ACOPOSmotor Compact

User's manual

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1 Introduction....7
1.1 Manual history....7

2 General safety guidelines....8
2.1 Organization of notices....8
2.2 General information....8
2.3 Qualified personnel....9
2.4 Intended use....9
2.5 Protection against electrostatic discharge....9
2.5.1 Packaging....9
2.5.2 Regulations for proper ESD handling....10
2.6 Transport and storage....10
2.7 Handling and installation....10
2.8 Operation....11
2.8.1 Protection against contact with electrical parts....11
2.8.2 Protection against hazardous movements....12
2.8.3 Protection against burns....12
2.9 Characteristic values of functional safety....12
2.10 Cybersecurity disclaimer for products....13

3 System characteristics....14
3.1 Compact and safe....14
3.2 Decentralized and flexible....15
3.3 Homogeneous and compatible....15
3.4 Cooling....15
3.5 ACOPOSmotor Compact configurations....15

4 Technical data....17
4.1 8D1 order key....17
4.1.1 Construction type (b)....19
4.1.2 Size (c)....19
4.1.3 Length (d)....19
4.1.4 Motor encoder system / Electronics option (e)....21
4.1.5 Nominal speed (f)....21
4.1.6 Motor options (g)....21
4.1.7 Gearbox (h)....24
4.1.8 Gearbox size (i)....25
4.1.9 Gear ratio (j)....26
4.1.10 Gearbox options (k)....27
4.1.11 Special motor options (ll)....27
4.2 Load due to radial and axial force....28
4.3 Status indicators....29
4.3.1 POWERLINK - LED status indicators....29
4.3.2 RDY/ERR - LED status indicators....29
4.3.3 Status changes when starting up the operating system loader....30
4.4 Order data for ACOPOSmotor Compact modules....31
4.5 Technical data....32
4.5.1 General information....32
4.5.2 Inverter module....33
4.5.3 Power dissipation....34
4.5.4 Formula symbols....35
4.6 8D1Ax - Technical data....36
4.6.1 Technical data....36
4.6.2 8D1A22.eIghijkhh-1 - Speed-Torque characteristic curve....36
4.6.3 8D1A23.eDghijkhh-1 - Speed-Torque characteristic curve....37
4.6.4 8D1A23.eHghijkhh-1 - Speed-Torque characteristic curve....37
4.6.5 8D1A33.eBghijkhh-1 - Speed-Torque characteristic curve....38

4.6.6 Permissible shaft load....38
4.7 8D1Bx - Technical data....39
4.7.1 Overview....39
4.7.2 8D1B22.eI - 4,500 rpm (8GM40, gearbox size 060) - Technical data....40
4.7.3 8D1B22.eI - 4,500 rpm (8GM45, gearbox size 067) - Technical data....42
4.7.4 8D1B22.eI - 4,500 rpm (8GM50, gearbox size 070) - Technical data....44
4.7.5 8D1B22.eI - 4,500 rpm (8GM55, gearbox size 060) - Technical data....46
4.7.6 8D1B22.eI - 4,500 rpm (8GG40, gearbox size 064) - Technical data....48
4.7.7 8D1B23.eD - 2,000 rpm (8GM40, gearbox size 060) - Technical data....50
4.7.8 8D1B23.eD - 2,000 rpm (8GM45, gearbox size 067) - Technical data....52
4.7.9 8D1B23.eD - 2,000 rpm (8GM50, gearbox size 070) - Technical data....54
4.7.10 8D1B23.eD - 2,000 rpm (8GM55, gearbox size 060) - Technical data....56
4.7.11 8D1B23.eD - 2,000 rpm (8GG40, gearbox size 064) - Technical data....58
4.7.12 8D1B23.eH - 4,100 rpm (8GM40, gearbox size 060) - Technical data....60
4.7.13 8D1B23.eH - 4,100 rpm (8GM45, gearbox size 067) - Technical data....62
4.7.14 8D1B23.eH - 4,100 rpm (8GM50, gearbox size 070) - Technical data....64
4.7.15 8D1B23.eH - 4,100 rpm (8GM55, gearbox size 060) - Technical data....66
4.7.16 8D1B23.eH - 4,100 rpm (8GG40, gearbox size 064) - Technical data....68
4.7.17 8D1B33.eB - 1,200 rpm (8GM40, gearbox size 080) - Technical data....70
4.7.18 8D1B33.eB - 1,200 rpm (8GM45, gearbox size 067) - Technical data....71
4.7.19 8D1B33.eB - 1,200 rpm (8GM50, gearbox size 070) - Technical data....73
4.7.20 8D1B33.eB - 1,200 rpm (8GM55, gearbox size 060) - Technical data....75
4.7.21 8D1B33.eB - 1,200 rpm (8GG40, gearbox size 064) - Technical data....77
4.8 8D1Cx - Technical data....80
4.8.1 8GP40, gearbox size 060 - Technical data....82
4.8.2 8GP40, gearbox size 080 - Technical data....83
4.8.3 8GP45, gearbox size 067 - Technical data....86
4.8.4 8GP45, gearbox size 089 - Technical data....87
4.8.5 8GP50, gearbox size 070 - Technical data....90
4.8.6 8GP50, gearbox size 090 - Technical data....91
4.8.7 8GP55, gearbox size 060 - Technical data....94
4.8.8 8GP55, gearbox size 080 - Technical data....95
4.8.9 8GP60, gearbox size 070 - Technical data....98
4.8.10 8GP70, gearbox size 070 - Technical data....101
4.8.11 8GF40, gearbox size 064 - Technical data....104
4.8.12 8GF60, gearbox size 064 - Technical data....105
4.8.13 8GF70, gearbox size 064 - Technical data....108
4.8.14 8GA40, gearbox size 060 - Technical data....110
4.8.15 8GA40, gearbox size 080 - Technical data....113
4.8.16 8GA45, gearbox size 067 - Technical data....116
4.8.17 8GA45, gearbox size 089 - Technical data....119
4.8.18 8GA50, gearbox size 070 - Technical data....122
4.8.19 8GA50, gearbox size 090 - Technical data....125
4.8.20 8GA55, gearbox size 064 - Technical data....128
4.8.21 8GA60, gearbox size 070 - Technical data....131
4.9 Dimension diagrams and installation dimensions....133
4.9.1 Overview....133
4.9.2 8D1A2x....134
4.9.3 8D1B2x.xxxBD - 8GM40 gearbox (gearbox size 060)....135
4.9.4 8D1B2x.xxxCF - 8GM45 gearbox (gearbox size 067)....136
4.9.5 8D1B2x.xxxDG - 8GM50 gearbox (gearbox size 070)....137
4.9.6 8D1B2x.xxxED - 8GM55 gearbox (gearbox size 060)....138
4.9.7 8D1B2x.xxxHE - 8GG40 gearbox (gearbox size 064)....139
4.9.8 8D1A3x....140
4.9.9 8D1B3x.xxxBH - 8GM40 gearbox (gearbox size 080)....141
4.9.10 8D1B3x.xxxCI - 8GM45 gearbox (gearbox size 089)....142
4.9.11 8D1B3x.xxxDJ - 8GM50 gearbox (gearbox size 090)....143

4.9.12 8D1B3x.xxxEH - 8GM55 gearbox (gearbox size 080)....144
4.9.13 8D1B3x.xxxHJ - 8GG40 gearbox (gearbox size 090)....145
4.10 Pinouts....146
4.10.1 Hybrid cable - Pinout....146
4.10.2 Electronics option - Pinout....147
4.11 POWERLINK node number setting....147

5 Dimensioning....148
5.1 Power supply....148
5.1.1 Power supply unit....148
5.2 Fuse protection of the power supply cable....148
5.3 Procedure for sizing the DC bus....149
5.3.1 Dimensioning example 1....150
5.3.2 Dimensioning example 2....151
5.4 Procedure for sizing the STO power supply cable....152
5.4.1 Dimensioning example 1....154
5.4.2 Dimensioning example 2....155

6 Installation and connection....156
6.1 Before installation....156
6.2 Safety....156
6.2.1 Noise emissions....156
6.2.2 General sources of danger....156
6.3 Shaft end and bearing....159
6.4 Installing in the system....160
6.4.1 Fasteners and tightening torques....161
6.5 Connecting and disconnecting the motor....161
6.6 Cable clamp and bend radius....162

7 Safety technology....163
7.1 Standard safety technology ("hardwired safety technology")....163
7.1.1 General information....163
7.1.2 Principle - Implementing the safety function....165
7.1.2.1 Additional functions....165
7.1.3 General danger notices....166
7.1.4 Wiring the enable inputs to the required safety category / SIL / PL....168
7.1.4.1 STO, category 3 / SIL 3 / PL e (variant A)....168
7.1.4.2 STO, category 3 / SIL 3 / PL e (variant B)....169
7.1.5 Wiring the enable inputs per required safety category / SIL / PL and functionality (STO, SS1, SS2, SLS, SOS)....171
7.1.5.1 STO, SLS, SOS - Safety category 3 / SIL 3 / PL e....171
7.1.5.2 SS1, SLS, SS2 - Safety category 3 / SIL 3 / PL e (variant A)....173
7.1.5.3 SS1, SLS, SS2 - Safety category 3 / SIL 3 / PL e (variant B)....175
7.1.5.4 STO, SLS, SOS - Safety category 3 / SIL 2 / PL d....178
7.1.5.5 SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant A)....180
7.1.5.6 SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant B)....182

8 Accessories....184
8.1 Cables....184
8.1.1 Hybrid cable....184
8.1.1.1 Power supply cables....184
8.1.1.2 Power cables....186
8.1.2 M8 sensor cables....188
8.1.2.1 Technical data....189
8.1.2.2 X67CA0D40.xxxx....190
8.1.2.3 X67CA0D50.xxxx....190

9 Standards and certifications.....191
9.1 International and national certifications..... 191
9.1.1 EU directives and standards (CE)..... 192
9.1.1.1 Requirements for immunity to interference.....193
9.1.1.2 Emission requirements.....195
9.1.1.3 Climate conditions.....196
9.1.1.4 Electrical safety.....196
9.1.2 UL / CSA - ACOPOSmotor Compact (8D1)..... 197
9.1.3 UKCA..... 197
9.2 Standards and definitions for safety technology.....198

10 Disposal.....200
10.1 Safety..... 200
10.1.1 Protective equipment.....200
10.1.2 Rotor with rare earth magnets..... 200

1 Introduction

1.1 Manual history

Version	Date	Comment[1)]
1.00	October 2023	First edition

1) Editorial corrections are not listed.

2 General safety guidelines

2.1 Organization of notices

Safety notices

Contain **only** information that warns of dangerous functions or situations.

Signal word	Description
Danger!	Failure to observe these safety guidelines and notices will result in death, severe injury or substantial damage to property.
Warning!	Failure to observe these safety guidelines and notices can result in death, severe injury or substantial damage to property.
Caution!	Failure to observe these safety guidelines and notices can result in minor injury or damage to property.
Notice!	Failure to observe these safety guidelines and notices can result in damage to property.

General notices

Contain **useful** information for users and instructions for avoiding malfunctions.

Signal word	Description
Information:	Useful information, application tips and instructions for avoiding malfunctions.

2.2 General information

B&R drive systems and servo motors have been designed, developed and manufactured for conventional use in industrial environments.

They have not been designed, developed and manufactured for use that involves fatal risks or hazards that could result in death, injury, serious physical harm or other loss without the assurance of exceptionally stringent safety precautions.

In particular, these risks include the use of these devices to monitor nuclear reactions in nuclear power plants, in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

Servo drives, inverter modules and frequency inverters from B&R are not dual-use goods per Annex I of Council Regulation (EC) No. 428/2009 | 3A225, amended by Commission Delegated Regulation (EU) No. 2015/2420.
The electrical output frequency of these modules is monitored; if the limit frequency is exceeded, the current movement is aborted and an error is reported.

Servo drives, inverter modules and frequency inverters with the dual-use option are dual-use goods per Annex I of Council Regulation (EC) No. 428/2009 | 3A225, amended by Commission Delegated Regulation (EU) No. 2015/2420.
The electrical output frequency of these modules is not monitored.

Modules with the dual-use option are subject to various export restrictions.

Danger!

Drive systems and servo motors can have exposed parts with voltages applied (e.g. terminals) or hot surfaces. Additional hazards include moving machine parts. The removal of required covers, inappropriate use of the devices or their improper installation or operation can result in severe personal injury or damage to property.

All tasks such as the transport, installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, installation, assembly, commissioning and operation of the product and have the appropriate qualifications for their job. National accident prevention regulations must be observed.

The safety guidelines, information about connection conditions (nameplate and documentation) and limit values specified in the technical data must be read carefully before installation and commissioning and must be strictly observed.

2.3 Qualified personnel

The use of safety-related products is restricted to the following persons:

- Qualified personnel who are familiar with relevant safety concepts for automation technology as well as applicable standards and regulations.
- Qualified personnel who plan, develop, install and commission safety equipment in machines and systems.

Qualified personnel in the context of this manual's safety guidelines are those who, due to their training, experience and instruction combined with their knowledge of relevant standards, regulations, accident prevention guidelines and operating conditions, are qualified to carry out essential tasks and to recognize and avoid potentially dangerous situations.

In this regard, sufficient language skills are also required in order to be able to properly understand this manual.

2.4 Intended use

Servo drives are components intended to be installed in electrical systems or machines. This intended use is prohibited until it has been determined that the machine complies with the regulations of EC directives 2006/42/EC (Machinery Directive) and 2004/108/CE (EMC Directive).

B&R drive systems are only permitted to be directly operated on grounded industrial power systems (TN, TN-C-S network). When used in residential areas, commercial areas or small businesses, additional protective and filtering measures must be implemented by the user.

Danger!

Drive systems are not permitted to be operated directly on TT, IT and corner-grounded TN-S systems!

For technical data as well as specifications for connection and ambient conditions, see the nameplate and user documentation. The connection and ambient conditions must be observed!

Danger!

Electronic devices are generally not failsafe. If the drive systems fails, the user is responsible for making sure that the motor is brought to a secure state.

2.5 Protection against electrostatic discharge

Electrical assemblies that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

2.5.1 Packaging

Electrical assemblies with housing do not require special ESD packaging but must be handled properly (see section 2.5.2 "Regulations for proper ESD handling " on page 10).

Electrical assemblies without a housing are protected by ESD-suitable packaging.

2.5.2 Regulations for proper ESD handling

Electrical assemblies with housing

- Do not touch the connector contacts of connected cables.
- Do not touch the contact tips on circuit boards.

Electrical assemblies without housing

The following applies in addition to "Electrical assemblies with housing":

- All persons handling electrical assemblies and devices in which electrical assemblies are installed must be grounded.
- Assemblies are only permitted to be touched on the narrow sides or front plate.
- Always place assemblies on suitable surfaces (ESD packaging, conductive foam, etc.).
  Metallic surfaces are not suitable surfaces!
- Assemblies must not be subjected to electrostatic discharges (e.g. due to charged plastics).
- A minimum distance of 10 cm from monitors or television sets must be maintained.
- Measuring instruments and devices must be grounded.
- Test probes of floating potential measuring instruments must be discharged briefly on suitable grounded surfaces before measurement.

Individual components

- ESD protective measures for individual components are implemented throughout B&R (conductive floors, shoes, wrist straps, etc.).
- The increased ESD protective measures for individual components are not required for handling B&R products at customer locations.

2.6 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical stress, temperature, humidity, aggressive atmosphere).

Drive systems contain components sensitive to electrostatic charges that can be damaged by inappropriate handling. It is therefore necessary to provide the required protective measures against electrostatic discharge when installing or removing these drive systems.

2.7 Handling and installation

Warning!

B&R drive systems and servo motors can be heavy.

When handling and installing heavy B&R drive systems or servo motors, there is therefore the risk of personal injury or damage to property caused by shearing, impacts, cutting or crushing. If required, use suitable protective equipment (e.g. safety glasses, protective gloves, safety shoes)!

Installation must be performed according to this documentation using suitable equipment and tools.

Devices are only permitted to be installed in a voltage-free state and by qualified personnel. The control cabinet must first be de-energized and secured against being switched on again.

General safety guidelines and national accident prevention regulations (e.g. VBG 4) for working with high voltage systems must be observed.

Electrical installation must be carried out in accordance with relevant regulations (e.g. line cross section, fuse protection, protective ground connection, see also "Dimensionierung" on page).

2.8 Operation

2.8.1 Protection against contact with electrical parts

> **Danger!**
>
> **To operate drive systems, it is necessary for certain parts to carry dangerous voltage levels over 60 VDC. Touching one of these components can result in a life-threatening electric shock. There is a risk of death, serious injury or damage to property.**

Before switching on a drive system, it is important to ensure that the housing is properly connected to ground potential (PE rail). Ground connections must also be made if the drive system is only connected for testing purposes or only operated for a short time!

Before switching on, live parts must be securely covered. All covers and control cabinet doors must be kept closed during operation.

> **Danger!**
>
> **If the safety functions integrated in the drive system are used in an application, then the safety functions must be fully validated before the drive system is switched on for the first time. There is a risk of death, serious injury or damage to property.**

Control and power connections can still be live even if the motor is not rotating. Touching these connections when the power is switched on is prohibited.

Before performing any work on drive systems, they must first be disconnected from the mains and prevented from being switched on again.

> **Danger!**
>
> **Dangerously high voltage!**
>
> **Before starting work, disconnect the power supply and wait 5 minutes to ensure that the capacitors have discharged. Observe regulations!**
> **This delay time of 5 minutes begins as soon as all of the synchronous motors connected to the drive system that has been disconnected from the power supply have come to a standstill. If the synchronous motors are not at standstill when the drive system is disconnected from the power supply, then the delay time must be extended accordingly.**

ACOPOSremote and ACOPOSmotor modules are marked with the following warning label:

Figure 1: Warning label sign on ACOPOSremote and ACOPOSmotor modules

The connections on the drive system for signal voltages in the voltage range 5 to 30 V are safely isolated circuits. The signal voltage connections and interfaces are therefore only permitted to be connected to devices or electrical components that have sufficient isolation in accordance with IEC 60364-4-41 or EN 61800-5-1 and that correspond to SELV / PELV or a protective extra-low voltage of class DVC A per EN 61800-5-1.

Never disconnect the electrical connections of drive systems while voltage is applied. In some cases, electric arcs may occur that can cause personal injury and/or damage to contacts.

2.8.2 Protection against hazardous movements

Danger!

Improper control of motors can result in unintended hazardous movements! Such incorrect behavior can have various causes:

- **Incorrect installation or faults when handling components**
- **Improper or incomplete wiring**
- **Defective devices (drive system, motor, position encoder, cables, brake)**
- **Incorrect control (e.g. caused by software error)**

Several of these fault causes are detected and prevented by the drive system's internal monitoring. Nevertheless, it is still possible for the motor shaft to move any time after the device is switched on! For this reason, higher-level protective measures must be put in place to ensure that personnel and the machine are protected.

The moving parts on machines must be shielded in such a way as to prevent unintentional access by personnel. This type of protection can be achieved by using stable mechanical protective equipment such as protective covers, protective fences, protective gates or photoelectric sensors.

It is prohibited to remove, bypass or circumvent this safety equipment or to remain within the machine's range of movement.

A sufficient number of emergency switch-offs must be installed in the immediate vicinity of the machine and easily accessible at all times. This emergency switch-off equipment must be checked before the machine is commissioned.

On free running motors, the shaft key (if present) must be removed or measures taken to prevent its ejection. The holding brake built into motors cannot prevent hoisting equipment from dropping the suspended load.

2.8.3 Protection against burns

The surfaces of servo drives and servo motors can reach very high temperatures during operation.

The servo drives are therefore marked with the following warning label:

Figure 2: "Hot surface" warning label

Information:

A corresponding "hot surface" warning label is provided with the servo motors. This must be placed so that it is visible at all times when the motor is installed.

2.9 Characteristic values of functional safety

For the characteristic values of individual safety functions, see chapter Sicherheitstechnik.

Characteristic values are calculated based on a proof test interval of max. 20 years. Since no proof test can be carried out for B&R drive systems, the proof test interval also corresponds to the mission time.

Per the EN ISO 13849, EN 62061 and IEC 61508 standards, the safety functions described in chapter Sicherheitstechnik cannot be used beyond the specified mission time.

Danger!

The user must ensure that all B&R drive systems that execute a safety function are replaced by new B&R drive systems or removed from operation before their mission time expires.

2.10 Cybersecurity disclaimer for products

B&R products communicate via a network interface and were developed for secure connection with internal and, if necessary, other networks such as the Internet.

Information:

In the following, B&R products are referred to as "product" and all types of networks (e.g. internal networks and the Internet) are referred to as "network".

It is the sole responsibility of the customer to establish and continuously ensure a secure connection between the product and the network. In addition, appropriate security measures must be implemented and maintained to protect the product and entire network from any security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

B&R Industrial Automation GmbH and its subsidiaries are not liable for damages and/or losses in connection with security breaches, unauthorized access, interference, digital intrusion, data leakage and/or theft of data or information.

The aforementioned appropriate security measures include, for example:

- Segmentation of the network (e.g. separation of the IT network from the control network[1)])
- Use of firewalls
- Use of authentication mechanisms
- Encryption of data
- Use of anti-malware software

Before B&R releases products or updates, they are subjected to appropriate functional testing. Independently of this, we recommend that our customers develop their own test processes in order to be able to check the effects of changes in advance. Such changes include, for example:

- Installation of product updates
- Significant system modifications such as configuration changes
- Deployment of updates or patches for third-party software (non-B&R software)
- Hardware replacement

These tests should ensure that implemented security measures remain effective and that systems in the customer's environment behave as expected.

1) The term "control network" refers to computer networks used to connect control systems. The control network can be divided into zones, and there can be several separate control networks within a company or site. The term "control systems" refers to all types of B&R products such as controllers (e.g. X20), HMI systems (e.g. Power Panel T30), process control systems (e.g. APROL) and supporting systems such as engineering workstations with Automation Studio.

