipment damage.

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

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

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

Motors are not suitable for cleaning with a pressure washer. The high pressure may force water into the motor.

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

Replacing the rolling bearing

The customer must not replace the rolling bearing. The motor will be partially demagnetized by this procedure and lose power.

8.4 Changing the motor

- ▶ Switch off all supply voltages. Verify that no voltages are present (safety instructions).
- ▶ Label all connections and uninstall the product.
- ▶ Note the identification number and the serial number shown on the product nameplate for later identification.
- ▶ Install the new product as per chapter "4 Installation".
- ▶ Commission the product as per chapter "5 Commissioning".

8.5 Shipping, storage, disposal

Note the ambient conditions in chapter "3.1 General features".

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

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

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

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

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

9 Glossary

9

9.1 Units and conversion tables

The value in the specified unit (left column) is calculated for the desired unit (top row) with the formula (in the field).

Example: conversion of 5 meters [m] to yards [yd]
 $5 \text{ m} / 0.9144 = 5.468 \text{ yd}$

9.1.1 Length

	in	ft	yd	m	cm	mm
in	-	/ 12	/ 36	* 0.0254	* 2.54	* 25.4
ft	* 12	-	/ 3	* 0.30479	* 30.479	* 304.79
yd	* 36	* 3	-	* 0.9144	* 91.44	* 914.4
m	/ 0.0254	/ 0.30479	/ 0.9144	-	* 100	* 1000
cm	/ 2.54	/ 30.479	/ 91.44	/ 100	-	* 10
mm	/ 25.4	/ 304.79	/ 914.4	/ 1000	/ 10	-

9.1.2 Mass

	lb	oz	slug	kg	g
lb	-	* 16	* 0.03108095	* 0.4535924	* 453.5924
oz	/ 16	-	* $1.942559 \cdot 10^{-3}$	* 0.02834952	* 28.34952
slug	/ 0.03108095	/ $1.942559 \cdot 10^{-3}$	-	* 14.5939	* 14593.9
kg	/ 0.45359237	/ 0.02834952	/ 14.5939	-	* 1000
g	/ 453.59237	/ 28.34952	/ 14593.9	/ 1000	-

9.1.3 Force

	lb	oz	p	N
lb	-	* 16	* 453.55358	* 4.448222
oz	/ 16	-	* 28.349524	* 0.27801
p	/ 453.55358	/ 28.349524	-	* $9.807 \cdot 10^{-3}$
N	/ 4.448222	/ 0.27801	/ $9.807 \cdot 10^{-3}$	-

9.1.4 Power

	HP	W
HP	-	* 746
W	/ 746	-

9.1.5 Rotation

	min ⁻¹ (RPM)	rad/s	deg./s
min ⁻¹ (RPM)	-	* $\pi / 30$	* 6
rad/s	* $30 / \pi$	-	* 57.295
deg./s	/ 6	/ 57.295	-

9.1.6 Torque

	lb·in	lb·ft	oz·in	Nm	kp·m	kp·cm	dyne·cm
lb·in	-	/ 12	* 16	* 0.112985	* 0.011521	* 1.1521	* $1.129 \cdot 10^6$
lb·ft	* 12	-	* 192	* 1.355822	* 0.138255	* 13.8255	* $13.558 \cdot 10^6$
oz·in	/ 16	/ 192	-	* $7.0616 \cdot 10^{-3}$	* $720.07 \cdot 10^{-6}$	* $72.007 \cdot 10^{-3}$	* 70615.5
Nm	/ 0.112985	/ 1.355822	/ $7.0616 \cdot 10^{-3}$	-	* 0.101972	* 10.1972	* $10 \cdot 10^6$
kp·m	/ 0.011521	/ 0.138255	/ $720.07 \cdot 10^{-6}$	/ 0.101972	-	* 100	* $98.066 \cdot 10^6$
kp·cm	/ 1.1521	/ 13.8255	/ $72.007 \cdot 10^{-3}$	/ 10.1972	/ 100	-	* $0.9806 \cdot 10^6$
dyne·cm	/ $1.129 \cdot 10^6$	/ $13.558 \cdot 10^6$	/ 70615.5	/ $10 \cdot 10^6$	/ $98.066 \cdot 10^6$	/ $0.9806 \cdot 10^6$	-