3 System characteristics

3.1 Compact and safe

ACOPOSmotor Compact modules combine the following components in a single compact unit:

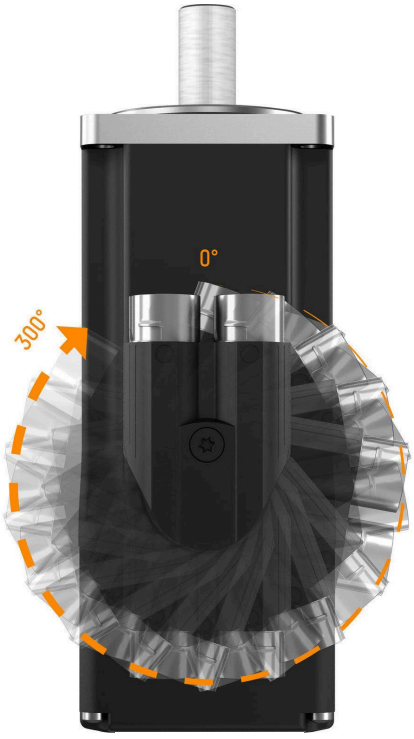
- Servo drive
- Servo motor as an energy transducer
- Built-in position sensor

The ACOPOSmotor Compact module achieves maximum performance through the use of the latest technology in power components with minimal power dissipation as well as from the motor series optimized for this use case.

ACOPOSmotor Compact modules cover a power range of up to 0.35 kW and measure just 60 mm x 90 mm (w x h) in the smallest variant. Despite the compact dimensions, a fully-fledged servo drive is integrated that processes control loops with a cycle time of 50 µs. The devices are optionally available with an integrated gearbox mounting.

Daisy chaining

The devices have two connections for hybrid cables, so only one cable to the control cabinet is required. The hybrid cable ensures the power supply and transfer of POWERLINK data. Additional ACOPOSmotor Compact modules are easily connected via daisy chaining.



ACOPOSmotor Compact modules function over a wide voltage range from 24 to 58 VDC.

Multi-turn and single-turn encoder variants are available.
ACOPOSmotor Compact modules are designed for use in harsh environments. With an oil seal, the device corresponds to IP65 protection. It requires neither fans nor heat sinks.

3.2 Decentralized and flexible

In terms of topology, the ACOPOSmotor Compact module is wired either as a simple line structure or as a tree structure. Node number assignment takes place automatically in the line structure. If the address must still be set, however, this can be done without opening the housing.

The connection to the drive system is made using a hybrid connector. This contains all of the power and signal lines needed to operate the ACOPOSmotor Compact module as well as the POWERLINK network.

With the oil seal option, the high IP65 degree of protection allows ACOPOSmotor Compact modules to be mounted directly on the machine. The control cabinet contains only the power supply modules, high-power inverter modules and the necessary electromechanical components. This makes it much easier to implement modular machine architectures and optional machine functions since they can be easily connected – with the requisite dimensioning of the power supply – to the machine's main line using hybrid cables.

3.3 Homogeneous and compatible

The ACOPOSmotor Compact module provides the familiar functions of the ACOPOS family and therefore fits seamlessly into the drive solution.

3.4 Cooling

ACOPOSmotor Compact modules are self-cooling and have a long, slim design. The modules must be installed on the cooling surface (flange).

3.5 ACOPOSmotor Compact configurations

ACOPOSmotor Compact drive systems have a wide range of technology-specific functions whose performance, flexibility and practicality have now been impressively proven in countless applications. The ACOPOSmotor Compact functions listed below are basic functions that the user can switch between as needed within 400 µs. In addition, manipulations such as changes in product length, registration mark control, overlying torque control, brief process adaptations and quality checks can be carried out at any time.

- Point-to-point
- Electronic gearbox
- Electronic compensation gears
- Cross cutter
- Electronic cams
- Flying saws
- Line shafts
- CNC

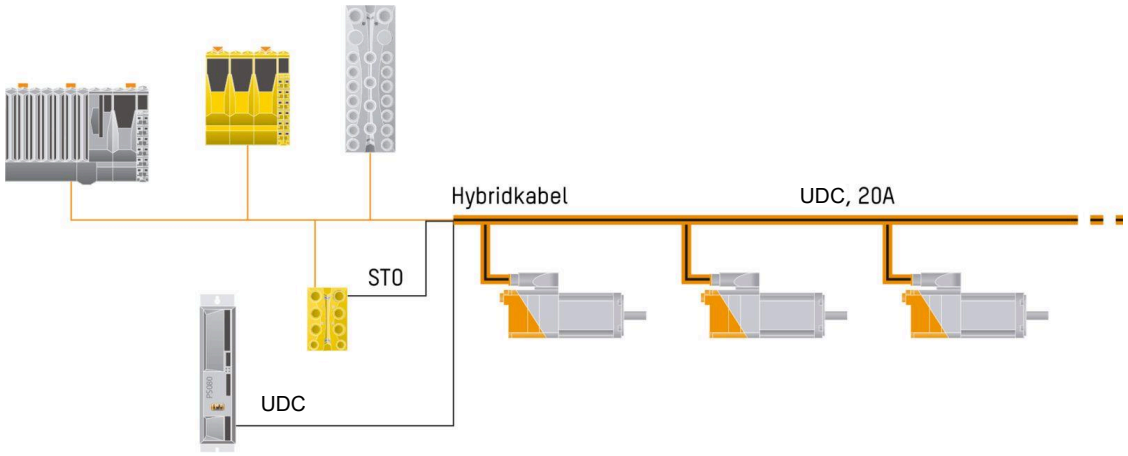
ACOPOSmotor Compact drive systems can be used in various configurations depending on the requirements of the application. The functions listed above are available to the user in each of the topology examples shown.

Reaction speeds are not influenced by the control system being used if technology functions are processed directly on the ACOPOSmotor Compact drive system. Additional sensors and actuators must be integrated in the control system for more complex processes. In these cases, the level of performance depends mostly on the type of network and control system being used. The topology examples shown on the following pages provide an overview of the bandwidths that are possible with B&R automation components.

Topologies

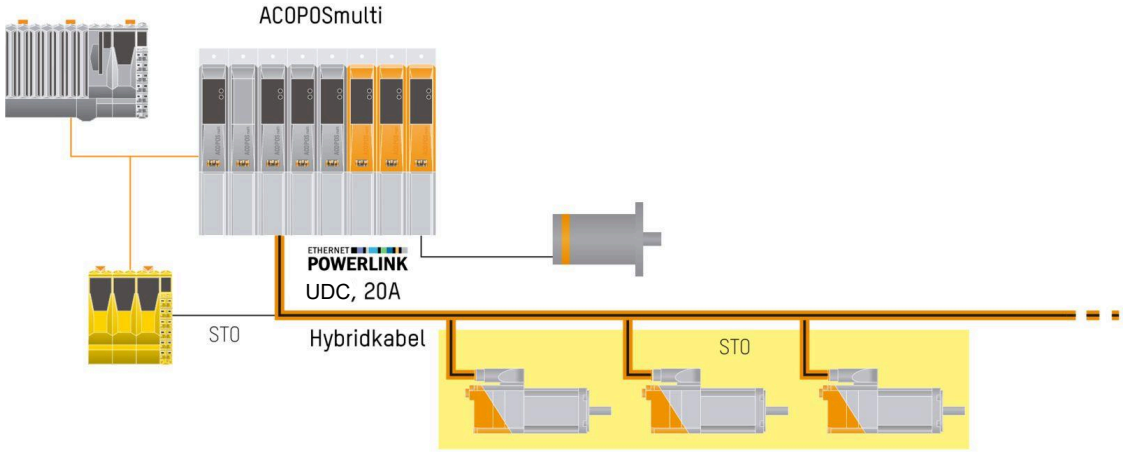
ACOPOSmotor Compact modules do not require an additional servo drive.

ACOPOSmotor Compact modules do not require an additional servo drive and are simply integrated into the POWERLINK network. Power is supplied via an DC power supply unit.



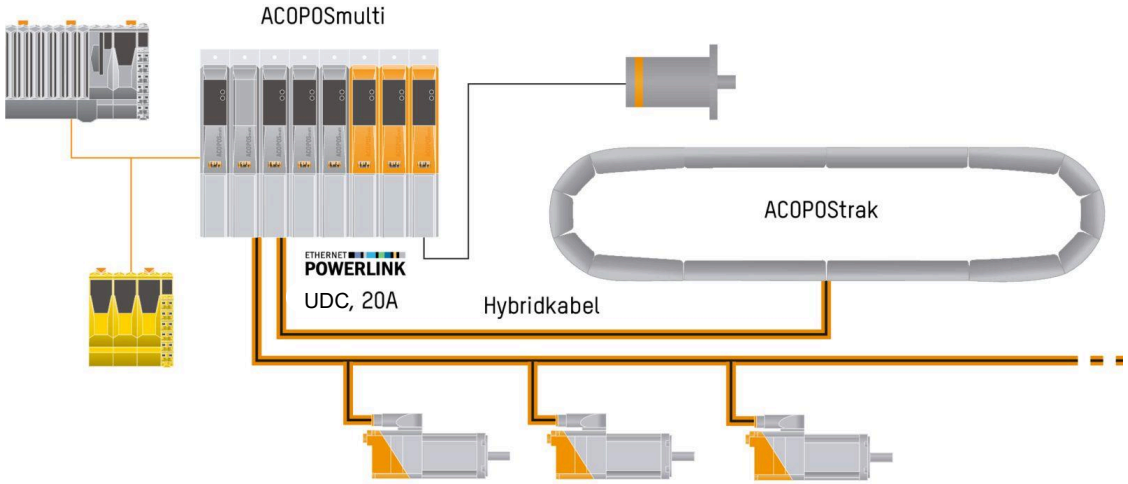
ACOPOSmotor Compact modules can be integrated into ACOPOSmulti architecture.

ACOPOSmotor Compact modules can be integrated into ACOPOSmulti architecture. Power is supplied via the DC bus.



ACOPOSmotor Compact modules can be connected directly to the ACOPOStrak power supply.

ACOPOSmotor Compact modules can be connected directly to the ACOPOStrak power supply. This greatly simplifies the wiring of processing stations on the track system. A separate power supply is not necessary for ACOPOSmotor Compact.



4 Technical data

4.1 8D1 order key

8D1	b	c	d	.	e	f	g	h	i	j	k	ll	-	m

Construction type

A ... Without gearbox
B ... Direct gearbox mounting
C ... Gearbox flanged
see "Construction type (b)" on page 19

Size

Valid values: **2, 3** see "Size (c)" on page 19

Length

Valid values: **2, 3** see "Length (d)" on page 19

Motor encoder system / Electronics option

Valid values: **A, B, G, H** see "Motor encoder system / Electronics option (e)" on page 21

Nominal speed

B ... **1,200 rpm** **D ... 2,000 rpm** **H ... 4,100 rpm** **I ... 4,500 rpm**
see "Nominal speed (f)" on page 21

Motor options

Valid values: **0, 1, 2, 3, 4, 5, 6, 7**
see "Motor options (g)" on page 21

Gearbox

0 ... Without gearbox	**E** ... 8GM55 / 8GP55	**I** ... 8GF60	**M** ... 8GA50
B ... 8GM40 / 8GP40	**F** ... 8GP60	**J** ... 8GF70	**N** ... 8GA55
C ... 8GM45 / 8GP45	**G** ... 8GP70	**K** ... 8GA40	**P** ... 8GA60
D ... 8GM50 / 8GP50	**H** ... 8GG40 / 8GF40	**L** ... 8GA45	see "Gearbox (h)" on page 24

Gearbox size

0 ... Without gearbox	**E** ... 064	**G** ... 070	**I** ... 89
D ... 060	**F** ... 067	**H** ... 080	**J** ... 90

see "Gearbox size (i)" on page 25

Gear ratio

0 ... Without gearbox	**E** ... 007	**I** ... 012	**M** ... 025	**R** ... 50	**V** ... 80
B ... 003	**F** ... 008	**J** ... 015	**N** ... 032	**S** ... 60	**W** ... 100
C ... 004	**G** ... 009	**K** ... 016	**P** ... 035	**T** ... 64	
D ... 005	**H** ... 010	**L** ... 020	**Q** ... 040	**U** ... 70	

see "Gear ratio (j)" on page 26

Gearbox options

0 ... Without gearbox see "Gearbox options (k)" on page 27
Valid values: **0, A, B, C, D, E, F, G, H, I, J, K, L, M, N, P, Q, R, S, T, U**

Special motor options

00 ... No special motor options For 8GA angular planetary gearbox see "Special motor options (ll)" on page 27
Valid values: **00, 0A, 0B, 0C, 0D**

Version

1 ... Version 1 (the motor version is specified as code (m) in the order number)

Note:

Order keys only provide information about possible combinations in exceptional cases. Information about possible combinations is available in the CAD configurator (cad.br-automation.com).

4.1.1 Construction type (b)

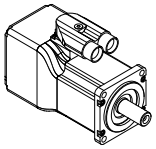
8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

ACOPOSmotor Compact modules are available in 3 different construction types (8D1**A**, 8D1**B** and 8D1**C**).

The construction type is differentiated by a letter (**b**) in the order number.

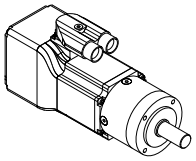
Construction type (b)	Cooling type	Connection type	Gearbox	Order code
8D1**A**	Self-cooling	Connector	Without gearbox	8D1A**cd.efg**000000-1
8D1**B**			Yes (direct mounting)	8D1B**cd.efghijkll**-1
8D1**C**			Yes (flanged)	8D1C**cd.efghijkll**-1

8D1A



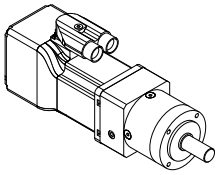
- Integrated servo drive
- Without gearbox

8D1B



- Integrated servo drive
- Direct mounted gearbox

8D1C



- Integrated servo drive
- Flanged gearbox

4.1.2 Size (c)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

ACOPOSmotor Compact modules are available in various sizes.

The size is differentiated by a digit (**c**) in the order number. The larger this digit, the larger the flange dimensions and power data of the respective ACOPOSmotor Compact module.

	Sizes (c)
	8D1x2
8D1A	Yes
8D1B	Yes
8D1C	Yes

	Sizes (c)
	8D1x3
8D1A	Yes
8D1B	Yes
8D1C	Yes

4.1.3 Length (d)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

ACOPOSmotor Compact modules are available in various lengths. These differ in the power data with identical flange dimensions. The different lengths are differentiated by a digit (**d**) in the order number.

	Lengths (d)	
	8D1xx2	8D1xx3
8D1A2	Yes	Yes
8D1B2	Yes	Yes
8D1C2	Yes	Yes

	Lengths (d)
	8D1xx3
8D1A3	Yes
8D1B3	Yes
8D1C3	Yes

4.1.4 Motor encoder system / Electronics option (e)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

ACOPOSmotor Compact modules are equipped with EnDat 2.2 encoders and optionally available with 2 external connections. The external connections are a combination of a 24 VDC output and trigger input.

The respective variant of the module is specified in the form of a one-digit code (**e**) as part of the order number.

Order code (e)	Motor encoder system	Electronics option
	Encoder type	2 external connections
A	B8	---
B	B9	---
G	B8	Yes
H	B9	Yes

EnDat 2.2 encoder

General information

Digital drive systems and position control loops require fast and highly secure transfer of data obtained from position measuring instruments. In addition, other data such as drive-specific characteristic values, correction tables, etc. should also be available. To ensure a high level of system security, measuring instruments must be integrated in routines for detecting errors and be able to perform diagnostics.

The EnDat interface from HEIDENHAIN is a digital, bidirectional interface for measuring instruments. It is able to output position values from incremental and absolute measuring instruments and can also read and update information on the measuring instrument or store new data there. Because it relies on serial data transfer, only 4 signal lines are needed. The data is transferred synchronous to the clock signal defined by the subsequent electronics. The transfer method (position values, parameters, diagnostics, etc.) is selected with mode commands that the subsequent electronics transmit to the measuring instrument.

Technical data

	Encoder type / Order code (ee)	
	B8	B9
Operating principle	Inductive	
EnDat protocol	EnDat 2.2	
Single-turn/Multi-turn	S	M
Revolutions	1	4096
Resolution [bits single-turn / bits multi-turn]	19/0	19/12
Accuracy ["]	120	
Cutoff frequency ≥ [kHz]	Digital pos. in the encoder	
Stator - Vibration during operation Max. [m/s²]	400	
Rotor - Vibration during operation Max. [m/s²]	600	
Max. shock during operation [m/s²]	2000	
Probability of dangerous failure per hour (PFH) SIL 2	$\leq 15 * 10^{-9}$	
Manufacturer's product ID	ECI 1119 FS EnDat22	EQI 1131 FS EnDat22

4.1.5 Nominal speed (f)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

The nominal speed is specified as part of the order number in the form of a code (**f**).

	Order code (f)			
	B	D	H	I
Nominal speed n_N [rpm]	1200	2000	4100	4500

Availability

	Nominal speeds n_N [rpm]			
	1200	2000	4100	4500
8D1x22	---	---	---	Yes
8D1x23	---	Yes	Yes	---
8D1x33	Yes	---	---	---

4.1.6 Motor options (g)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

The motor option is specified as part of the order number in the form of a one-digit code (**g**).

8D1A

Order code (g)	Motor options		
	Holding brake	Shaft end	Oil seal
0	No	Smooth shaft	No
1		Keyed shaft	
2	Yes	Smooth shaft	
3		Keyed shaft	
4	No	Smooth shaft	Yes
5		Keyed shaft	
6	Yes	Smooth shaft	
7		Keyed shaft	

8D1B / 8D1C

Order code (g)	Motor options		
	Holding brake	Gearbox shaft end	Oil seal
0	No	see "Gearbox options (k)" on page 27	No
2	Yes		

Holding brake

The holding brake is a permanent magnet brake. Voltage (see the technical data) must be applied to release the brake. Based on principle, this type of holding brake exhibits a minimal amount of backlash.

The brake is designed as a holding brake. It not permitted to be used for operational braking! Loaded braking during an emergency stop is permitted but reduces its service life.

Information:

The required brake holding torque is determined based on the actual load torque. It is recommended by the brake manufacturer to take into account a safety factor of 2.

Warning!

The holding brake is not intended for normal braking. The maximum motor torque far exceeds the holding torque for the brake.

Warning!

The number of revolutions of the motor shaft with the holding brake applied is not permitted to exceed the value 3200 since safety function STO can no longer be ensured in this case. 2)3)

Technical data

	Motor size	
	8D1x2	8D1x3
Holding torque M_{Br} [Nm]	2.2	3.2
Connected load P_{On} [W]	8.4	13.4
Maximum speed n_{max} [rpm]	12000	12000
Supply current I_{On} [A]	0.35	0.56
Supply voltage U_{On} [V]	24 VDC +6% / -10%	24 VDC +6% / -10%
Moment of inertia J_{Br} [kgcm²]	0.07	0.38
Weight m_{Br} [kg]	0.16	0.29
Service life	Approx. 5,000,000 switching cycles 1)	Approx. 5,000,000 switching cycles 1)

1) This specification is only valid if all conditions are observed.

Releasing and re-engaging corresponds to 1 switching cycle.

The brake is designed as a holding brake. It not permitted to be used for operational braking! Loaded braking during an emergency stop is permitted but reduces its service life.

8D1A - Shaft end design

ACOPOSmotor Compact modules (8D1A) can be delivered with a smooth shaft end or keyed shaft end.

A **smooth shaft end** is used for a force-fit shaft-hub connection and guarantees a backlash-free connection between the shaft and hub as well as a high degree of operating smoothness. The end of the shaft has a threaded center hole.

A **keyed shaft end** is used for a form-fit torque transfer with low demands on the shaft-hub connection and for handling torque in a constant direction.
The keyways for ACOPOSmotor Compact modules conform to keyway form N1 per DIN 6885-1. Form A keyed

2) The current value of the revolutions when the holding brake is applied can be read out under parameter ID BRAKE_WEARMON_REVO.
3) Values are only valid for size 2.

shafts that conform to DIN 6885-1 are used. Balancing motors with keyways is done using the shaft and fitment key convention per DIN ISO 8821.
The end of the shaft has a threaded center hole that can be used to install machine actuators with shaft end cover plates.

8D1A - Oil seal

All ACOPOSmotor Compact modules without gearbox (8D1A) are available with an optional form A oil seal per DIN 3760.
With an oil seal, the ACOPOSmotor Compact modules meet the requirements for IP65 protection per EN 60529.
Proper lubrication of the oil seal must be ensured throughout the entire service life of the motor.

4.1.7 Gearbox (h)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

The gearbox is specified by a code (**k**) in the order key. Code 0 must be used in the order code for no gearbox.

8D1A

Order code	Gearbox type	Class	Toothing type	Degree of protection	Gearbox type - Description	
0	Without gearbox	---	---	---		---

8D1B

Order code	Gearbox type	Class	Toothing type	Degree of protection	Gearbox type - Description	
B	8GM40	Standard	Straight	IP54		Planetary gearbox with output shaft
C	8GM45					
D	8GM50					
E	8GM55			IP65		
H	8GG40			IP54		Planetary gearbox with output flange

8D1C

Order code	Gearbox type	Class	Toothing type	Degree of protection	Gearbox type - Description	
B	8GP40	Standard	Straight	IP54		Planetary gearbox with output shaft
C	8GP45					
D	8GP50					
E	8GP55			IP65		
F	8GP60	Premium [1]				
G	8GP70		Helical			
H	8GF40	Standard	Straight	IP54		Planetary gearbox with output flange
I	8GF60	Premium [1]	Straight	IP65		
J	8GF70		Helical			
K	8GA40	Standard	Straight	IP54		Angular planetary gearbox
L	8GA45					
M	8GA50					
N	8GA55					
P	8GA60	Premium	Spiral bevel	IP65		

1) **Premium class**
For applications that demand high precision. In addition to standard spur toothing, helical gearing, which runs even smoother and quieter, is also possible.

4.1.8 Gearbox size (i)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

B&R gearboxes are available in different sizes.

The gearbox size is specified by a code (**i**) in the order key (e.g. H).

The larger the size (e.g. 080), the larger the flange dimensions and power data of the respective gearbox.

8D1A	8D1B	8D1C
Order code ... Without gearbox	**Order code ...** Gearbox size	**Order code ...** Gearbox size
0 ... Without gearbox	**D** ... 060 **E** ... 064 **F** ... 067 **G** ... 070	**D** ... 060 **E** ... 064 **F** ... 067 **G** ... 070 **H** ... 080 **I** ... 089 **J** ... 090

8D1B (8GM / 8GG) - Possible gearbox sizes

Gearbox series	Gearbox size[1)]
8GM40	060
8GM40	080
8GM45	067
8GM45	089
8GM50	070
8GM50	090
8GM55	060
8GM55	080
8GG40	064
8GG40	090

8D1C (8GP) - Possible gearbox sizes

Gearbox series	Gearbox size[2)]
8GP40	060, 080
8GP45	067, 089
8GP50	070, 090
8GP55	060, 080
8GP60	070, 090
8GP70	070, 090

8D1C (8GF) - Possible gearbox sizes

Gearbox series	Gearbox size[2)]
8GF40	064
8GF60	064, 090
8GF70	064, 090

8D1C (8GA) - Possible gearbox sizes

Gearbox series	Gearbox size[2)]
8GA40	060, 080
8GA45	067, 089
8GA50	070, 090
8GA55	064, 090
8GA60	070, 090

1) **1-stage or 2-stage:** Defined only by the selected gear ratio.
2) **1-stage, 2-stage or 3-stage:** Defined only by the selected gear ratio.

4.1.9 Gear ratio (j)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

B&R gearboxes are available with different gear ratios.

The code (**j**) in the order number contains the gear ratio.

8D1A	8D1B / 8D1C		
Order code ... Without gearbox	**Order code ...** Gear ratio		
0 ... Without gearbox	**B** ... 003 **C** ... 004 **D** ... 005 **E** ... 007 **F** ... 008 **G** ... 009 **H** ... 010	**I** ... 012 **J** ... 015 **K** ... 016 **L** ... 020 **M** ... 025 **N** ... 032 **P** ... 035	**Q** ... 040 **R** ... 050 **S** ... 060 **T** ... 064 **U** ... 070 **V** ... 080 **W** ... 100

8D1B - Possible gear ratios

Gearbox series / Gearbox size	Gear ratio		
	1-stage:	2-stage:	3-stage:
8GM40 / 060 / 080	005, 008, 010	015, 020, 025, 032, 040, 064, 100	---
8GM45 / 067 / 089	005, 008, 010	015, 020, 025, 032, 040, 064, 100	---
8GM50 / 070 / 090	005, 008, 010	015, 020, 025, 032, 040, 064, 100	---
8GM55 / 060 / 080	005, 008, 010	015, 020, 025, 032, 040, 064, 100	---
8GG40 / 064 / 090	005, 008, 010	015, 020, 025, 032, 040, 064, 100	---

8D1C (8GP) - Possible gear ratios

Gearbox series / Gearbox size	Gear ratio		
	1-stage:	2-stage:	3-stage:
8GP40 / 060	003, 004, 007	009, 012, 016	---
8GP40 / 080	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	060, 080
8GP45 / 067	003, 004, 007	009, 012, 016	---
8GP45 / 089	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	060, 080
8GP50 / 070	003, 004, 007	009, 012, 016	---
8GP50 / 090	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	---
8GP55 / 060	003, 004, 007	009, 012, 016	---
8GP55 / 080	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	---
8GP60 / 070	003, 004, 005, 007, 008, 010	012, 015, 016, 020, 025, 032, 040, 064, 100	---
8GP60 / 090	003, 004, 005, 007, 008, 010	012, 015, 016, 020, 025, 032, 040, 064, 100	
8GP70 / 070	003, 004, 005, 007, 010	012, 015, 016, 020, 025, 035, 040, 050, 070, 100	---
8GP70 / 090	003, 004, 005, 007, 010	012, 015, 016, 020, 025, 035, 040, 050, 070, 100	

8D1C (8GF) - Possible gear ratios

Gearbox series / Gearbox size	Gear ratio		
	1-stage:	2-stage:	3-stage:
8GF40 / 064	003, 004, 007	009, 012, 016	---
8GF60 / 064	004, 005, 007, 008, 010	016, 020, 025, 032, 040, 050, 064, 100	---
8GF60 / 090	004, 005, 007, 008, 010	016, 020, 025, 032, 040, 050, 064, 100	
8GF70 / 064	004, 005, 007, 010	016, 020, 025, 035, 040, 050, 070, 100	---
8GF70 / 090	004, 005, 007, 010	016, 020, 025, 035, 040, 050, 070, 100	

8D1C (8GA) - Possible gear ratios

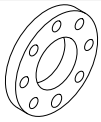
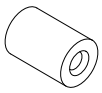
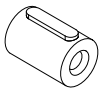
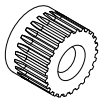
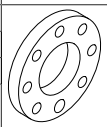
Gearbox series / Gearbox size	Gear ratio		
	1-stage:	2-stage:	3-stage:
8GA40 / 060	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	060, 080
8GA40 / 080	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	060, 080
8GA45 / 067	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	060, 080
8GA45 / 089	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	060, 080
8GA50 / 070	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	---
8GA50 / 090	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	
8GA55 / 064	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	---
8GA55 / 090	003, 004, 005, 007, 008, 010	009, 012, 015, 016, 020, 025, 032, 040, 064, 100	
8GA60 / 070	004, 005, 008, 010	016, 020, 025, 032, 040, 050, 064, 100	---
8GA60 / 090	004, 005, 008, 010	016, 020, 025, 032, 040, 050, 064, 100	

4.1.10 Gearbox options (k)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

B&R gearboxes are available with various options.

The respective option is specified by a character (**k**) in the order key.

Order code	Output shaft		Variant	Backlash [1]
0		Without gearbox (8D1**A**)	---	---
A		Flange output shaft	Standard	Standard
B				Reduced backlash [1]
C			Food-safe lubrication	Standard
D				Reduced backlash [1]
E		Smooth shaft	Standard	Standard
F				Reduced backlash [1]
G			Food-safe lubrication	Standard
H				Reduced backlash [1]
I		Keyed shaft DIN 6885 T1	Standard	Standard
J				Reduced backlash [1]
K			Food-safe lubrication	Standard
L				Reduced backlash [1]
M		Toothed shaft DIN 5480	Standard	Standard
N				Reduced backlash [1]
P			Food-safe lubrication	Standard
Q				Reduced backlash [1]
R		Flange output shaft with dowel pin hole	Standard	Standard
S				Reduced backlash [1]
T			Food-safe lubrication	Standard
U				Reduced backlash [1]

1) Reduced backlash is only available for premium gearboxes: 8GP60, 8GP70 / 8GA60, 8GA75 / 8GF60, 8GF70.

4.1.11 Special motor options (ll)

8D1 b c d . e f g h i j k ll - 1 see "Order key" on page 17

The special motor options are specified as part of the order number in the form of a 2-digit code (ll).

For ACOPOSmotor Compact 8D1C modules with an 8GA angular gearbox, a mounting position for the gearbox must be defined using code (ll).
For all other motors, there are no special motor options and code **00** must be used.

Valid values: **00**, **0A**, **0B**, **0C**, **0D**

	Without gearbox	With 8GP / 8GF gearbox	Order code (ll) With 8GA angular gearbox (mounting position)			
			(A)	(B)	(C)	(D)
8D1**A**	**00**	---	---	---	---	---
8D1**B**	---	**00**	---	---	---	---
8D1**C**	---	**00**	**0A** 	**0B** 	**0C** 	**0D** 

8D1C example:

ACOPOSmotor Compact **8D1C** with **8GA** angular gearbox in **mounting position A** (code **0A**)
Order key =**8D1Cxx.xxxxx0A-1**

4.2 Load due to radial and axial force

Radial and axial forces (F_r, F_a) applied to the shaft end during operation and installation must observe the conditions listed below.

Simultaneously **loading the shaft** end with the maximum values of $\mathbf{F_r}$ and $\mathbf{F_a}$ is not permitted! Contact B&R if this occurs.

Radial force

Radial force F_r on the shaft end is a function of the loads during installation (e.g. belt tension on pulleys) and operation (e.g. load torque on the pinion). Maximum permissible radial force F_r depends on the shaft end variant, bearing type, average speed, the position where the radial force is applied and the desired service life of the bearings.

Axial force, shift in shaft position caused by axial force

Axial force F_a on the shaft end is a function of the loads during installation (e.g. stress caused by mounting) and operation (e.g. thrust caused by slanted tooth pinions). The maximum axial force F_a depends on the bearing type and the desired service life of the bearings.

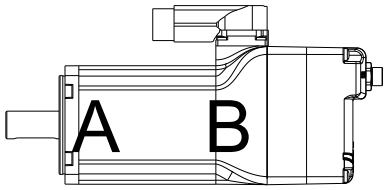
8D1x2 (with holding brake)

The **fixed bearing** is secured on the **B-side flange** with a retaining ring. The floating bearing on the A-side flange is preloaded with a spring in the direction of the B-side flange. Axial forces in the direction of the A-side flange can cause the spring bias to be overcome, which shifts the shaft by the amount of axial backlash in the bearing (approx. 0.1 - 0.2 mm). This shift can cause problems on motors with holding brakes or all motors with inductive encoder systems. As a result, no axial force in excess of the calculated values is permitted in the direction of the A-side flange when using these motor (see "Determining permissible values of F_r and F_a).

8D1x2 (without holding brake)
8D1x3 (with/without holding brake)

The **fixed bearing** is secured on the **A-side flange** with a retaining ring. The floating bearing on the B-side flange is preloaded with a spring in the direction of the A-side flange. Axial forces in the direction of the B-side flange can cause the spring bias to be overcome, which shifts the shaft by the amount of axial backlash in the bearing (approx. 0.1 - 0.2 mm). This shift can cause problems on motors with holding brakes or all motors with inductive encoder systems. As a result, no axial force in excess of the calculated values is permitted in the direction of the B-side flange when using these motor (see "Determining permissible values of F_r and F_a).

A- and B-side flange position



Definition for permissible shaft load diagrams

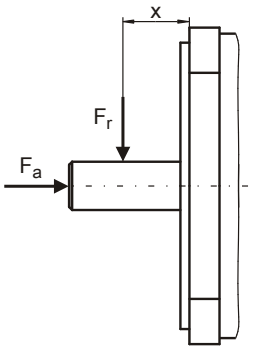


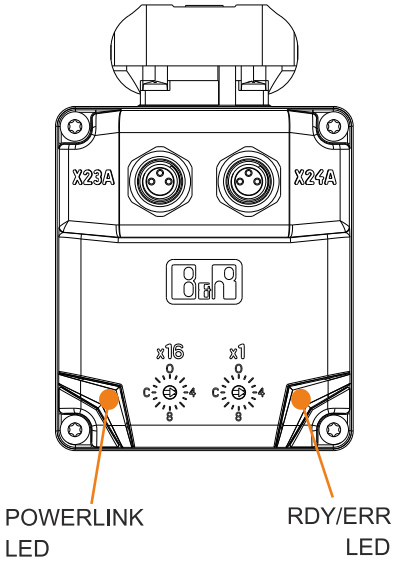
Figure 3: Definition of shaft load

F_r..... Radial force
F_a..... Axial force
x..... Distance between the motor flange and the point where radial force Fr is applied

Overdetermined bearing

Avoid an overdetermined bearing when attaching drive elements onto the output shaft!. The necessarily occurring tolerances cause additional forces on the output shaft bearing. This can damage or significantly reduce the service life of the bearings!

4.3 Status indicators



4.3.1 POWERLINK - LED status indicators

Color	Function	Description	
Green/Red	Ready/Error	LED off	The module is not supplied with power or network interface initialization has failed.
		Solid red	The POWERLINK node number of the module is 0.
		Blinking red/green	The client is in an error state (drops out of cyclic operation).
		Blinking green (1x)	The client detects a valid POWERLINK frame on the network.
		Blinking green (2x)	Cyclic operation on the network, but the client itself is not yet in cyclic operation.
		Blinking green (3x)	Cyclic operation of the client is in preparation.
		Solid green	The client is in cyclic operation.
		Flickering green	The client is not in cyclic operation and also does not detect any other stations on the network in cyclic operation.

Table 1: POWERLINK - LED status indicators

4.3.2 RDY/ERR - LED status indicators

Color	Function	Description	
Green	Ready	Solid green	The module is ready for operation and the power stage can be enabled (operating system present and booted, no pending permanent or temporary errors).
		Blinking green	The module is not ready for operation. **Examples:** • No signal on the enable input • DC bus voltage outside the tolerance range • Overtemperature on the motor • Motor feedback not connected or defective • Overtemperature on the module • Disturbance on network
Red	Error	Solid red	There is a permanent error on the module. **Examples:** • Permanent overcurrent • Data in EPROM not valid

Table 2: RDY/ERR - LED status indicators

4.3.3 Status changes when starting up the operating system loader

The following intervals are used for the LED status indicators:

Width of box: 50 ms
Repeats after: 3,000 ms

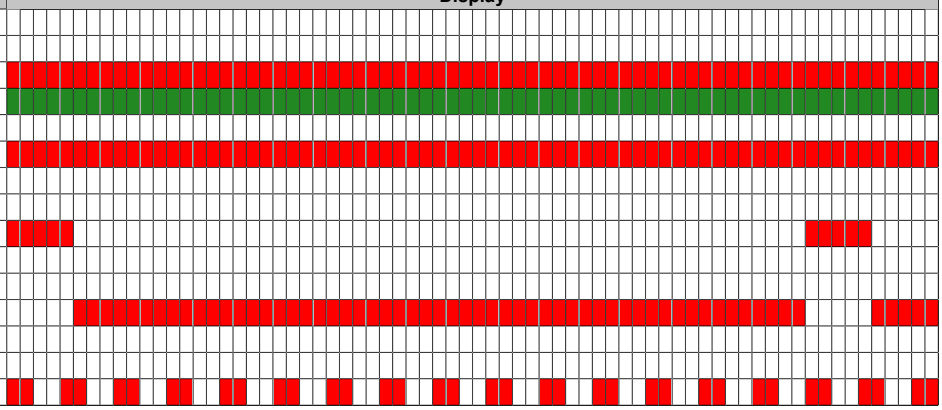
Status	LED	Display
1. Boot procedure for base hardware active	RDY	
	RUN	
	ERR	
2. Network configuration active	RDY	
	RUN	
	ERR	
3. Waiting for network telegram	RDY	
	RUN	
	ERR	
4. Network communication active	RDY	
	RUN	
	ERR	
5. ACOPOS operating system being transferred/burned	RDY	
	RUN	
	ERR	

Table 3: Status changes when starting up the operating system loader

4.4 Order data for ACOPOSmotor Compact modules

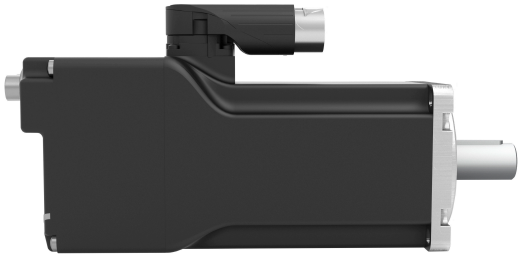
Order number	Short description	Figure
	ACOPOSmotor Compact	
8D1bcd.Afghijkhh-1 8D1bcd.Bfghijkhh-1	ACOPOSmotor Compact module configuration Without electronics option	
8D1bcd.Gfghijkhh-1 8D1bcd.Hfghijkhh-1	ACOPOSmotor Compact module configuration With electronics options (2x 24VOut + Trigger)	
	Required accessories	
	Threaded caps	
X67AC0M08	X67 M8 threaded caps, 50 pcs.	
	Accessory sets	
8F1X0A.00001000K-1	Blind plug caps M15, 30 pcs.	
	Optional accessories	
	Hybrid cable	
8D1CH0003.11120-0	ACOPOSmotor Compact power supply cable, length 3 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	
8D1CH0005.11120-0	ACOPOSmotor Compact power supply cable, length 5 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	
8D1CH0010.11120-0	ACOPOSmotor Compact power supply cable, length 10 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	
8D1CH0015.11120-0	ACOPOSmotor Compact power supply cable, length 15 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	
	Hybrid cable daisy chain	
8D1CH00X5.11110-0	ACOPOSmotor Compact power cable, length 0.5 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0001.11110-0	ACOPOSmotor Compact power cable, length 1 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0002.11110-0	ACOPOSmotor Compact power cable, length 2 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0003.11110-0	ACOPOSmotor Compact power cable, length 3 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0005.11110-0	ACOPOSmotor Compact power cable, length 5 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0010.11110-0	ACOPOSmotor Compact power cable, length 10 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0015.11110-0	ACOPOSmotor Compact power cable, length 15 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
	M8 sensor cable (for modules with 24 VOut + trigger connection)	
X67CA0D40.0020	M8 sensor cable, M8, 3-pin, straight, 1 m	
X67CA0D40.0050	M8 sensor cable, M8, 3-pin, straight, 5 m	
X67CA0D40.0100	M8 sensor cable, M8, 3-pin, straight, 10 m	
X67CA0D40.0150	M8 sensor cable, M8, 3-pin, straight, 15 m	
X67CA0D40.0200	M8 sensor cable, M8, 3-pin, straight, 20 m	
X67CA0D50.0020	M8 sensor cable, M8, 3-pin, angled, 1 m	
X67CA0D50.0050	M8 sensor cable, M8, 3-pin, angled, 5 m	
X67CA0D50.0100	M8 sensor cable, M8, 3-pin, angled, 10 m	
X67CA0D50.0150	M8 sensor cable, M8, 3-pin, angled, 15 m	
X67CA0D50.0200	M8 sensor cable, M8, 3-pin, angled, 20 m	

Table 4: 8D1bcd.efghijkhh-1 - Order data

4.5 Technical data

4.5.1 General information

General information	
Module type	ACOPOSmotor Compact
Current-carrying capacity of 9-pin hybrid connector	
Power contacts	Max. 20 A at 40°C
Certifications	
CE	Yes
UL	cURus E225616 Power conversion equipment
Support	
Motion system	
mapp Motion ACP10	V5.22.1 or higher V5.22.1 or higher
Thermal properties	
Cooling method per EN 60034-6 (IC code)	
Standard	Self-cooling, free circulation surface cooling (IC4A0A0)
Operating conditions	
Type of construction and mounting arrangement per EN 60034-7 (IM code)	Horizontal, motor shaft aligned horizontally (IM 3001) Vertical, motor standing on the machine (IM 3011) Vertical, motor hanging on the machine (IM 3031) [1]
Reduction of the continuous current at temperatures above 40°C: 8D1A22.eI... (4500 rpm) 8D1A23.eD... (2000 rpm) 8D1A23.eH... (4100 rpm) 8D1A33.eB... (1200 rpm)	 0.156 A/K 0.139 A/K 0.273 A/K 0.177 A/K
Reduction of the nominal current and stall current at installation elevations over 1000 m above sea level	-10% per 1,000 m
Installation elevation above sea level	
Nominal	0 to 500 m
Maximum	4,000 m
Degree of protection per EN 60529 [2]	Without oil seal option: IP54 With oil seal option: IP65
Degree of protection per UL 50	Type 1
Ambient conditions	
Temperature	
Operation	
Nominal	5 to 40°C
Maximum	55°C [3]
Storage	-25 to 55°C
Transport	-25 to 70°C
Max. flange temperature	65°C
Relative humidity	
Operation	5 - 85%, non-condensing
Storage	5% - 95%, non-condensing
Transport	Max. 95% at 40°C
Mechanical properties	
Motor coating	Water-based paint, RAL 9005 flat
Inverter coating	EPD coating, RAL 9005 flat
Roller bearing, dynamic load rating and nominal service life	Based on DIN ISO 281
Shaft end per DIN 748	Form E
Oil seal per DIN 3760	Form A
Key and keyway per DIN 6885-1	Keyway form N1, key form A
Shaft balancing per ISO 1940/1, G6.3	Shaft and fitment key convention
Radial runout, concentricity and axial runout of mounting flange per DIN 42955	Tolerance R

Table 5: Technical data

1) The IM3031 type of construction and mounting arrangement (vertical, motor hanging on the machine) must be avoided since production fluids or oils, e.g. from a gearbox, can penetrate the motor and damage it. If this is not possible, it is mandatory to select the oil seal option and to ensure that no production fluids or oils get onto the seal.
2) The specified degree of protection is only met if all connectors on the module that are not being used are closed with suitable threaded caps or slot covers! Suitable threaded caps covers are available as optional accessories. The module is delivered with IP20 protection.
3) Continuous operation at an ambient temperature of 40°C to max. 55°C is possible taking the reduction of continuous torque into account, but this results in premature aging of components.