9.1.7 Moment of inertia

	lb·in ²	lb·ft ²	kg·m ²	kg·cm ²	kp·cm·s ²	oz·in ²
lb·in ²	-	/ 144	/ 3417.16	/ 0.341716	/ 335.109	* 16
lb·ft ²	* 144	-	* 0.04214	* 421.4	* 0.429711	* 2304
kg·m ²	* 3417.16	/ 0.04214	-	* $10 \cdot 10^3$	* 10.1972	* 54674
kg·cm ²	* 0.341716	/ 421.4	/ $10 \cdot 10^3$	-	/ 980.665	* 5.46
kp·cm·s ²	* 335.109	/ 0.429711	/ 10.1972	* 980.665	-	* 5361.74
oz·in ²	/ 16	/ 2304	/ 54674	/ 5.46	/ 5361.74	-

9.1.8 Temperature

	°F	°C	K
°F	-	(°F - 32) * 5/9	(°F - 32) * 5/9 + 273.15
°C	°C * 9/5 + 32	-	°C + 273.15
K	(K - 273.15) * 9/5 + 32	K - 273.15	-

9.1.9 Conductor cross section

AWG	1	2	3	4	5	6	7	8	9	10	11	12	13
mm ²	42.4	33.6	26.7	21.2	16.8	13.3	10.5	8.4	6.6	5.3	4.2	3.3	2.6

AWG	14	15	16	17	18	19	20	21	22	23	24	25	26
mm ²	2.1	1.7	1.3	1.0	0.82	0.65	0.52	0.41	0.33	0.26	0.20	0.16	0.13

9.2 Terms and Abbreviations

See chapter "2.5 Standards and terminology" for information on the pertinent standards on which many terms are based. Some terms and abbreviations may have specific meanings with regard to the standards.

<i>Axial forces</i>	Tension or compression forces acting longitudinally on the shaft
<i>Centering collar</i>	Centering device at the motor flange that allows for accurate motor mounting.
<i>DOM</i>	Date of manufacturing: The nameplate of the product shows the date of manufacture in the format DD.MM.YY or in the format DD.MM.YYYY. For example: 31.12.11 corresponds to December 31, 2011 31.12.2011 corresponds to December 31, 2011
<i>Degree of protection</i>	The degree of protection is a standardized specification for electrical equipment that describes the protection against the ingress of foreign objects and water (for example: IP 20).
<i>EMC</i>	Electromagnetic compatibility
<i>Error</i>	Discrepancy between a detected (computed, measured or signaled) value or condition and the specified or theoretically correct value or condition.
<i>Error class</i>	Classification of errors into groups. The different error classes allow for specific responses to errors, for example by severity.
<i>Fatal error</i>	In the case of fatal error, the product is no longer able to control the motor so that the power stage must be immediately disabled.
<i>Fault</i>	Fault is a state that can be caused by an error. Further information can be found in the pertinent standards such as IEC 61800-7, ODVA Common Industrial Protocol (CIP).
<i>Fault reset</i>	A function used to restore the drive to an operational state after a detected error is cleared by removing the cause of the error so that the error is no longer active.
<i>Length</i>	In the type code, the length is defined in terms of the number of stacks.
<i>PELV</i>	Protective Extra Low Voltage, low voltage with isolation. For more information: IEC 60364-4-41
<i>Radial forces</i>	Forces that act radially on the shaft
<i>Size</i>	In the type code, the size is defined in terms of the flange size.
<i>Warning</i>	If the term is used outside the context of safety instructions, a warning alerts to a potential problem that was detected by a monitoring function. A warning does not cause a transition of the operating state.

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