4.5.2 Inverter module

Product ID	8D1xxx.A... 8D1xxx.B...	8D1xxx.G... 8D1xxx.H...
DC bus connection		
Voltage		
Minimum Nominal Maximum	24 VDC 54 VDC 58 VDC	
Continuous power consumption [1]	P_{mech} / 0.85 + P_{In} (optional) + $P_{24VDC,Out}$ (optional) + 10 W	
DC bus capacitance	264 µF	
Variant	9-pin hybrid connector [3]	
Max. line length	15 m [2]	
24 VDC Out 1		
Output voltage [7]	-	24 VDC ±3%
Continuous current	-	Max. 250 mA [4]
Fuse protection	-	Electronic
Variant	M8 connector	
Max. line length	30 m	
24 VDC Out 2		
Output voltage [7]	-	24 VDC ±3%
Continuous current	-	Max. 250 mA [4]
Fuse protection	-	Electronic
Variant	M8 connector	
Max. line length	30 m	
Motor connection		
Nominal switching frequency	40 kHz	
Max. output frequency	598 Hz [5]	
Motor holding brake		
Max. switching frequency	0.5 Hz	
Response threshold for undervoltage monitoring	24 VDC -10%	
Fieldbus		
Type	POWERLINK V2 controlled node (CN)	
Variant	Internal 2-port hub, 2x 9-pin male hybrid connector [3]	
Line length	Max. 30 m between two stations	
Transfer rate	100 Mbit/s	
Enable inputs		
Quantity	1	
Circuit	Sink	
Electrical isolation		
Input - Inverter module	Yes	
Input voltage		
Nominal	24 VDC	
Maximum	30 VDC	
Input current at nominal voltage	Approx. 4 mA (typical/nominal)	
Switching threshold		
Low	<5 V	
High	>15 V	
Switching delay at nominal input voltage		
Enable 1 → 0, PWM off	2 ms	
Enable 0 → 1, ready for PWM	1 ms	
Modulation compared to ground potential	Max. ±38 V	
OSSD signal connections	0.05-0.5 ms [6]	
Variant	9-pin hybrid connector [3]	
Trigger inputs		
Quantity	-	2
Circuit	-	Sink
Electrical isolation		
Input - Inverter module	-	No
Input - Input	-	No
Input voltage		
Nominal	-	24 VDC
Maximum	-	30 VDC
Switching threshold		
Low	-	<5 V
High	-	>15 V
Input current at nominal voltage	-	4 mA
Switching delay		
Rising edge	-	51 µs
Falling edge	-	51 µs
Modulation compared to ground potential	-	Max. ±38 V
Variant	-	M8 female connector, 3-pin

Table 6: 8D1bcd.efghijkhh-1 - Technical data

Product ID	8D1xxx.A... 8D1xxx.B...	8D1xxx.G... 8D1xxx.H...
Max. line length	30 m	
Support		
Motion system		
mapp Motion	V5.22.1 or higher [8]	
ACP10	V5.22.1 or higher [8]	

Table 6: 8D1bcd.efghijkhh-1 - Technical data

1) Valid under the following conditions: 54 VDC DC bus voltage, 40 kHz switching frequency, 40°C ambient temperature, installation elevation <500 m above sea level, no derating due to cooling type.
P_{mech} … Mechanical power at the motor shaft: $P_{mech} = \omega \cdot M = 2\pi \cdot n$ [rpm] / 60 s · M
P_{In} … Connection power of the holding brake depending on the motor size, see "holding brake technical data" on page 21
$P_{24VDC,Out}$ … Maximum power consumption of the 24 VDC output: 7 W
2) Also valid for the daisy-chain connection from module to module.
3) <500 mating cycles
4) The continuous current of 24 VDC Out 1 and Out 2 together are not permitted to exceed 250 mA.
5) The module's electrical output frequency (SCTRL_SPEED_ACT * MOTOR_POLEPAIRS) is monitored to protect against dual use in accordance with Regulation (EC) 428/2009 | 3A225. If the electrical output frequency of the module exceeds the limit value of 598 Hz uninterrupted for more than 0.5 s, then the current movement is aborted and error 6060 is output ("Power unit: Limit speed exceeded").
6) If shorter or no OSSD low pulses are applied, STO must be tested manually at regular intervals. If this is not done, the safety characteristics cannot be maintained. (Diagnostic test interval: see "Chapter "Safety technology", ACOPOSmotor Compact, General information, table 1" on page 163)
7) Depends on the DC bus. Dropout voltage of 2 V must be taken into account. starting at a DC bus voltage <26 VDC.
8) Valid for ACOPOSmotor Compact 8D1 modules with 8ZDI... starting with revision yyy.
ACOPOSmotor Compact 8D1 modules with 8ZDI... up to revision xxx can be operated with V5.17 or higher. B&R also recommends operation with V5.22.1 and higher for these modules.

4.5.3 Power dissipation

Power from ACOPOSmotor Compact modules is dissipated via the motor flange and surface of the motor. The following factors are important to ensure optimal heat dissipation:

- Thermally open installation
- Free convection

The motor data specified for the nominal operating point apply to a motor installed in a thermally open system. The dimensions of the flange plates used for the measurement are shown in the table below.

Generally speaking, the larger the flange, the better the heat dissipation.

Size	Dimensions [mm]	Material
8D1x2, 8D1x3	250 x 250 x 6	Aluminum

4.5.4 Formula symbols

Term	Symbol	Unit	Description
Nominal speed	n_N	rpm	Nominal speed of the motor
Nominal torque	M_N	Nm	The nominal torque is output by the motor with n = n_N when the nominal current is absorbed. This is possible for any length of time if the ambient conditions are correct.
Nominal power	P_N	kW	The nominal power is supplied by the motor when n = n_N. This is possible for any length of time if the ambient conditions are correct.
Nominal current	I_N	A	The nominal current is the effective value of the phase current (current in the motor supply line) for the development of the nominal torque at nominal speed. This is possible for any length of time if the ambient conditions are correct.
Stall torque	M_0	Nm	The stall torque is output by the motor at speed n_0 and when the stall current is absorbed. This is possible for any length of time if the ambient conditions are correct. Speed n_0 must be high enough for the temperature in all windings to be homogeneous and stationary (for B&R motors, n_0 = 50 rpm). The continuous torque is reduced at a real standstill.
Stall current	I_0	A	The stall current is the effective value of the phase current (current in the motor supply line) for the development of the standstill torque at speed n_0. This can be output for any length of time if the ambient conditions are maintained. Speed n_0 must be high enough for the temperature in all windings to be homogeneous and stationary (for B&R motors, n_0 = 50 rpm).
Peak torque	M_{max}	Nm	The peak torque is briefly output by the motor when the peak current is absorbed.
Peak current	I_{max}	A	The peak current is the effective value of the phase current (current in the motor supply line) for the development of the peak torque. This is only permitted to be used for a short time. The peak current is determined by the magnetic circuit. Exceeding this value for a short time can cause irreversible damage (demagnetization of the magnet material).
Maximum speed	n_{max}	rpm	Maximum motor speed. This is a mechanical condition (centrifugal force, bearing wear).
Average speed	$n_{average}$	rpm	Average speed for one cycle.
Torque constant	K_T	Nm/A	The torque constant specifies the torque generated by the motor at 1 Arms phase current. This value applies at a motor temperature of 20°C. If the temperature increases, the torque constant is reduced (typically down to 10%). If the current increases, the torque constant is reduced (typically starting at twice the value of the nominal current).
Voltage constant	K_E	V/1000 rpm	The voltage constant specifies the RMS value (phase-phase) of the reverse voltage induced by the motor at a speed of 1000 rpm (EMF). This value applies at a motor temperature of 20°C. When the temperature increases, the voltage constant is reduced (usually down to 5%). If the current increases, the voltage constant is reduced (typically starting at twice the value of the nominal current).
Stator resistance	R_{2ph}	Ω (Ohm)	Resistance measured in ohms between two motor leads (phase-phase) at 20°C winding temperature. On B&R motors, the windings use a star connection.
Stator inductance	L_{2ph}	mH	Winding inductance measured between two motor leads. The stator inductance depends on the rotor position.
Electrical time constant	t_{el}	ms	Corresponds to 1/5 of the time needed for the stator current to stabilize with constant operating conditions.
Thermal time constant	t_{therm}	min	Corresponds to 1/5 of the time needed for the motor temperature to stabilize with constant operating conditions.
Moment of inertia without brake	J	kgcm²	Moment of inertia for a motor without a holding brake.
Weight without brake	m	kg	Mass of motor without holding brake.
Moment of inertia of brake	J_{Br}	kgcm²	Moment of inertia for the built-in holding brake.
Mass of brake	m_{Br}	kg	Mass of built-in holding brake.
Brake holding torque	M_{Br}	Nm	Minimum torque required to hold the rotor when the brake is activated.
Installed load	P_{On}	W	Installed load for the built-in holding brake.
Installed current	I_{on}	A	Installed current for the built-in holding brake.
Connection voltage	U_{on}	V	Operating voltage for the built-in holding brake.
Activation delay	t_{on}	ms	Delay time required for the holding torque of the brake to be established after the operating voltage has been removed from the holding brake.
Release delay	t_{off}	ms	Delay time required until the holding torque of the holding brake is reduced by 90% (the brake is released) after operating voltage has been returned to the holding brake.

4.6 8D1Ax - Technical data

4.6.1 Technical data

Order number	8D1A22.eIg000000-1	8D1A23.eDg000000-1	8D1A23.eHg000000-1	8D1A33.eBg000000-1
General information				
Certifications				
CE	Yes			In preparation
UKCA	Yes			In preparation
UL	cURus E225616 Power conversion equipment			In preparation
Motor				
Nominal speed n_N [rpm]	4500	2000	4100	1200
Number of pole pairs	5			
Nominal torque M_n [Nm]	0.536	1.047	0.792	2.000
Nominal power P_N [W]	253	219	340	251
Nominal current I_N [A]	5.360	4.760	7.200	6.060
Stall torque M_0 [Nm]	0.659	1.118	0.880	2.001
Stall current I_0 [A]	6.590	5.080	8.000	6.064
Maximum torque M_{max} [Nm]	1.34	3.01	1.56	4.92
Maximum current I_{max} [A]	15.70			
Maximum speed n_{max} [rpm]	6600			
Torque constant K_T [Nm/A]	0.100	0.220	0.110	0.330
Voltage constant K_E [V/1000 rpm]	5.97	13.41	6.60	19.90
Stator resistance R_{2ph} [Ω]	0.400	0.760	0.200	0.540
Stator inductance L_{2ph} [mH]	0.37000	0.93000	0.24000	0.80000
Electrical time constant t_{el} [ms]	0.930	1.200		1.555
Thermal time constant t_{therm} [min]	35.0	38.0		34.0
Moment of inertia J [kgcm²]	0.2200	0.4100		1.6000
Weight without brake m [kg]	1.26	1.62		2.71
Holding brake				
Holding torque of brake M_{Br} [Nm]		2.20		3.20
Mass of brake [kg]		0.28		0.57
Moment of inertia of brake J_{Br} [kgcm²]		0.1200		0.3800

Table 7: 8D1A22.eIg000000-1, 8D1A23.eDg000000-1, 8D1A23.eHg000000-1, 8D1A33.eBg000000-1 - Technical data

4.6.2 8D1A22.eIghijkhh-1 - Speed-Torque characteristic curve

With 54 VDC DC bus voltage

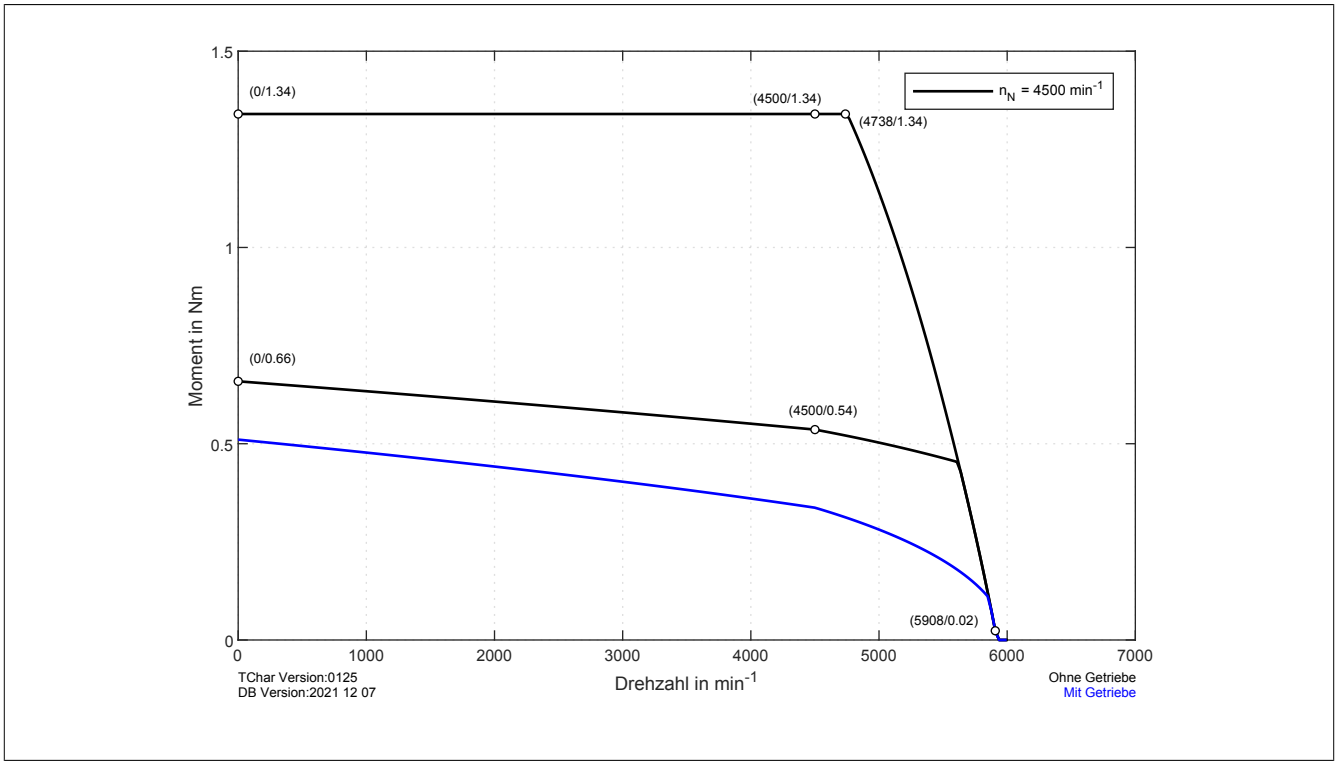


Figure 4: 8D1A22.eIghijkhh-1 with 54 VDC DC bus voltage - Speed-torque characteristic curve

4.6.3 8D1A23.eDghijkhh-1 - Speed-Torque characteristic curve

With 54 VDC DC bus voltage

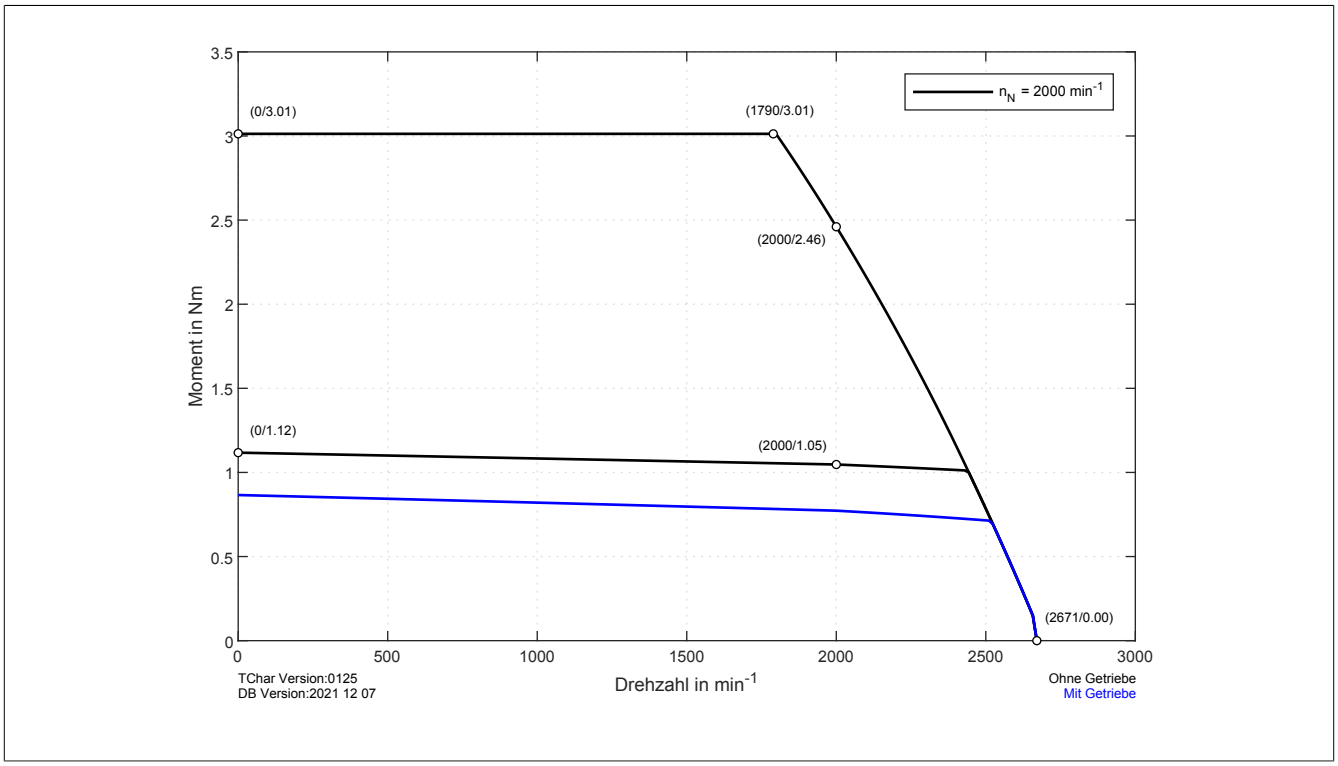


Figure 5: 8D1A23.eDghijkhh-1 with 54 VDC DC bus voltage - Speed-torque characteristic curve

4.6.4 8D1A23.eHghijkhh-1 - Speed-Torque characteristic curve

With 54 VDC DC bus voltage

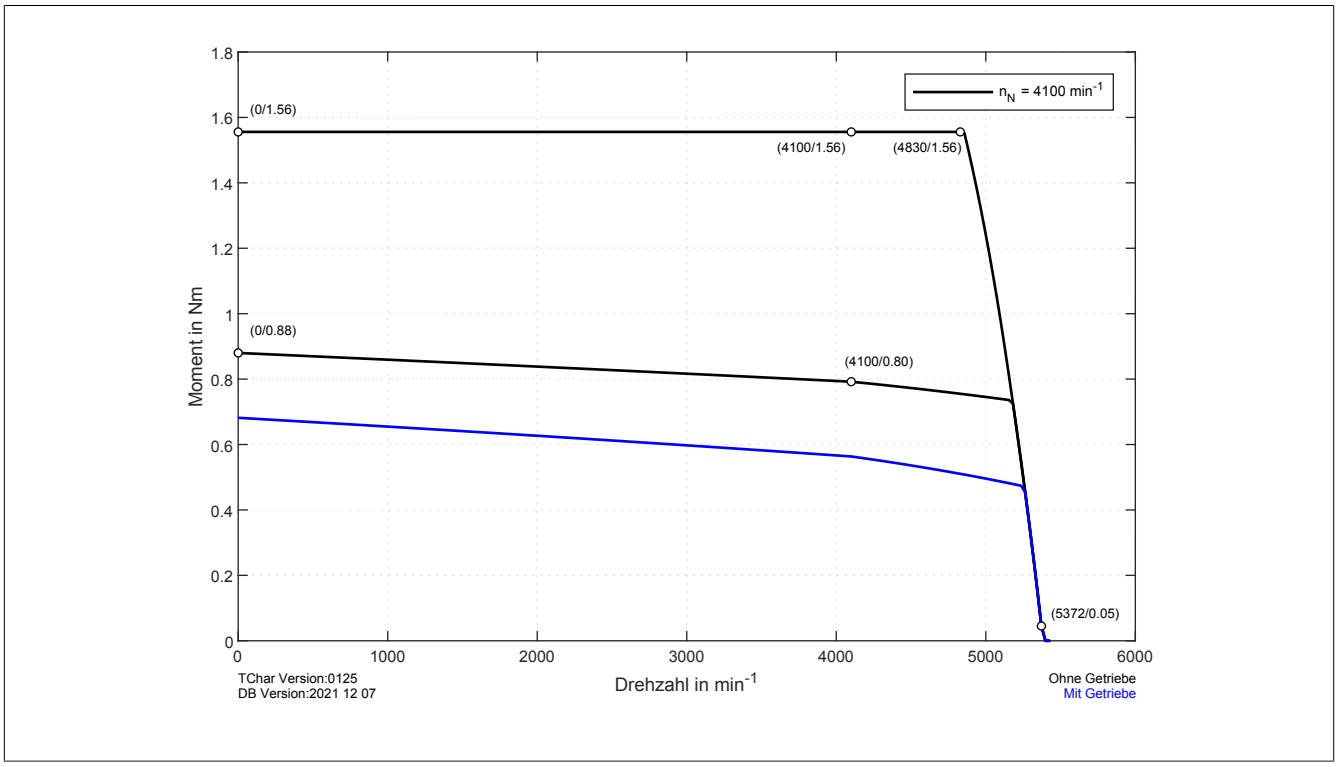
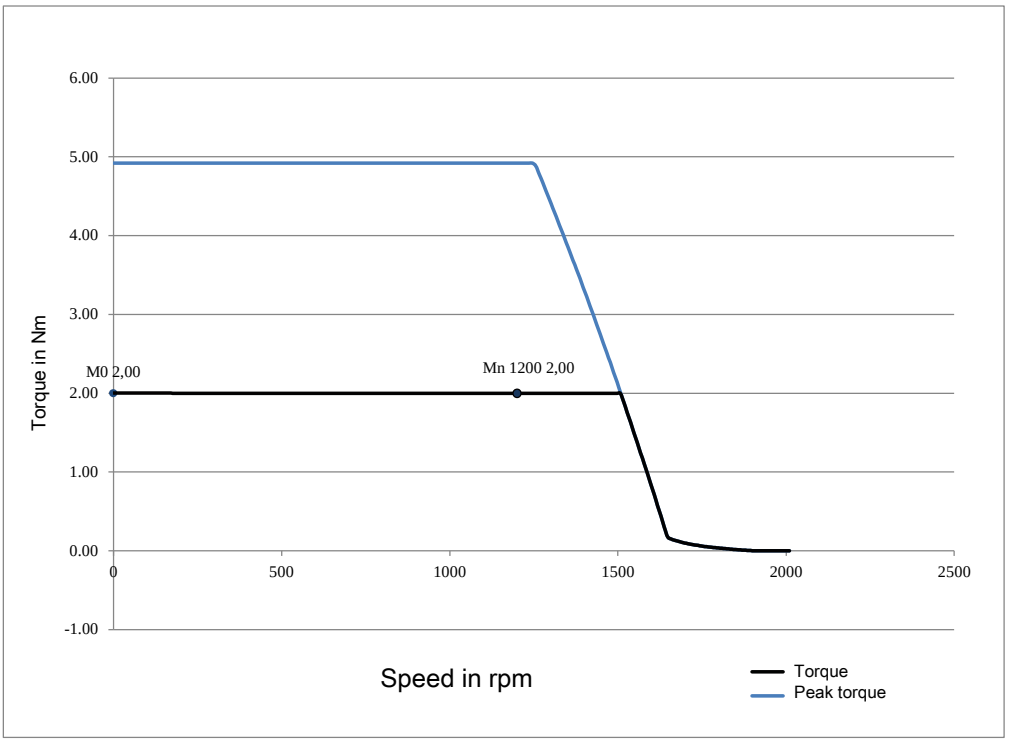


Figure 6: 8D1A23.eHghijkhh-1 with 54 VDC DC bus voltage - Speed-torque characteristic curve

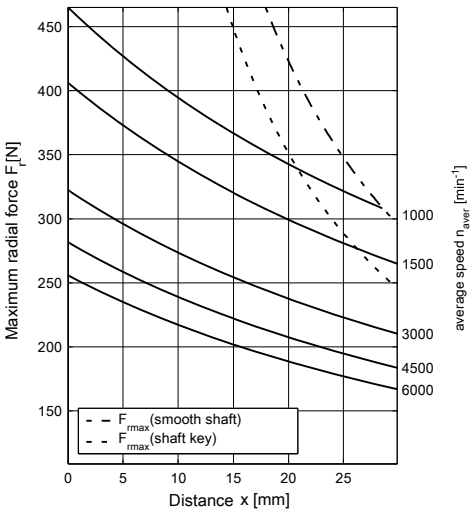
4.6.5 8D1A33.eBghijkhh-1 - Speed-Torque characteristic curve

With 54 VDC DC bus voltage



4.6.6 Permissible shaft load

The values in the diagram below are based on a mechanical service life of the bearings of 20000 operating hours.



maximum allowed axial force: F_{amax} = 42 N

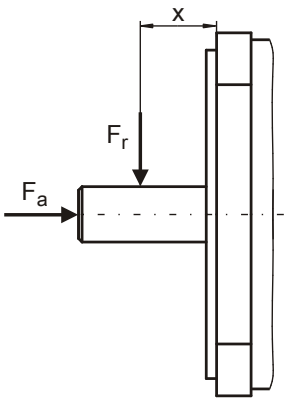


Figure 7: Definition of shaft load

F_r..... Radial force
F_a..... Axial force
x..... Distance between the motor flange and the point where radial force F_r is applied.

4.7 8D1Bx - Technical data

4.7.1 Overview

8D1B22 - 4,500 rpm

Order number	Gearbox type Gearbox size		Technical data
8D1B22.eIgBD	8GM40, 060		see "8D1B22.el - 4,500 rpm (8GM40, gearbox size 060) - Technical data" on page 40
8D1B22.eIgCF	8GM45, 067		see "8D1B22.el - 4,500 rpm (8GM45, gearbox size 067) - Technical data" on page 42
8D1B22.eIgDG	8GM50, 070		see "8D1B22.el - 4,500 rpm (8GM50, gearbox size 070) - Technical data" on page 44
8D1B22.eIgED	8GM55, 060		see "8D1B22.el - 4,500 rpm (8GM55, gearbox size 060) - Technical data" on page 46
8D1B22.eIgHE	8GG40, 064		see "8D1B22.el - 4,500 rpm (8GG40, gearbox size 064) - Technical data" on page 48

8D1B23 - 2,000 rpm

Order number	Gearbox type Gearbox size		Technical data
8D1B23.eDgBD	8GM40, 060		see "8D1B23.eD - 2,000 rpm (8GM40, gearbox size 060) - Technical data" on page 50
8D1B23.eDgCF	8GM45, 067		see "8D1B23.eD - 2,000 rpm (8GM45, gearbox size 067) - Technical data" on page 52
8D1B23.eDgDG	8GM50, 070		see "8D1B23.eD - 2,000 rpm (8GM50, gearbox size 070) - Technical data" on page 54
8D1B23.eDgED	8GM55, 060		see "8D1B23.eD - 2,000 rpm (8GM50, gearbox size 070) - Technical data" on page 54
8D1B23.eDgHE	8GG40, 064		see "8D1B23.eD - 2,000 rpm (8GG40, gearbox size 064) - Technical data" on page 58

8D1B23 - 4,100 rpm

Order number	Gearbox type Gearbox size		Technical data
8D1B23.eHgBD	8GM40, 060		see "8D1B23.eH - 4,100 rpm (8GM40, gearbox size 060) - Technical data" on page 60
8D1B23.eHgCF	8GM45, 067		see "8D1B23.eH - 4,100 rpm (8GM45, gearbox size 067) - Technical data" on page 62
8D1B23.eHgDG	8GM50, 070		see "8D1B23.eH - 4,100 rpm (8GM50, gearbox size 070) - Technical data" on page 64
8D1B23.eHgED	8GM55, 060		see "8D1B23.eH - 4,100 rpm (8GM50, gearbox size 070) - Technical data" on page 64
8D1B23.eHgHE	8GG40, 064		see "8D1B23.eH - 4,100 rpm (8GG40, gearbox size 064) - Technical data" on page 68

8D1B33 - 1,200 rpm

Order number	Gearbox type Gearbox size		Technical data
8D1B33.eBgBH	8GM40, 080		see "8D1B33.eB - 1,200 rpm (8GM40, gearbox size 080) - Technical data" on page 70
8D1B33.eHgCI	8GM45, 067		see "8D1B33.eB - 1,200 rpm (8GM45, gearbox size 067) - Technical data" on page 71
8D1B33.eHgDJ	8GM50, 070		see "8D1B33.eB - 1,200 rpm (8GM50, gearbox size 070) - Technical data" on page 73
8D1B33.eBgEH	8GM55, 060		see "8D1B33.eB - 1,200 rpm (8GM55, gearbox size 060) - Technical data" on page 75
8D1B33.eBgHJ	8GG40, 064		see "8D1B33.eB - 1,200 rpm (8GG40, gearbox size 064) - Technical data" on page 77

4.7.2 8D1B22.el - 4,500 rpm (8GM40, gearbox size 060) - Technical data

Gear ratio 005 to 020

Order number	8D1B22. elgBDDk00-1	8D1B22.elgBDFk00-1	8D1B22. elgBDHk00-1	8D1B22.elgBDJk00-1	8D1B22.elgBDLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	2.6	2.3	2.2	2.4	2.5
Max. radial force Fr_{max} [N] for 30,000 h	340				
Max. radial force Fr_{max} [N] for 20,000 h	400				
Max. axial force Fa_{max} [N] for 30,000 h	450				
Max. axial force Fa_{max} [N] for 20,000 h	500				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.57		0.58	0.75	0.76
Moment of inertia J_1 [kgcm²]	0.019	0.007	0.004	0.016	0.015

Gear ratio 025 to 100

Order number	8D1B22. eIgBDMk00-1	8D1B22. eIgBDNk00-1	8D1B22. eIgBDQk00-1	8D1B22.eIgBDTk00-1	8D1B22. eIgBDWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	2.6	2.5		2.3	2
Max. radial force Fr_{max} [N] for 30,000 h	340				
Max. radial force Fr_{max} [N] for 20,000 h	400				
Max. axial force Fa_{max} [N] for 30,000 h	450				
Max. axial force Fa_{max} [N] for 20,000 h	500				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0.77		0.78		0.96
Moment of inertia J_1 [kgcm²]	0.014	0.005			0.003

4.7.3 8D1B22.el - 4,500 rpm (8GM45, gearbox size 067) - Technical data

Gear ratio 005 to 020

Order number	8D1B22.elgCFDk00-1	8D1B22.elgCFFk00-1	8D1B22.elgCFHk00-1	8D1B22.elgCFJk00-1	8D1B22.elgCFLk00-1
General information					
Certifications					
CE			Yes		
UKCA			Yes		
UL			cURus E225616 Power conversion equipment		
Motor					
Nominal speed n_N [rpm]			4500		
Number of pole pairs			5		
Nominal torque M_n [Nm]			0.536		
Nominal power P_N [W]			253		
Nominal current I_N [A]			5.360		
Stall torque M_0 [Nm]			0.659		
Stall current I_0 [A]			6.590		
Maximum torque M_{max} [Nm]			1.34		
Maximum current I_{max} [A]			15.70		
Maximum speed n_{max} [rpm]			6600		
Torque constant K_T [Nm/A]			0.100		
Voltage constant K_E [V/1000 rpm]			5.97		
Stator resistance R_{2ph} [Ω]			0.400		
Stator inductance L_{2ph} [mH]			0.37000		
Electrical time constant t_{el} [ms]			0.930		
Thermal time constant t_{therm} [min]			35.0		
Moment of inertia J [kgcm²]			0.2200		
Weight without brake m [kg]			1.26		
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]			2.20		
Mass of brake [kg]			0.28		
Moment of inertia of brake J_{Br} [kgcm²]			0.1200		
Gearbox					
Number of gear stages		1		2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1			4500		
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1			4500		
Max. backlash J_t [arcmin]		10		12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.1	3.4	3.1	3.6	3.8
Max. radial force Fr_{max} [N] for 30,000 h			700		
Max. radial force Fr_{max} [N] for 20,000 h			900		
Max. axial force Fa_{max} [N] for 30,000 h			800		
Max. axial force Fa_{max} [N] for 20,000 h			1000		
Operating noise L_{PA} [dB(A)]			58		
Efficiency at full load ŋ [%]		96		94	
Weight m [kg]	0.78		0.79	0.96	0.97
Moment of inertia J_1 [kgcm²]	0.024	0.008	0.005	0.016	0.015

Gear ratio 025 to 100

Order number	8D1B22. eIgCFMk00-1	8D1B22.eIgCFNk00-1	8D1B22. eIgCFQk00-1	8D1B22.eIgCFTk00-1	8D1B22. eIgCFWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	3.9	3.8	3.9	3.3	2.7
Max. radial force Fr_{max} [N] for 30,000 h	700				
Max. radial force Fr_{max} [N] for 20,000 h	900				
Max. axial force Fa_{max} [N] for 30,000 h	800				
Max. axial force Fa_{max} [N] for 20,000 h	1000				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0.98		0.99		1.16
Moment of inertia J_1 [kgcm²]	0.014	0.006	0.005		0.003

4.7.4 8D1B22.el - 4,500 rpm (8GM50, gearbox size 070) - Technical data

Gear ratio 005 to 020

Order number	8D1B22. elgDGDk00-1	8D1B22. elgDGFk00-1	8D1B22. elgDGHk00-1	8D1B22.elgDGJk00-1	8D1B22. elgDGLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		33	
Max. output torque T_{2max} [Nm]	26	24		53	
Emergency switch-off torque T_{2stop} [Nm]	32	30		66	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	5.7	4.4	3.9	4.9	5.2
Max. radial force Fr_{max} [N] for 30,000 h	900				
Max. radial force Fr_{max} [N] for 20,000 h	1050				
Max. axial force Fa_{max} [N] for 30,000 h	1000				
Max. axial force Fa_{max} [N] for 20,000 h	1350				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	1.1	1.12	1.13	1.39	1.4
Moment of inertia J_1 [kgcm²]	0.035	0.013	0.008	0.018	0.016

Gear ratio 025 to 100

Order number	8D1B22. eIgDGMk00-1	8D1B22. eIgDGNk00-1	8D1B22. eIgDGQk00-1	8D1B22. eIgDGTk00-1	8D1B22. eIgDGWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	30	33	30	18	15
Max. output torque T_{2max} [Nm]	48	53	48	29	24
Emergency switch-off torque T_{2stop} [Nm]	60	66	60	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	5.3	5.1	5.2	4.2	3.3
Max. radial force Fr_{max} [N] for 30,000 h	900				
Max. radial force Fr_{max} [N] for 20,000 h	1050				
Max. axial force Fa_{max} [N] for 30,000 h	1000				
Max. axial force Fa_{max} [N] for 20,000 h	1350				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	1.4	1.41		1.42	1.57
Moment of inertia J_1 [kgcm²]	0.015	0.006		0.005	0.003

4.7.5 8D1B22.el - 4,500 rpm (8GM55, gearbox size 060) - Technical data

Gear ratio 005 to 020

Order number	8D1B22. eIgEDDk00-1	8D1B22.eIgEDFk00-1	8D1B22. eIgEDHk00-1	8D1B22.eIgEDJk00-1	8D1B22.eIgEDLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	1.93	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4200	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	3400	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.5	3.7	3.3	3.9	4.2
Max. radial force Fr_{max} [N] for 30,000 h	3200				
Max. radial force Fr_{max} [N] for 20,000 h	3200				
Max. axial force Fa_{max} [N] for 30,000 h	3900				
Max. axial force Fa_{max} [N] for 20,000 h	4400				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0				
Moment of inertia J_1 [kgcm²]	0.037	0.014	0.008	0.021	0.019

Gear ratio 025 to 100

Order number	8D1B22. eIgEDMk00-1	8D1B22. eIgEDNk00-1	8D1B22. eIgEDQk00-1	8D1B22.eIgEDTk00-1	8D1B22. eIgEDWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	4.2	4.1	4.2	3.5	2.9
Max. radial force Fr_{max} [N] for 30,000 h	3200				
Max. radial force Fr_{max} [N] for 20,000 h	3200				
Max. axial force Fa_{max} [N] for 30,000 h	3900				
Max. axial force Fa_{max} [N] for 20,000 h	4400				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0				
Moment of inertia J_1 [kgcm²]	0.018	0.007		0.006	0.004

4.7.6 8D1B22.el - 4,500 rpm (8GG40, gearbox size 064) - Technical data

Gear ratio 005 to 020

Order number	8D1B22. eIgHEDk00-1	8D1B22.eIgHEFk00-1	8D1B22. eIgHEHk00-1	8D1B22.eIgHEJk00-1	8D1B22.eIgHELk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	1.8	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4000	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	14.2	8.2	6.4	10.2	11.7
Max. radial force Fr_{max} [N] for 30,000 h	500				
Max. radial force Fr_{max} [N] for 20,000 h	550				
Max. axial force Fa_{max} [N] for 30,000 h	1200				
Max. axial force Fa_{max} [N] for 20,000 h	1200				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.78		0.79	1	1.02
Moment of inertia J_1 [kgcm²]	0.049	0.018	0.011	0.019	0.017

Gear ratio 025 to 100

Order number	8D1B22. eIgHEMk00-1	8D1B22. eIgHENk00-1	8D1B22. eIgHEQk00-1	8D1B22.eIgHETk00-1	8D1B22. eIgHEWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4500				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.536				
Nominal power P_N [W]	253				
Nominal current I_N [A]	5.360				
Stall torque M_0 [Nm]	0.659				
Stall current I_0 [A]	6.590				
Maximum torque M_{max} [Nm]	1.34				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.100				
Voltage constant K_E [V/1000 rpm]	5.97				
Stator resistance R_{2ph} [Ω]	0.400				
Stator inductance L_{2ph} [mH]	0.37000				
Electrical time constant t_{el} [ms]	0.930				
Thermal time constant t_{therm} [min]	35.0				
Moment of inertia J [kgcm²]	0.2200				
Weight without brake m [kg]	1.26				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	12	11.4	11.8	7.5	5.1
Max. radial force Fr_{max} [N] for 30,000 h	500				
Max. radial force Fr_{max} [N] for 20,000 h	550				
Max. axial force Fa_{max} [N] for 30,000 h	1200				
Max. axial force Fa_{max} [N] for 20,000 h	1200				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	1.02	1.03	1.04	1.03	1.09
Moment of inertia J_1 [kgcm²]	0.015	0.006		0.005	0.003

4.7.7 8D1B23.eD - 2,000 rpm (8GM40, gearbox size 060) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eDgBDDk00-1	8D1B23. eDgBDFk00-1	8D1B23. eDgBDHk00-1	8D1B23. eDgBDJk00-1	8D1B23. eDgBDLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	2.6	2.3	2.2	2.4	2.5
Max. radial force Fr_{max} [N] for 30,000 h	340				
Max. radial force Fr_{max} [N] for 20,000 h	400				
Max. axial force Fa_{max} [N] for 30,000 h	450				
Max. axial force Fa_{max} [N] for 20,000 h	500				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.57		0.58	0.75	0.76
Moment of inertia J_1 [kgcm²]	0.019	0.007	0.004	0.016	0.015

Gear ratio 025 to 100

Order number	8D1B23. eDgBDMk00-1	8D1B23. eDgBDNk00-1	8D1B23. eDgBDQk00-1	8D1B23. eDgBDTk00-1	8D1B23. eDgBDWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	2.6	2.5		2.3	2
Max. radial force Fr_{max} [N] for 30,000 h	340				
Max. radial force Fr_{max} [N] for 20,000 h	400				
Max. axial force Fa_{max} [N] for 30,000 h	450				
Max. axial force Fa_{max} [N] for 20,000 h	500				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0.77		0.78		0.96
Moment of inertia J_1 [kgcm²]	0.014	0.005			0.003

4.7.8 8D1B23.eD - 2,000 rpm (8GM45, gearbox size 067) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eDgCFDk00-1	8D1B23. eDgCFFk00-1	8D1B23. eDgCFHk00-1	8D1B23. eDgCFJk00-1	8D1B23. eDgCFLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.1	3.4	3.1	3.6	3.8
Max. radial force Fr_{max} [N] for 30,000 h	700				
Max. radial force Fr_{max} [N] for 20,000 h	900				
Max. axial force Fa_{max} [N] for 30,000 h	800				
Max. axial force Fa_{max} [N] for 20,000 h	1000				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.78		0.79	0.96	0.97
Moment of inertia J_1 [kgcm²]	0.024	0.008	0.005	0.016	0.015

Gear ratio 025 to 100

Order number	8D1B23. eDgCFMk00-1	8D1B23. eDgCFNk00-1	8D1B23. eDgCFQk00-1	8D1B23. eDgCFTk00-1	8D1B23. eDgCFWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	3.9	3.8	3.9	3.3	2.7
Max. radial force Fr_{max} [N] for 30,000 h	700				
Max. radial force Fr_{max} [N] for 20,000 h	900				
Max. axial force Fa_{max} [N] for 30,000 h	800				
Max. axial force Fa_{max} [N] for 20,000 h	1000				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0.98		0.99		1.16
Moment of inertia J_1 [kgcm²]	0.014	0.006	0.005		0.003

4.7.9 8D1B23.eD - 2,000 rpm (8GM50, gearbox size 070) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eDgDGDk00-1	8D1B23. eDgDGFk00-1	8D1B23. eDgDGHk00-1	8D1B23. eDgDGJk00-1	8D1B23. eDgDGLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		33	
Max. output torque T_{2max} [Nm]	26	24		53	
Emergency switch-off torque T_{2stop} [Nm]	32	30		66	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	5.7	4.4	3.9	4.9	5.2
Max. radial force Fr_{max} [N] for 30,000 h	900				
Max. radial force Fr_{max} [N] for 20,000 h	1050				
Max. axial force Fa_{max} [N] for 30,000 h	1000				
Max. axial force Fa_{max} [N] for 20,000 h	1350				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	1.1	1.12	1.13	1.39	1.4
Moment of inertia J_1 [kgcm²]	0.035	0.013	0.008	0.018	0.016

Gear ratio 025 to 100

Order number	8D1B23. eDgDGMk00-1	8D1B23. eDgDGNk00-1	8D1B23. eDgDGQk00-1	8D1B23. eDgDGTk00-1	8D1B23. eDgDGWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	30	33	30	18	15
Max. output torque T_{2max} [Nm]	48	53	48	29	24
Emergency switch-off torque T_{2stop} [Nm]	60	66	60	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	5.3	5.1	5.2	4.2	3.3
Max. radial force Fr_{max} [N] for 30,000 h	900				
Max. radial force Fr_{max} [N] for 20,000 h	1050				
Max. axial force Fa_{max} [N] for 30,000 h	1000				
Max. axial force Fa_{max} [N] for 20,000 h	1350				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	1.4	1.41		1.42	1.57
Moment of inertia J_1 [kgcm²]	0.015	0.006		0.005	0.003

4.7.10 8D1B23.eD - 2,000 rpm (8GM55, gearbox size 060) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eDgEDDk00-1	8D1B23. eDgEDFk00-1	8D1B23. eDgEDHk00-1	8D1B23. eDgEDJk00-1	8D1B23. eDgEDLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.93	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4200	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	3400	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.5	3.7	3.3	3.9	4.2
Max. radial force Fr_{max} [N] for 30,000 h	3200				
Max. radial force Fr_{max} [N] for 20,000 h	3200				
Max. axial force Fa_{max} [N] for 30,000 h	3900				
Max. axial force Fa_{max} [N] for 20,000 h	4400				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0				
Moment of inertia J_1 [kgcm²]	0.037	0.014	0.008	0.021	0.019

Gear ratio 025 to 100

Order number	8D1B23. eDgEDMk00-1	8D1B23. eDgEDNk00-1	8D1B23. eDgEDQk00-1	8D1B23. eDgEDTk00-1	8D1B23. eDgEDWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	4.2	4.1	4.2	3.5	2.9
Max. radial force Fr_{max} [N] for 30,000 h	3200				
Max. radial force Fr_{max} [N] for 20,000 h	3200				
Max. axial force Fa_{max} [N] for 30,000 h	3900				
Max. axial force Fa_{max} [N] for 20,000 h	4400				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0				
Moment of inertia J_1 [kgcm²]	0.018	0.007		0.006	0.004

4.7.11 8D1B23.eD - 2,000 rpm (8GG40, gearbox size 064) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eDgHEDk00-1	8D1B23. eDgHEFk00-1	8D1B23. eDgHEHk00-1	8D1B23. eDgHEJk00-1	8D1B23. eDgHELk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.8	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4000	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	14.2	8.2	6.4	10.2	11.7
Max. radial force Fr_{max} [N] for 30,000 h	500				
Max. radial force Fr_{max} [N] for 20,000 h	550				
Max. axial force Fa_{max} [N] for 30,000 h	1200				
Max. axial force Fa_{max} [N] for 20,000 h	1200				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.78		0.79	1	1.02
Moment of inertia J_1 [kgcm²]	0.049	0.018	0.011	0.019	0.017

Gear ratio 025 to 100

Order number	8D1B23. eDgHEMk00-1	8D1B23. eDgHENk00-1	8D1B23. eDgHEQk00-1	8D1B23. eDgHETk00-1	8D1B23. eDgHEWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	2000				
Number of pole pairs	5				
Nominal torque M_n [Nm]	1.047				
Nominal power P_N [W]	219				
Nominal current I_N [A]	4.760				
Stall torque M_0 [Nm]	1.118				
Stall current I_0 [A]	5.080				
Maximum torque M_{max} [Nm]	3.01				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.220				
Voltage constant K_E [V/1000 rpm]	13.41				
Stator resistance R_{2ph} [Ω]	0.760				
Stator inductance L_{2ph} [mH]	0.93000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	12	11.4	11.8	7.5	5.1
Max. radial force Fr_{max} [N] for 30,000 h	500				
Max. radial force Fr_{max} [N] for 20,000 h	550				
Max. axial force Fa_{max} [N] for 30,000 h	1200				
Max. axial force Fa_{max} [N] for 20,000 h	1200				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	1.02	1.03	1.04	1.03	1.09
Moment of inertia J_1 [kgcm²]	0.015	0.006		0.005	0.003

4.7.12 8D1B23.eH - 4,100 rpm (8GM40, gearbox size 060) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eHgBDDk00-1	8D1B23. eHgBDFk00-1	8D1B23. eHgBDHk00-1	8D1B23. eHgBDJk00-1	8D1B23. eHgBDLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	2.6	2.3	2.2	2.4	2.5
Max. radial force Fr_{max} [N] for 30,000 h	340				
Max. radial force Fr_{max} [N] for 20,000 h	400				
Max. axial force Fa_{max} [N] for 30,000 h	450				
Max. axial force Fa_{max} [N] for 20,000 h	500				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.57		0.58	0.75	0.76
Moment of inertia J_1 [kgcm²]	0.019	0.007	0.004	0.016	0.015

Gear ratio 025 to 100

Order number	8D1B23. eHgBDMk00-1	8D1B23. eHgBDNk00-1	8D1B23. eHgBDQk00-1	8D1B23. eHgBDTk00-1	8D1B23. eHgBDWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	2.6	2.5		2.3	2
Max. radial force Fr_{max} [N] for 30,000 h	340				
Max. radial force Fr_{max} [N] for 20,000 h	400				
Max. axial force Fa_{max} [N] for 30,000 h	450				
Max. axial force Fa_{max} [N] for 20,000 h	500				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0.77		0.78		0.96
Moment of inertia J_1 [kgcm²]	0.014	0.005			0.003

4.7.13 8D1B23.eH - 4,100 rpm (8GM45, gearbox size 067) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eHgCFDk00-1	8D1B23. eHgCFFk00-1	8D1B23. eHgCFHk00-1	8D1B23. eHgCFJk00-1	8D1B23. eHgCFLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.1	3.4	3.1	3.6	3.8
Max. radial force Fr_{max} [N] for 30,000 h	700				
Max. radial force Fr_{max} [N] for 20,000 h	900				
Max. axial force Fa_{max} [N] for 30,000 h	800				
Max. axial force Fa_{max} [N] for 20,000 h	1000				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.78		0.79	0.96	0.97
Moment of inertia J_1 [kgcm²]	0.024	0.008	0.005	0.016	0.015

Gear ratio 025 to 100

Order number	8D1B23. eHgCFMk00-1	8D1B23. eHgCFNk00-1	8D1B23. eHgCFQk00-1	8D1B23. eHgCFTk00-1	8D1B23. eHgCFWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	3.9	3.8	3.9	3.3	2.7
Max. radial force Fr_{max} [N] for 30,000 h	700				
Max. radial force Fr_{max} [N] for 20,000 h	900				
Max. axial force Fa_{max} [N] for 30,000 h	800				
Max. axial force Fa_{max} [N] for 20,000 h	1000				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0.98		0.99		1.16
Moment of inertia J_1 [kgcm²]	0.014	0.006	0.005		0.003

4.7.14 8D1B23.eH - 4,100 rpm (8GM50, gearbox size 070) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eHgDGDk00-1	8D1B23. eHgDGFk00-1	8D1B23. eHgDGHk00-1	8D1B23. eHgDGJk00-1	8D1B23. eHgDGLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.69	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		33	
Max. output torque T_{2max} [Nm]	26	24		53	
Emergency switch-off torque T_{2stop} [Nm]	32	30		66	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	5.7	4.4	3.9	4.9	5.2
Max. radial force Fr_{max} [N] for 30,000 h	900				
Max. radial force Fr_{max} [N] for 20,000 h	1050				
Max. axial force Fa_{max} [N] for 30,000 h	1000				
Max. axial force Fa_{max} [N] for 20,000 h	1350				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	1.1	1.12	1.13	1.39	1.4
Moment of inertia J_1 [kgcm²]	0.035	0.013	0.008	0.018	0.016

Gear ratio 025 to 100

Order number	8D1B23. eHgDGMk00-1	8D1B23. eHgDGNk00-1	8D1B23. eHgDGQk00-1	8D1B23. eHgDGTk00-1	8D1B23. eHgDGWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	30	33	30	18	15
Max. output torque T_{2max} [Nm]	48	53	48	29	24
Emergency switch-off torque T_{2stop} [Nm]	60	66	60	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	5.3	5.1	5.2	4.2	3.3
Max. radial force Fr_{max} [N] for 30,000 h	900				
Max. radial force Fr_{max} [N] for 20,000 h	1050				
Max. axial force Fa_{max} [N] for 30,000 h	1000				
Max. axial force Fa_{max} [N] for 20,000 h	1350				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	1.4	1.41		1.42	1.57
Moment of inertia J_1 [kgcm²]	0.015	0.006		0.005	0.003

4.7.15 8D1B23.eH - 4,100 rpm (8GM55, gearbox size 060) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eHgEDDk00-1	8D1B23. eHgEDFk00-1	8D1B23. eHgEDHk00-1	8D1B23. eHgEDJk00-1	8D1B23. eHgEDLk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.93	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4200	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	3400	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.5	3.7	3.3	3.9	4.2
Max. radial force Fr_{max} [N] for 30,000 h	3200				
Max. radial force Fr_{max} [N] for 20,000 h	3200				
Max. axial force Fa_{max} [N] for 30,000 h	3900				
Max. axial force Fa_{max} [N] for 20,000 h	4400				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0				
Moment of inertia J_1 [kgcm²]	0.037	0.014	0.008	0.021	0.019

Gear ratio 025 to 100

Order number	8D1B23. eHgEDMk00-1	8D1B23. eHgEDNk00-1	8D1B23. eHgEDQk00-1	8D1B23. eHgEDTk00-1	8D1B23. eHgEDWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	4.2	4.1	4.2	3.5	2.9
Max. radial force Fr_{max} [N] for 30,000 h	3200				
Max. radial force Fr_{max} [N] for 20,000 h	3200				
Max. axial force Fa_{max} [N] for 30,000 h	3900				
Max. axial force Fa_{max} [N] for 20,000 h	4400				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	0				
Moment of inertia J_1 [kgcm²]	0.018	0.007		0.006	0.004

4.7.16 8D1B23.eH - 4,100 rpm (8GG40, gearbox size 064) - Technical data

Gear ratio 005 to 020

Order number	8D1B23. eHgHEDk00-1	8D1B23. eHgHEFk00-1	8D1B23. eHgHEHk00-1	8D1B23. eHgHEJk00-1	8D1B23. eHgHELk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	1.8	2.7	3.37	5.06	6.74
Max. permissible peak torque M_{Kmax} [Nm]	6.7	10.72	13.4	20.1	26.8
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	15	20
Nominal output torque T_{2N} [Nm]	16	15		44	
Max. output torque T_{2max} [Nm]	25	24		70	
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4000	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	14.2	8.2	6.4	10.2	11.7
Max. radial force Fr_{max} [N] for 30,000 h	500				
Max. radial force Fr_{max} [N] for 20,000 h	550				
Max. axial force Fa_{max} [N] for 30,000 h	1200				
Max. axial force Fa_{max} [N] for 20,000 h	1200				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.78		0.79	1	1.02
Moment of inertia J_1 [kgcm²]	0.049	0.018	0.011	0.019	0.017

Gear ratio 025 to 100

Order number	8D1B23. eHgHEMk00-1	8D1B23. eHgHENk00-1	8D1B23. eHgHEQk00-1	8D1B23. eHgHETk00-1	8D1B23. eHgHEWk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	4100				
Number of pole pairs	5				
Nominal torque M_n [Nm]	0.792				
Nominal power P_N [W]	340				
Nominal current I_N [A]	7.200				
Stall torque M_0 [Nm]	0.880				
Stall current I_0 [A]	8.000				
Maximum torque M_{max} [Nm]	1.56				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.110				
Voltage constant K_E [V/1000 rpm]	6.60				
Stator resistance R_{2ph} [Ω]	0.200				
Stator inductance L_{2ph} [mH]	0.24000				
Electrical time constant t_{el} [ms]	1.200				
Thermal time constant t_{therm} [min]	38.0				
Moment of inertia J [kgcm²]	0.4100				
Weight without brake m [kg]	1.62				
Max. permissible output torque M_{KN} [Nm]	8.43	10.78	13.48	21.57	33.7
Max. permissible peak torque M_{Kmax} [Nm]	33.5	42.88	53.6	85.76	134
Holding brake					
Holding torque of brake M_{Br} [Nm]	2.20				
Mass of brake [kg]	0.28				
Moment of inertia of brake J_{Br} [kgcm²]	0.1200				
Gearbox					
Number of gear stages	2				
Gear ratio i	25	32	40	64	100
Nominal output torque T_{2N} [Nm]	40	44	40	18	15
Max. output torque T_{2max} [Nm]	64	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	80	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	12				
Torsional rigidity C_{t21} [Nm/arcmin]	12	11.4	11.8	7.5	5.1
Max. radial force Fr_{max} [N] for 30,000 h	500				
Max. radial force Fr_{max} [N] for 20,000 h	550				
Max. axial force Fa_{max} [N] for 30,000 h	1200				
Max. axial force Fa_{max} [N] for 20,000 h	1200				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	94				
Weight m [kg]	1.02	1.03	1.04	1.03	1.09
Moment of inertia J_1 [kgcm²]	0.015	0.006		0.005	0.003

4.7.17 8D1B33.eB - 1,200 rpm (8GM40, gearbox size 080) - Technical data

Gear ratio 005-025

Order number	8D1B33. eBgBHDk00-1	8D1B33. eBgBHFk00-1	8D1B33. eBgBHHk00-1	8D1B33. eBgBHLk00-1	8D1B33. eBgBHMk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				
Motor					
Nominal speed n_N [rpm]	1200				
Number of pole pairs	5				
Nominal torque M_n [Nm]	2.000				
Nominal power P_N [W]	251				
Nominal current I_N [A]	6.060				
Stall torque M_0 [Nm]	2.000				
Stall current I_0 [A]	6.060				
Maximum torque M_{max} [Nm]	4.92				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.330				
Voltage constant K_E [V/1000 rpm]	19.00				
Stator resistance R_{2ph} [Ω]	0.540				
Stator inductance L_{2ph} [mH]	0.80000				
Electrical time constant t_{el} [ms]	1.555				
Thermal time constant t_{therm} [min]	34.0				
Moment of inertia J [kgcm²]	1.6000				
Weight without brake m [kg]	2.71				
Max. permissible output torque M_{KN} [Nm]	7.75	12.4	15.5	31	39
Max. permissible peak torque M_{Kmax} [Nm]	24.6	39.4	49.2	98.4	123
Holding brake					
Holding torque of brake M_{Br} [Nm]	3.20				
Mass of brake [kg]	0.57				
Moment of inertia of brake J_{Br} [kgcm²]	0.3800				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	20	25
Nominal output torque T_{2N} [Nm]	50		38	120	110
Max. output torque T_{2max} [Nm]	80		61	192	176
Emergency switch-off torque T_{2stop} [Nm]	100		76	240	220
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4000				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4000				
Max. backlash J_t [arcmin]	7			9	
Torsional rigidity C_{t21} [Nm/arcmin]	9.9	8.4	8.3	9.8	9.7
Max. radial force Fr_{max} [N] for 30,000 h	650				
Max. radial force Fr_{max} [N] for 20,000 h	750				
Max. axial force Fa_{max} [N] for 30,000 h	900				
Max. axial force Fa_{max} [N] for 20,000 h	1000				
Operating noise L_{PA} [dB(A)]	60				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	1.32		1.35	1.8	1.82
Moment of inertia J_1 [kgcm²]	0.085	0.027	0.017	0.068	0.066

Table 38: 8D1B33.eBgBHDk00-1, 8D1B33.eBgBHFk00-1, 8D1B33.eBgB-HHk00-1, 8D1B33.eBgBHLk00-1, 8D1B33.eBgBHMk00-1 - Technical data

Gear ratio 032-100

Order number	8D1B33.eBgBHNk00-1	8D1B33.eBgBHQk00-1	8D1B33.eBgBHTk00-1	8D1B33.eBgBHWk00-1
General information				
Certifications				
CE	Yes			
UKCA	Yes			
UL	cURus E225616 Power conversion equipment			
Motor				
Nominal speed n_N [rpm]	1200			
Number of pole pairs	5			
Nominal torque M_n [Nm]	2.000			
Nominal power P_N [W]	251			
Nominal current I_N [A]	6.060			
Stall torque M_0 [Nm]	2.000			
Stall current I_0 [A]	6.060			
Maximum torque M_{max} [Nm]	4.92			
Maximum current I_{max} [A]	15.70			
Maximum speed n_{max} [rpm]	6600			
Torque constant K_T [Nm/A]	0.330			
Voltage constant K_E [V/1000 rpm]	19.00			
Stator resistance R_{2ph} [Ω]	0.540			
Stator inductance L_{2ph} [mH]	0.80000			
Electrical time constant t_{el} [ms]	1.555			
Thermal time constant t_{therm} [min]	34.0			
Moment of inertia J [kgcm²]	1.6000			
Weight without brake m [kg]	2.71			
Max. permissible output torque M_{KN} [Nm]	49.6	62	99.15	154.92
Max. permissible peak torque M_{Kmax} [Nm]	157.4	196.8	314.9	492
Holding brake				
Holding torque of brake M_{Br} [Nm]	3.20			
Mass of brake [kg]	0.57			
Moment of inertia of brake J_{Br} [kgcm²]	0.3800			
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	120	110	50	38
Max. output torque T_{2max} [Nm]	192	176	80	61
Emergency switch-off torque T_{2stop} [Nm]	240	220	100	76
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4000			
Max. backlash J_t [arcmin]	9			
Torsional rigidity C_{t21} [Nm/arcmin]	9.7	9.6	7.9	7.2
Max. radial force Fr_{max} [N] for 30,000 h	650			
Max. radial force Fr_{max} [N] for 20,000 h	750			
Max. axial force Fa_{max} [N] for 30,000 h	900			
Max. axial force Fa_{max} [N] for 20,000 h	1000			
Operating noise L_{PA} [dB(A)]	60			
Efficiency at full load ŋ [%]	94			
Weight m [kg]	1.83	1.85	1.84	2.27
Moment of inertia J_1 [kgcm²]	0.023			0.013

Table 39: 8D1B33.eBgBHNk00-1, 8D1B33.eBgBHQk00-1, 8D1B33.eBgBHTk00-1, 8D1B33.eBgBHWk00-1 - Technical data

4.7.18 8D1B33.eB - 1,200 rpm (8GM45, gearbox size 067) - Technical data

Gear ratio 005-025

Order number	8D1B33. eBgCIDk00-1	8D1B33.eBgCIFk00-1	8D1B33. eBgCIHk00-1	8D1B33.eBgCILk00-1	8D1B33. eBgCIMk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				

Table 40: 8D1B33.eBgCIDk00-1, 8D1B33.eBgCIFk00-1, 8D1B33.e-BgCIHk00-1, 8D1B33.eBgCILk00-1, 8D1B33.eBgCIMk00-1 - Technical data

Order number	8D1B33. eBgCIDk00-1	8D1B33.eBgCIFk00-1	8D1B33. eBgCIHk00-1	8D1B33.eBgCILk00-1	8D1B33. eBgCIMk00-1
Motor					
Nominal speed n_N [rpm]	1200				
Number of pole pairs	5				
Nominal torque M_n [Nm]	2.000				
Nominal power P_N [W]	251				
Nominal current I_N [A]	6.060				
Stall torque M_0 [Nm]	2.000				
Stall current I_0 [A]	6.060				
Maximum torque M_{max} [Nm]	4.92				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.330				
Voltage constant K_E [V/1000 rpm]	19.00				
Stator resistance R_{2ph} [Ω]	0.540				
Stator inductance L_{2ph} [mH]	0.80000				
Electrical time constant t_{el} [ms]	1.555				
Thermal time constant t_{therm} [min]	34.0				
Moment of inertia J [kgcm²]	1.6000				
Weight without brake m [kg]	2.71				
Max. permissible output torque M_{KN} [Nm]	7.75	12.39	15.5	31	38.7
Max. permissible peak torque M_{Kmax} [Nm]	24.6	39.4	49.2	98.4	123
Holding brake					
Holding torque of brake M_{Br} [Nm]	3.20				
Mass of brake [kg]	0.57				
Moment of inertia of brake J_{Br} [kgcm²]	0.3800				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	20	25
Nominal output torque T_{2N} [Nm]	16	15		44	40
Max. output torque T_{2max} [Nm]	25	24		70	64
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	80
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.1	3.4	3.1	3.8	3.9
Max. radial force Fr_{max} [N] for 30,000 h	700				
Max. radial force Fr_{max} [N] for 20,000 h	900				
Max. axial force Fa_{max} [N] for 30,000 h	800				
Max. axial force Fa_{max} [N] for 20,000 h	1000				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load η [%]	96			94	
Weight m [kg]	0.78		0.79	0.97	0.98
Moment of inertia J_1 [kgcm²]	0.024	0.008	0.005	0.015	0.014

Table 40: 8D1B33.eBgCIDk00-1, 8D1B33.eBgCIFk00-1, 8D1B33.e-BgCIHk00-1, 8D1B33.eBgCILk00-1, 8D1B33.eBgCIMk00-1 - Technical data

Gear ratio 032-100

Order number	8D1B33.eBgCINk00-1	8D1B33.eBgCIQk00-1	8D1B33.eBgCITk00-1	8D1B33.eBgCIWk00-1
General information				
Certifications				
CE	Yes			
UKCA	Yes			
UL	cURus E225616 Power conversion equipment			
Motor				
Nominal speed n_N [rpm]	1200			
Number of pole pairs	5			
Nominal torque M_n [Nm]	2.000			
Nominal power P_N [W]	251			
Nominal current I_N [A]	6.060			
Stall torque M_0 [Nm]	2.000			
Stall current I_0 [A]	6.060			
Maximum torque M_{max} [Nm]	4.92			
Maximum current I_{max} [A]	15.70			
Maximum speed n_{max} [rpm]	6600			
Torque constant K_T [Nm/A]	0.330			
Voltage constant K_E [V/1000 rpm]	19.00			
Stator resistance R_{2ph} [Ω]	0.540			
Stator inductance L_{2ph} [mH]	0.80000			
Electrical time constant t_{el} [ms]	1.555			
Thermal time constant t_{therm} [min]	34.0			
Moment of inertia J [kgcm²]	1.6000			
Weight without brake m [kg]	2.71			
Max. permissible output torque M_{KN} [Nm]	49.6	62	99.15	154.92
Max. permissible peak torque M_{Kmax} [Nm]	157.44	196.8	314.9	492
Holding brake				
Holding torque of brake M_{Br} [Nm]	3.20			
Mass of brake [kg]	0.57			
Moment of inertia of brake J_{Br} [kgcm²]	0.3800			
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	44	40	18	15
Max. output torque T_{2max} [Nm]	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500			
Max. backlash J_t [arcmin]	12			
Torsional rigidity C_{t21} [Nm/arcmin]	3.8	3.9	3.3	2.7
Max. radial force Fr_{max} [N] for 30,000 h	700			
Max. radial force Fr_{max} [N] for 20,000 h	900			
Max. axial force Fa_{max} [N] for 30,000 h	800			
Max. axial force Fa_{max} [N] for 20,000 h	1000			
Operating noise L_{PA} [dB(A)]	58			
Efficiency at full load ŋ [%]	94			
Weight m [kg]	0.98	0.99		1.16
Moment of inertia J_1 [kgcm²]	0.006	0.005		0.003

Table 41: 8D1B33.eBgCINk00-1, 8D1B33.eBgCIQk00-1, 8D1B33.eBgCITk00-1, 8D1B33.eBgCIWk00-1 - Technical data

4.7.19 8D1B33.eB - 1,200 rpm (8GM50, gearbox size 070) - Technical data

Gear ratio 005-025

Order number	8D1B33. eBgDJDk00-1	8D1B33. eBgDJFk00-1	8D1B33. eBgDJHk00-1	8D1B33. eBgDJLk00-1	8D1B33. eBgDJMk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				

Table 42: 8D1B33.eBgDJDk00-1, 8D1B33.eBgDJFk00-1, 8D1B33.e-BgDJHk00-1, 8D1B33.eBgDJLk00-1, 8D1B33.eBgDJMk00-1 - Technical data

Order number	8D1B33. eBgDJDk00-1	8D1B33. eBgDJFk00-1	8D1B33. eBgDJHk00-1	8D1B33. eBgDJLk00-1	8D1B33. eBgDJMk00-1
Motor					
Nominal speed n_N [rpm]	1200				
Number of pole pairs	5				
Nominal torque M_n [Nm]	2.000				
Nominal power P_N [W]	251				
Nominal current I_N [A]	6.060				
Stall torque M_0 [Nm]	2.000				
Stall current I_0 [A]	6.060				
Maximum torque M_{max} [Nm]	4.92				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.330				
Voltage constant K_E [V/1000 rpm]	19.00				
Stator resistance R_{2ph} [Ω]	0.540				
Stator inductance L_{2ph} [mH]	0.80000				
Electrical time constant t_{el} [ms]	1.555				
Thermal time constant t_{therm} [min]	34.0				
Moment of inertia J [kgcm²]	1.6000				
Weight without brake m [kg]	2.71				
Max. permissible output torque M_{KN} [Nm]	7.75	12.4	15.5	31	38.7
Max. permissible peak torque M_{Kmax} [Nm]	24.6	39.4	49.2	98.4	123
Holding brake					
Holding torque of brake M_{Br} [Nm]	3.20				
Mass of brake [kg]	0.57				
Moment of inertia of brake J_{Br} [kgcm²]	0.3800				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	20	25
Nominal output torque T_{2N} [Nm]	16	15		33	30
Max. output torque T_{2max} [Nm]	26	24		53	48
Emergency switch-off torque T_{2stop} [Nm]	32	30		66	60
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500				
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	5.7	4.4	3.9	5.2	5.3
Max. radial force Fr_{max} [N] for 30,000 h	900				
Max. radial force Fr_{max} [N] for 20,000 h	1050				
Max. axial force Fa_{max} [N] for 30,000 h	1000				
Max. axial force Fa_{max} [N] for 20,000 h	1350				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load η [%]	96			94	
Weight m [kg]	1.1	1.12	1.13	1.4	
Moment of inertia J_1 [kgcm²]	0.035	0.013	0.008	0.016	0.015

Table 42: 8D1B33.eBgDJDk00-1, 8D1B33.eBgDJFk00-1, 8D1B33.e-BgDJHk00-1, 8D1B33.eBgDJLk00-1, 8D1B33.eBgDJMk00-1 - Technical data

Gear ratio 032-100

Order number	8D1B33.eBgDJNk00-1	8D1B33.eBgDJQk00-1	8D1B33.eBgDJTk00-1	8D1B33.eBgDJWk00-1
General information				
Certifications				
CE	Yes			
UKCA	Yes			
UL	cURus E225616 Power conversion equipment			
Motor				
Nominal speed n_N [rpm]	1200			
Number of pole pairs	5			
Nominal torque M_n [Nm]	2.000			
Nominal power P_N [W]	251			
Nominal current I_N [A]	6.060			
Stall torque M_0 [Nm]	2.000			
Stall current I_0 [A]	6.060			
Maximum torque M_{max} [Nm]	4.92			
Maximum current I_{max} [A]	15.70			
Maximum speed n_{max} [rpm]	6600			
Torque constant K_T [Nm/A]	0.330			
Voltage constant K_E [V/1000 rpm]	19.00			
Stator resistance R_{2ph} [Ω]	0.540			
Stator inductance L_{2ph} [mH]	0.80000			
Electrical time constant t_{el} [ms]	1.555			
Thermal time constant t_{therm} [min]	34.0			
Moment of inertia J [kgcm²]	1.6000			
Weight without brake m [kg]	2.71			
Max. permissible output torque M_{KN} [Nm]	94.6	62	99.15	154.92
Max. permissible peak torque M_{Kmax} [Nm]	157.4	196.8	314.9	492
Holding brake				
Holding torque of brake M_{Br} [Nm]	3.20			
Mass of brake [kg]	0.57			
Moment of inertia of brake J_{Br} [kgcm²]	0.3800			
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	33	30	18	15
Max. output torque T_{2max} [Nm]	53	48	29	24
Emergency switch-off torque T_{2stop} [Nm]	66	60	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500			
Max. backlash J_t [arcmin]	12			
Torsional rigidity C_{t21} [Nm/arcmin]	5.1	5.2	4.2	3.3
Max. radial force Fr_{max} [N] for 30,000 h	900			
Max. radial force Fr_{max} [N] for 20,000 h	1050			
Max. axial force Fa_{max} [N] for 30,000 h	1000			
Max. axial force Fa_{max} [N] for 20,000 h	1350			
Operating noise L_{PA} [dB(A)]	58			
Efficiency at full load η [%]	94			
Weight m [kg]	1.41		1.42	1.57
Moment of inertia J_1 [kgcm²]	0.006		0.005	0.003

Table 43: 8D1B33.eBgDJNk00-1, 8D1B33.eBgDJQk00-1, 8D1B33.eBgDJTk00-1, 8D1B33.eBgDJWk00-1 - Technical data

4.7.20 8D1B33.eB - 1,200 rpm (8GM55, gearbox size 060) - Technical data

Gear ratio 005-025

Order number	8D1B33. eBgEHDk00-1	8D1B33. eBgEHFk00-1	8D1B33. eBgEHHk00-1	8D1B33. eBgEHLk00-1	8D1B33. eBgEHMk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				

Table 44: 8D1B33.eBgEHDk00-1, 8D1B33.eBgEHFk00-1, 8D1B33.eBgE-HHk00-1, 8D1B33.eBgEHLk00-1, 8D1B33.eBgEHMk00-1 - Technical data

Order number	8D1B33. eBgEHDk00-1	8D1B33. eBgEHFk00-1	8D1B33. eBgEHHk00-1	8D1B33. eBgEHLk00-1	8D1B33. eBgEHMk00-1
Motor					
Nominal speed n_N [rpm]	1200				
Number of pole pairs	5				
Nominal torque M_n [Nm]	2.000				
Nominal power P_N [W]	251				
Nominal current I_N [A]	6.060				
Stall torque M_0 [Nm]	2.000				
Stall current I_0 [A]	6.060				
Maximum torque M_{max} [Nm]	4.92				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.330				
Voltage constant K_E [V/1000 rpm]	19.00				
Stator resistance R_{2ph} [Ω]	0.540				
Stator inductance L_{2ph} [mH]	0.80000				
Electrical time constant t_{el} [ms]	1.555				
Thermal time constant t_{therm} [min]	34.0				
Moment of inertia J [kgcm²]	1.6000				
Weight without brake m [kg]	2.71				
Max. permissible output torque M_{KN} [Nm]	7.75	12.39	15.5	31	38.7
Max. permissible peak torque M_{Kmax} [Nm]	24.6	39.4	49.2	98.4	123
Holding brake					
Holding torque of brake M_{Br} [Nm]	3.20				
Mass of brake [kg]	0.57				
Moment of inertia of brake J_{Br} [kgcm²]	0.3800				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	20	25
Nominal output torque T_{2N} [Nm]	16	15		44	40
Max. output torque T_{2max} [Nm]	25	24		70	64
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	80
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4200	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	3400	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	4.5	3.7	3.3	4.2	
Max. radial force Fr_{max} [N] for 30,000 h	3200				
Max. radial force Fr_{max} [N] for 20,000 h	3200				
Max. axial force Fa_{max} [N] for 30,000 h	3900				
Max. axial force Fa_{max} [N] for 20,000 h	4400				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load η [%]	96			94	
Weight m [kg]	0				
Moment of inertia J_1 [kgcm²]	0.037	0.014	0.008	0.019	0.018

Table 44: 8D1B33.eBgEHDk00-1, 8D1B33.eBgEHFk00-1, 8D1B33.eBgE-HHk00-1, 8D1B33.eBgEHLk00-1, 8D1B33.eBgEHMk00-1 - Technical data

Gear ratio 032-100

Order number	8D1B33.eBgEHNk00-1	8D1B33.eBgEHQk00-1	8D1B33.eBgEHTk00-1	8D1B33.eBgEHWk00-1
General information				
Certifications				
CE	Yes			
UKCA	Yes			
UL	cURus E225616 Power conversion equipment			
Motor				
Nominal speed n_N [rpm]	1200			
Number of pole pairs	5			
Nominal torque M_n [Nm]	2.000			
Nominal power P_N [W]	251			
Nominal current I_N [A]	6.060			
Stall torque M_0 [Nm]	2.000			
Stall current I_0 [A]	6.060			
Maximum torque M_{max} [Nm]	4.92			
Maximum current I_{max} [A]	15.70			
Maximum speed n_{max} [rpm]	6600			
Torque constant K_T [Nm/A]	0.330			
Voltage constant K_E [V/1000 rpm]	19.00			
Stator resistance R_{2ph} [Ω]	0.540			
Stator inductance L_{2ph} [mH]	0.80000			
Electrical time constant t_{el} [ms]	1.555			
Thermal time constant t_{therm} [min]	34.0			
Moment of inertia J [kgcm²]	1.6000			
Weight without brake m [kg]	2.71			
Max. permissible output torque M_{KN} [Nm]	94.6	62	99.15	154.92
Max. permissible peak torque M_{Kmax} [Nm]	157.4	196.8	314.9	492
Holding brake				
Holding torque of brake M_{Br} [Nm]	3.20			
Mass of brake [kg]	0.57			
Moment of inertia of brake J_{Br} [kgcm²]	0.3800			
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	44	40	18	15
Max. output torque T_{2max} [Nm]	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500			
Max. backlash J_t [arcmin]	12			
Torsional rigidity C_{t21} [Nm/arcmin]	4.1	4.2	3.5	2.9
Max. radial force Fr_{max} [N] for 30,000 h	3200			
Max. radial force Fr_{max} [N] for 20,000 h	3200			
Max. axial force Fa_{max} [N] for 30,000 h	3900			
Max. axial force Fa_{max} [N] for 20,000 h	4400			
Operating noise L_{PA} [dB(A)]	58			
Efficiency at full load ŋ [%]	94			
Weight m [kg]	0			
Moment of inertia J_1 [kgcm²]	0.007		0.006	0.004

Table 45: 8D1B33.eBgEHNk00-1, 8D1B33.eBgEHQk00-1, 8D1B33.eBgEHTk00-1, 8D1B33.eBgEHWk00-1 - Technical data

4.7.21 8D1B33.eB - 1,200 rpm (8GG40, gearbox size 064) - Technical data

Gear ratio 005-025

Order number	8D1B33. eBgHJDk00-1	8D1B33. eBgHJFk00-1	8D1B33. eBgHJHk00-1	8D1B33. eBgHJLk00-1	8D1B33. eBgHJMk00-1
General information					
Certifications					
CE	Yes				
UKCA	Yes				
UL	cURus E225616 Power conversion equipment				

Table 46: 8D1B33.eBgHJDk00-1, 8D1B33.eBgHJFk00-1, 8D1B33.e-BgHJHk00-1, 8D1B33.eBgHJLk00-1, 8D1B33.eBgHJMk00-1 - Technical data

Order number	8D1B33. eBgHJDk00-1	8D1B33. eBgHJFk00-1	8D1B33. eBgHJHk00-1	8D1B33. eBgHJLk00-1	8D1B33. eBgHJMk00-1
Motor					
Nominal speed n_N [rpm]	1200				
Number of pole pairs	5				
Nominal torque M_n [Nm]	2.000				
Nominal power P_N [W]	251				
Nominal current I_N [A]	6.060				
Stall torque M_0 [Nm]	2.000				
Stall current I_0 [A]	6.060				
Maximum torque M_{max} [Nm]	4.92				
Maximum current I_{max} [A]	15.70				
Maximum speed n_{max} [rpm]	6600				
Torque constant K_T [Nm/A]	0.330				
Voltage constant K_E [V/1000 rpm]	19.00				
Stator resistance R_{2ph} [Ω]	0.540				
Stator inductance L_{2ph} [mH]	0.80000				
Electrical time constant t_{el} [ms]	1.555				
Thermal time constant t_{therm} [min]	34.0				
Moment of inertia J [kgcm²]	1.6000				
Weight without brake m [kg]	2.71				
Max. permissible output torque M_{KN} [Nm]	7.75	12.39	15.5	31	38.7
Max. permissible peak torque M_{Kmax} [Nm]	24.6	39.4	49.2	98.4	123
Holding brake					
Holding torque of brake M_{Br} [Nm]	3.20				
Mass of brake [kg]	0.57				
Moment of inertia of brake J_{Br} [kgcm²]	0.3800				
Gearbox					
Number of gear stages	1			2	
Gear ratio i	5	8	10	20	25
Nominal output torque T_{2N} [Nm]	16	15		44	40
Max. output torque T_{2max} [Nm]	25	24		70	64
Emergency switch-off torque T_{2stop} [Nm]	32	30		88	80
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4000	4500			
Max. backlash J_t [arcmin]	10			12	
Torsional rigidity C_{t21} [Nm/arcmin]	14.2	8.2	6.4	11.7	12
Max. radial force Fr_{max} [N] for 30,000 h	500				
Max. radial force Fr_{max} [N] for 20,000 h	550				
Max. axial force Fa_{max} [N] for 30,000 h	1200				
Max. axial force Fa_{max} [N] for 20,000 h	1200				
Operating noise L_{PA} [dB(A)]	58				
Efficiency at full load ŋ [%]	96			94	
Weight m [kg]	0.78		0.79	1.02	
Moment of inertia J_1 [kgcm²]	0.049	0.018	0.011	0.017	0.015

Table 46: 8D1B33.eBgHJDk00-1, 8D1B33.eBgHJFk00-1, 8D1B33.e-BgHJHk00-1, 8D1B33.eBgHJLk00-1, 8D1B33.eBgHJMk00-1 - Technical data

Gear ratio 032-100

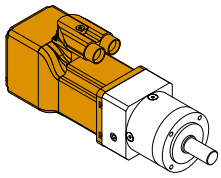
Order number	8D1B33.eBgHJNk00-1	8D1B33.eBgHJQk00-1	8D1B33.eBgHJTk00-1	8D1B33.eBgHJWk00-1
General information				
Certifications				
CE	Yes			
UKCA	Yes			
UL	cURus E225616 Power conversion equipment			
Motor				
Nominal speed n_N [rpm]	1200			
Number of pole pairs	5			
Nominal torque M_n [Nm]	2.000			
Nominal power P_N [W]	251			
Nominal current I_N [A]	6.060			
Stall torque M_0 [Nm]	2.000			
Stall current I_0 [A]	6.060			
Maximum torque M_{max} [Nm]	4.92			
Maximum current I_{max} [A]	15.70			
Maximum speed n_{max} [rpm]	6600			
Torque constant K_T [Nm/A]	0.330			
Voltage constant K_E [V/1000 rpm]	19.00			
Stator resistance R_{2ph} [Ω]	0.540			
Stator inductance L_{2ph} [mH]	0.80000			
Electrical time constant t_{el} [ms]	1.555			
Thermal time constant t_{therm} [min]	34.0			
Moment of inertia J [kgcm²]	1.6000			
Weight without brake m [kg]	2.71			
Max. permissible output torque M_{KN} [Nm]	49.6	62	99.15	154.92
Max. permissible peak torque M_{Kmax} [Nm]	157.44	196.8	314.9	492
Holding brake				
Holding torque of brake M_{Br} [Nm]	3.20			
Mass of brake [kg]	0.57			
Moment of inertia of brake J_{Br} [kgcm²]	0.3800			
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	44	40	18	15
Max. output torque T_{2max} [Nm]	70	64	30	24
Emergency switch-off torque T_{2stop} [Nm]	88	80	36	30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% $T_{2N}$and S1	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% $T_{2N}$and S1	4500			
Max. backlash J_t [arcmin]	12			
Torsional rigidity C_{t21} [Nm/arcmin]	11.4	11.8	7.5	5.1
Max. radial force Fr_{max} [N] for 30,000 h	500			
Max. radial force Fr_{max} [N] for 20,000 h	550			
Max. axial force Fa_{max} [N] for 30,000 h	1200			
Max. axial force Fa_{max} [N] for 20,000 h	1200			
Operating noise L_{PA} [dB(A)]	58			
Efficiency at full load η [%]	94			
Weight m [kg]	1.03	1.04	1.03	1.09
Moment of inertia J_1 [kgcm²]	0.006		0.005	0.003

Table 47: 8D1B33.eBgHJNk00-1, 8D1B33.eBgHJQk00-1, 8D1B33.eBgHJTk00-1, 8D1B33.eBgHJWk00-1 - Technical data

4.8 8D1Cx - Technical data

ACOPOSmotor Compact 8D1C modules consist of an **8D1A module** with flange-mounted **gearbox**. Due to the variety of combinations, the technical data for the motor and gearbox is listed separately.

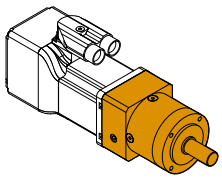
Motor data (without gearbox)



Product ID	8D1C22	8D1C23	8D1C23	8D1C33
General information				
Certifications				
CE		Yes		In preparation
UKCA		Yes		In preparation
UL		cURus E225616 Power conversion equipment		In preparation
Motor				
Nominal speed n_N [rpm]	4500	2000	4100	1200
Number of pole pairs		5		
Nominal torque M_n [Nm]	0.536	1.047	0.792	2
Nominal power P_N [W]	253	219	340	251
Nominal current I_N [A]	5.36	4.76	7.2	6.06
Stall torque M_0 [Nm]	0.659	1.118	0.88	2
Stall current I_0 [A]	6.59	5.08	8	6.06
Maximum torque M_{max} [Nm]	1.34	3.01	1.56	4.92
Maximum current I_{max} [A]		15.7		
Maximum speed n_{max} [rpm]		6600		
Torque constant K_T [Nm/A]	0.1	0.22	0.11	0.33
Voltage constant K_E [V/1000 rpm]	5.97	13.41	6.6	19
Stator resistance R_{2ph} [Ω]	0.4	0.76	0.2	0.54
Stator inductance L_{2ph} [mH]	0.37	0.93	0.24	0.8
Electrical time constant t_{el} [ms]	0.93	1.2		1.555
Thermal time constant t_{therm} [min]	35	38		34
Moment of inertia J [kgcm²]	0.22	0.41		1.6
Weight without brake m [kg]	1.26	1.62		2.71
Holding brake				
Holding torque of brake M_{Br} [Nm]		2.2		3.2
Mass of brake [kg]		0.28		0.57
Moment of inertia of brake J_{Br} [kgcm²]		0.12		0.38

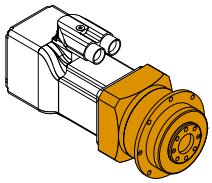
Table 48: 8D1A22.eIg000000-1, 8D1A23.eDg000000-1, 8D1A23.eHg000000-1, 8D1A33.eBg000000-1 - Technical data

Flange-mounted 8GP - Gearbox data



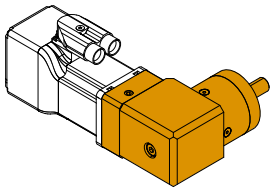
Gearbox	Technical data
8GP40, gearbox size 060	see "8GP40, gearbox size 060 - Technical data" on page 82
8GP40, gearbox size 080	see "8GP40, gearbox size 080 - Technical data" on page 83
8GP45, gearbox size 067	see "8GP45, gearbox size 067 - Technical data" on page 86
8GP45, gearbox size 089	see "8GP45, gearbox size 089 - Technical data" on page 87
8GP50, gearbox size 070	see "8GP50, gearbox size 070 - Technical data" on page 90
8GP50, gearbox size 090	see "8GP50, gearbox size 090 - Technical data" on page 91
8GP55, gearbox size 060	see "8GP55, gearbox size 060 - Technical data" on page 94
8GP55, gearbox size 080	see "8GP55, gearbox size 080 - Technical data" on page 95
8GP60, gearbox size 070	see "8GP60, gearbox size 070 - Technical data" on page 98
8GP70, gearbox size 070	see "8GP70, gearbox size 070 - Technical data" on page 101

Flange-mounted 8GF - Gearbox data



Gearbox	Technical data
8GF40, gearbox size 064	see "8GF40, gearbox size 064 - Technical data" on page 104
8GF60, gearbox size 064	see "8GF60, gearbox size 064 - Technical data" on page 105
8GF70, gearbox size 064	see "8GF70, gearbox size 064 - Technical data" on page 108

Flange-mounted 8GA - Gearbox data



Gearbox	Technical data
8GA40, gearbox size 060	see "8GA40, gearbox size 060 - Technical data" on page 110
8GA40, gearbox size 080	see "8GA40, gearbox size 080 - Technical data" on page 113
8GA45, gearbox size 067	see "8GA45, gearbox size 067 - Technical data" on page 116
8GA45, gearbox size 089	see "8GA45, gearbox size 089 - Technical data" on page 119
8GA50, gearbox size 070	see "8GA50, gearbox size 070 - Technical data" on page 122
8GA50, gearbox size 090	see "8GA50, gearbox size 090 - Technical data" on page 125
8GA55, gearbox size 064	see "8GA55, gearbox size 064 - Technical data" on page 128
8GA60, gearbox size 070	see "8GA60, gearbox size 070 - Technical data" on page 131

4.8.1 8GP40, gearbox size 060 - Technical data

Gear ratio 003 to 016

Order number	8GP40-060h-h003klmm	8GP40-060h-h004klmm	8GP40-060h-h007klmm	8GP40-060h-h009klmm	8GP40-060h-h012klmm	8GP40-060h-h016klmm
Gearbox						
Number of gear stages		1			2	
Gear ratio i	3	4	7	9	12	16
Nominal output torque T_{2N} [Nm]	28.0	38.0	25.0		44.0	
Max. output torque T_{2max} [Nm]	45.0	61.0	40.0		70.0	
Emergency switch-off torque T_{2stop} [Nm]	66	88	80		88	
Idle torque [Nm] at 20°C and 3000 rpm	0.15	0.10				
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500					
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]		10			12	
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]		2.3			2.5	
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	340					
Max. radial force Fr_{max} [N] for 20,000 h	400					
Max. axial force Fa_{max} [N] for 30,000 h	450					
Max. axial force Fa_{max} [N] for 20,000 h	500					
Operating noise L_{PA} [dB(A)]	58					
Efficiency at full load ŋ [%]		96			94	
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]		0.90			1.10	
Moment of inertia J_1 [kgcm²]	0.135	0.093	0.072	0.131	0.127	0.088

4.8.2 8GP40, gearbox size 080 - Technical data

Gear ratio 003 to 010

Order number	8GP40-080h-h003klmm	8GP40-080h-h004klmm	8GP40-080h-h005klmm	8GP40-080h-h007klmm	8GP40-080h-h008klmm	8GP40-080h-h010klmm
Gearbox						
Number of gear stages	1					
Gear ratio i	3	4	5	7	8	10
Nominal output torque T_{2N} [Nm]	85.0	115.0	110.0	65.0	50.0	38.0
Max. output torque T_{2max} [Nm]	136.0	184.0	176.0	104.0	80.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	180	240	220	178	190	200
Idle torque [Nm] at 20°C and 3000 rpm	0.35		0.25	0.20		
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000	3900	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2700	2500	3000	4000		
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	7					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	650					
Max. radial force Fr_{max} [N] for 20,000 h	750					
Max. axial force Fa_{max} [N] for 30,000 h	900					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	96					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	2.10					
Moment of inertia J_1 [kgcm²]	0.770	0.520	0.450	0.420	0.390	

Gear ratio 009 to 025

Order number	8GP40-080h-h009klmm	8GP40-080h-h012klmm	8GP40-080h-h015klmm	8GP40-080h-h016klmm	8GP40-080h-h020klmm	8GP40-080h-h025klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	9	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	130.0	120.0	110.0	120.0		110.0
Max. output torque T_{2max} [Nm]	208.0	192.0	176.0	192.0		176.0
Emergency switch-off torque T_{2stop} [Nm]	260	240	220	240		220
Idle torque [Nm] at 20°C and 3000 rpm	0.25				0.20	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3050	3750	4000			
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	9					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	650					
Max. radial force Fr_{max} [N] for 20,000 h	750					
Max. axial force Fa_{max} [N] for 30,000 h	900					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	94					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	2.60					
Moment of inertia J_1 [kgcm²]	0.740	0.720	0.710	0.500	0.440	

Gear ratio 032 to 080

Order number	8GP40-080h-h032klmm	8GP40-080h-h040klmm	8GP40-080h-h064klmm	8GP40-080h-h100klmm	8GP40-080h-h060klmm	8GP40-080h-h080klmm
Gearbox						
Number of gear stages	2				3	
Gear ratio i	32	40	64	100	60	80
Nominal output torque T_{2N} [Nm]	120.0	110.0	50.0	38.0	110.0	120.0
Max. output torque T_{2max} [Nm]	192.0	176.0	80.0	61.0	176.0	192.0
Emergency switch-off torque T_{2stop} [Nm]	240	220	190	200	220	240
Idle torque [Nm] at 20°C and 3000 rpm	0.20	0.15			0.20	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000					
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	9				11	
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5				6.3	
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	650					
Max. radial force Fr_{max} [N] for 20,000 h	750					
Max. axial force Fa_{max} [N] for 30,000 h	900					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	94				90	
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	2.60				3.10	
Moment of inertia J_1 [kgcm²]	0.390				0.510	0.500

4.8.3 8GP45, gearbox size 067 - Technical data

Gear ratio 003 to 016

Order number	8GP45-067h-h003klmm	8GP45-067h-h004klmm	8GP45-067h-h007klmm	8GP45-067h-h009klmm	8GP45-067h-h012klmm	8GP45-067h-h016klmm
Gearbox						
Number of gear stages	1			2		
Gear ratio i	3	4	7	9	12	16
Nominal output torque T_{2N} [Nm]	28.0	38.0	25.0	44.0		
Max. output torque T_{2max} [Nm]	45.0	61.0	40.0	70.0		
Emergency switch-off torque T_{2stop} [Nm]	66	88	80	88		
Idle torque [Nm] at 20°C and 3000 rpm	0.20	0.15	0.10	0.15	0.10	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4200	4300	4500			
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	10			12		
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	2.3			2.5		
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	700					
Max. radial force Fr_{max} [N] for 20,000 h	900					
Max. axial force Fa_{max} [N] for 30,000 h	800					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	58					
Efficiency at full load ŋ [%]	96			94		
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.10			1.30		
Moment of inertia J_1 [kgcm²]	0.135	0.093	0.072	0.131	0.127	0.088

4.8.4 8GP45, gearbox size 089 - Technical data

Gear ratio 003 to 010

Order number	8GP45-089h-h003klmm	8GP45-089h-h004klmm	8GP45-089h-h005klmm	8GP45-089h-h007klmm	8GP45-089h-h008klmm	8GP45-089h-h010klmm
Gearbox						
Number of gear stages	1					
Gear ratio i	3	4	5	7	8	10
Nominal output torque T_{2N} [Nm]	85.0	115.0	110.0	65.0	50.0	38.0
Max. output torque T_{2max} [Nm]	136.0	184.0	176.0	104.0	80.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	180	240	220	178	190	200
Idle torque [Nm] at 20°C and 3000 rpm	0.55	0.50	0.40	0.30	0.25	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3400	3450	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2400	2350	2800	4000		
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	7					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	2050					
Max. axial force Fa_{max} [N] for 30,000 h	2000					
Max. axial force Fa_{max} [N] for 20,000 h	2500					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	96					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	3.20					
Moment of inertia J_1 [kgcm²]	0.770	0.520	0.450	0.420	0.390	

Gear ratio 009 to 025

Order number	8GP45-089h-h009klmm	8GP45-089h-h012klmm	8GP45-089h-h015klmm	8GP45-089h-h016klmm	8GP45-089h-h020klmm	8GP45-089h-h025klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	9	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	130.0	120.0	110.0	120.0		110.0
Max. output torque T_{2max} [Nm]	208.0	192.0	176.0	192.0		176.0
Emergency switch-off torque T_{2stop} [Nm]	260	240	220	240		220
Idle torque [Nm] at 20°C and 3000 rpm	0.30	0.25		0.30	0.25	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2950	3650	4000			
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	9					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	2050					
Max. axial force Fa_{max} [N] for 30,000 h	2000					
Max. axial force Fa_{max} [N] for 20,000 h	2500					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	94					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	3.70					
Moment of inertia J_1 [kgcm²]	0.740	0.720	0.710	0.500	0.440	

Gear ratio 032 to 100

Order number	8GP45-089h-h032klmm	8GP45-089h-h040klmm	8GP45-089h-h060klmm	8GP45-089h-h064klmm	8GP45-089h-h080klmm	8GP45-089h-h100klmm
Gearbox						
Number of gear stages	2		3	2	3	2
Gear ratio i	32	40	60	64	80	100
Nominal output torque T_{2N} [Nm]	120.0	110.0		50.0	120.0	38.0
Max. output torque T_{2max} [Nm]	192.0	176.0		80.0	192.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	240	220		190	240	200
Idle torque [Nm] at 20°C and 3000 rpm	0.20					0.15
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000					
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	9		11	9	11	9
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5		6.3	6.5	6.3	6.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	2050					
Max. axial force Fa_{max} [N] for 30,000 h	2000					
Max. axial force Fa_{max} [N] for 20,000 h	2500					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	94		90	94	90	94
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	3.70		4.20	3.70	4.20	3.70
Moment of inertia J_1 [kgcm²]	0.390		0.510	0.390	0.500	0.390

4.8.5 8GP50, gearbox size 070 - Technical data

Gear ratio 003 to 016

Order number	8GP50-070h-h003klmm	8GP50-070h-h004klmm	8GP50-070h-h007klmm	8GP50-070h-h009klmm	8GP50-070h-h012klmm	8GP50-070h-h016klmm
Gearbox						
Number of gear stages	1			2		
Gear ratio i	3	4	7	9	12	16
Nominal output torque T_{2N} [Nm]	28.0	33.0	25.0	33.0		
Max. output torque T_{2max} [Nm]	45.0	53.0	40.0	53.0		
Emergency switch-off torque T_{2stop} [Nm]	66	88	80	88		
Idle torque [Nm] at 20°C and 3000 rpm	0.40	0.25	0.15			0.10
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3650	4100	4500			
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	10			12		
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	2.3			2.5		
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	900					
Max. radial force Fr_{max} [N] for 20,000 h	1050					
Max. axial force Fa_{max} [N] for 30,000 h	1000					
Max. axial force Fa_{max} [N] for 20,000 h	1350					
Operating noise L_{PA} [dB(A)]	58					
Efficiency at full load ŋ [%]	96			94		
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.50			1.80		
Moment of inertia J_1 [kgcm²]	0.157	0.106	0.078	0.133	0.128	0.089

4.8.6 8GP50, gearbox size 090 - Technical data

Gear ratio 003 to 010

Order number	8GP50-090h-h003klmm	8GP50-090h-h004klmm	8GP50-090h-h005klmm	8GP50-090h-h007klmm	8GP50-090h-h008klmm	8GP50-090h-h010klmm
Gearbox						
Number of gear stages	1					
Gear ratio i	3	4	5	7	8	10
Nominal output torque T_{2N} [Nm]	85.0	90.0	82.0	65.0	50.0	38.0
Max. output torque T_{2max} [Nm]	136.0	144.0	131.0	104.0	80.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	180	240	220	178	190	200
Idle torque [Nm] at 20°C and 3000 rpm	0.75	0.55	0.45	0.30		0.25
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3250	3750	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2300	2650	3200	4000		
Max. drive speed n_{1max} [rpm]	7000			0	7000	
Max. backlash J_t [arcmin]	7					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	1900					
Max. axial force Fa_{max} [N] for 30,000 h	1500					
Max. axial force Fa_{max} [N] for 20,000 h	2000					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	96					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	3.00					
Moment of inertia J_1 [kgcm²]	0.820	0.570	0.480	0.450	0.400	

Gear ratio 009 to 025

Order number	8GP50-090h-h009klmm	8GP50-090h-h012klmm	8GP50-090h-h015klmm	8GP50-090h-h016klmm	8GP50-090h-h020klmm	8GP50-090h-h025klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	9	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	97.0	90.0	82.0	90.0		82.0
Max. output torque T_{2max} [Nm]	155.0	144.0	131.0	144.0		131.0
Emergency switch-off torque T_{2stop} [Nm]	260	240	220	240		220
Idle torque [Nm] at 20°C and 3000 rpm	0.30		0.25			0.20
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3450	4000				
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	9					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	1900					
Max. axial force Fa_{max} [N] for 30,000 h	1500					
Max. axial force Fa_{max} [N] for 20,000 h	2000					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	94					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	3.70					
Moment of inertia J_1 [kgcm²]	0.750	0.730	0.710	0.500	0.440	

Gear ratio 032 to 100

Order number	8GP50-090hh032klmm	8GP50-090hh040klmm	8GP50-090hh064klmm	8GP50-090hh100klmm
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	90.0	82.0	50.0	38.0
Max. output torque T_{2max} [Nm]	144.0	131.0	80.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	240	220	190	200
Idle torque [Nm] at 20°C and 3000 rpm	0.20			0.15
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000			
Max. drive speed n_{1max} [rpm]	7000			
Max. backlash J_t [arcmin]	9			
Reduced backlash J_t [arcmin] less than	0			
Torsional rigidity C_{t21} [Nm/arcmin]	6.5			
Tilting rigidity C_{2K} [Nm/arcmin]	0.0			
Max. breakdown torque M_{2Kmax} [Nm]	0.0			
Max. radial force Fr_{max} [N] for 30,000 h	1700			
Max. radial force Fr_{max} [N] for 20,000 h	1900			
Max. axial force Fa_{max} [N] for 30,000 h	1500			
Max. axial force Fa_{max} [N] for 20,000 h	2000			
Operating noise L_{PA} [dB(A)]	60			
Efficiency at full load ŋ [%]	94			
Min. operating temperature $B_{Tempmin}$ [°C]	-25			
Max. operating temperature $B_{Tempmax}$ [°C]	90			
Mounting orientation	Any			
Degree of protection	IP54			
Weight m [kg]	3.70			
Moment of inertia J_1 [kgcm^2]	0.390			

4.8.7 8GP55, gearbox size 060 - Technical data

Gear ratio 003 to 016

Order number	8GP55-060h-h003klmm	8GP55-060h-h004klmm	8GP55-060h-h007klmm	8GP55-060h-h009klmm	8GP55-060h-h012klmm	8GP55-060h-h016klmm
Gearbox						
Number of gear stages	1				2	
Gear ratio i	3	4	7	9	12	16
Nominal output torque T_{2N} [Nm]	28.0	38.0	25.0		44.0	
Max. output torque T_{2max} [Nm]	45.0	61.0	40.0		70.0	
Emergency switch-off torque T_{2stop} [Nm]	66	88	80		88	
Idle torque [Nm] at 20°C and 3000 rpm	0.50	0.35	0.20		0.15	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	2950	3500	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2500	2900	4500	4200	4500	
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	10			12		
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	2.3			2.5		
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	3200					
Max. radial force Fr_{max} [N] for 20,000 h	3200					
Max. axial force Fa_{max} [N] for 30,000 h	3900					
Max. axial force Fa_{max} [N] for 20,000 h	4400					
Operating noise L_{PA} [dB(A)]	58					
Efficiency at full load ŋ [%]	96			94		
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	1.40			1.60		
Moment of inertia J_1 [kgcm²]	0.150	0.102	0.075	0.133	0.128	0.089

4.8.8 8GP55, gearbox size 080 - Technical data

Gear ratio 003 to 010

Order number	8GP55-080h-h003klmm	8GP55-080h-h004klmm	8GP55-080h-h005klmm	8GP55-080h-h007klmm	8GP55-080h-h008klmm	8GP55-080h-h010klmm
Gearbox						
Number of gear stages	1					
Gear ratio i	3	4	5	7	8	10
Nominal output torque T_{2N} [Nm]	85.0	115.0	110.0	65.0	50.0	38.0
Max. output torque T_{2max} [Nm]	136.0	184.0	176.0	104.0	80.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	180	240	220	178	190	200
Idle torque [Nm] at 20°C and 3000 rpm	0.90	0.70	0.55	0.40	0.35	0.30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	2450	2700	3250		4000	
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	1900	2000	2400		4000	
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	7					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	4800					
Max. radial force Fr_{max} [N] for 20,000 h	5500					
Max. axial force Fa_{max} [N] for 30,000 h	5700					
Max. axial force Fa_{max} [N] for 20,000 h	6400					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	96					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	2.70					
Moment of inertia J_1 [kgcm²]	0.803	0.538	0.462	0.428	0.395	0.393

Gear ratio 009 to 025

Order number	8GP55-080h-h009klmm	8GP55-080h-h012klmm	8GP55-080h-h015klmm	8GP55-080h-h016klmm	8GP55-080h-h020klmm	8GP55-080h-h025klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	9	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	130.0	120.0	110.0	120.0		110.0
Max. output torque T_{2max} [Nm]	208.0	192.0	176.0	192.0		176.0
Emergency switch-off torque T_{2stop} [Nm]	260	240	220	240		220
Idle torque [Nm] at 20°C and 3000 rpm	0.40	0.35	0.30	0.35	0.25	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2850	3550	4000			
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	9					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	4800					
Max. radial force Fr_{max} [N] for 20,000 h	5500					
Max. axial force Fa_{max} [N] for 30,000 h	5700					
Max. axial force Fa_{max} [N] for 20,000 h	6400					
Operating noise L_{PA} [dB(A)]	60					
Efficiency at full load ŋ [%]	94					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	3.40					
Moment of inertia J_1 [kgcm²]	0.744	0.722	0.710	0.500	0.440	

Gear ratio 032 to 100

Order number	8GP55-080hh032klmm	8GP55-080hh040klmm	8GP55-080hh064klmm	8GP55-080hh100klmm
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	120.0	110.0	50.0	38.0
Max. output torque T_{2max} [Nm]	192.0	176.0	80.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	240	220	190	200
Idle torque [Nm] at 20°C and 3000 rpm	0.20			0.15
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000			
Max. drive speed n_{1max} [rpm]	7000			
Max. backlash J_t [arcmin]	9			
Reduced backlash J_t [arcmin] less than	0			
Torsional rigidity C_{t21} [Nm/arcmin]	6.5			
Tilting rigidity C_{2K} [Nm/arcmin]	0.0			
Max. breakdown torque M_{2Kmax} [Nm]	0.0			
Max. radial force Fr_{max} [N] for 30,000 h	4800			
Max. radial force Fr_{max} [N] for 20,000 h	5500			
Max. axial force Fa_{max} [N] for 30,000 h	5700			
Max. axial force Fa_{max} [N] for 20,000 h	6400			
Operating noise L_{PA} [dB(A)]	60			
Efficiency at full load ŋ [%]	94			
Min. operating temperature $B_{Tempmin}$ [°C]	-25			
Max. operating temperature $B_{Tempmax}$ [°C]	90			
Mounting orientation	Any			
Degree of protection	IP 65			
Weight m [kg]	3.40			
Moment of inertia J_1 [kgcm^2]	0.390			

4.8.9 8GP60, gearbox size 070 - Technical data

Gear ratio 003 to 010

Order number	8GP60-070h-h003klmm	8GP60-070h-h004klmm	8GP60-070h-h005klmm	8GP60-070h-h007klmm	8GP60-070h-h008klmm	8GP60-070h-h010klmm
Gearbox						
Number of gear stages	1					
Gear ratio i	3	4	5	7	8	10
Nominal output torque T_{2N} [Nm]	45.0	60.0	65.0	45.0	40.0	27.0
Max. output torque T_{2max} [Nm]	72.0	96.0	104.0	72.0	64.0	43.0
Emergency switch-off torque T_{2stop} [Nm]	90	120	130	80	90	
Idle torque [Nm] at 20°C and 3000 rpm	0.70	0.50	0.40	0.35	0.30	0.25
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	2050	2300	2650	3450	3800	4400
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	1700	1900	2100	2950	3300	4000
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	3					
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	6.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	3200					
Max. radial force Fr_{max} [N] for 20,000 h	3200					
Max. axial force Fa_{max} [N] for 30,000 h	3900					
Max. axial force Fa_{max} [N] for 20,000 h	4400					
Operating noise L_{PA} [dB(A)]	58					
Efficiency at full load ŋ [%]	98					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	1.90					
Moment of inertia J_1 [kgcm²]	0.400	0.320	0.280	0.260	0.250	

Gear ratio 012 to 032

Order number	8GP60-070h-h012klmm	8GP60-070h-h015klmm	8GP60-070h-h016klmm	8GP60-070h-h020klmm	8GP60-070h-h025klmm	8GP60-070h-h032klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	12	15	16	20	25	32
Nominal output torque T_{2N} [Nm]	68.0		77.0		65.0	77.0
Max. output torque T_{2max} [Nm]	109.0		123.0		104.0	123.0
Emergency switch-off torque T_{2stop} [Nm]	135		150			
Idle torque [Nm] at 20°C and 3000 rpm	0.35	0.30		0.25		0.20
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3550	4000	3800	4300	4500	
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2900	3300	3150	3600	4100	4500
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	5					
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	7.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	3200					
Max. radial force Fr_{max} [N] for 20,000 h	3200					
Max. axial force Fa_{max} [N] for 30,000 h	3900					
Max. axial force Fa_{max} [N] for 20,000 h	4400					
Operating noise L_{PA} [dB(A)]	58					
Efficiency at full load ŋ [%]	95					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	2.40					
Moment of inertia J_1 [kgcm²]	0.400	0.380	0.350	0.330	0.300	0.320

Gear ratio 040 to 100

Order number	8GP60-070hh040klmm	8GP60-070hh064klmm	8GP60-070hh100klmm
Gearbox			
Number of gear stages		2	
Gear ratio i	40	64	100
Nominal output torque T_{2N} [Nm]	65.0	40.0	27.0
Max. output torque T_{2max} [Nm]	104.0	64.0	43.0
Emergency switch-off torque T_{2stop} [Nm]	150	80	
Idle torque [Nm] at 20°C and 3000 rpm		0.20	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1		4500	
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1		4500	
Max. drive speed n_{1max} [rpm]		14000	
Max. backlash J_t [arcmin]		5	
Reduced backlash J_t [arcmin] less than		2	
Torsional rigidity C_{t21} [Nm/arcmin]		7.0	
Tilting rigidity C_{2K} [Nm/arcmin]		0.0	
Max. breakdown torque M_{2Kmax} [Nm]		0.0	
Max. radial force Fr_{max} [N] for 30,000 h		3200	
Max. radial force Fr_{max} [N] for 20,000 h		3200	
Max. axial force Fa_{max} [N] for 30,000 h		3900	
Max. axial force Fa_{max} [N] for 20,000 h		4400	
Operating noise L_{PA} [dB(A)]		58	
Efficiency at full load ŋ [%]		95	
Min. operating temperature $B_{Tempmin}$ [°C]		-25	
Max. operating temperature $B_{Tempmax}$ [°C]		90	
Mounting orientation		Any	
Degree of protection		IP 65	
Weight m [kg]		2.40	
Moment of inertia J_1 [kgcm²]	0.290	0.260	0.250

4.8.10 8GP70, gearbox size 070 - Technical data

Gear ratio 003 to 012

Order number	8GP70-070h-h003klmm	8GP70-070h-h004klmm	8GP70-070h-h005klmm	8GP70-070h-h007klmm	8GP70-070h-h010klmm	8GP70-070h-h012klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	10	12
Nominal output torque T_{2N} [Nm]	29.0	39.0	40.0	37.0	28.0	29.0
Max. output torque T_{2max} [Nm]	46.0	62.0	64.0	59.0	45.0	46.0
Emergency switch-off torque T_{2stop} [Nm]	90	120	130	80	90	135
Idle torque [Nm] at 20°C and 3000 rpm	0.65	0.45	0.35	0.25	0.20	0.45
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3000	3700	4400		4500	
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2850	3400	4050		4500	
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	3					5
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	5.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	3200					
Max. radial force Fr_{max} [N] for 20,000 h	3200					
Max. axial force Fa_{max} [N] for 30,000 h	3900					
Max. axial force Fa_{max} [N] for 20,000 h	4400					
Operating noise L_{PA} [dB(A)]	63	57				
Efficiency at full load ŋ [%]	98					95
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	1.90					2.70
Moment of inertia J_1 [kgcm²]	0.273	0.191	0.163	0.137	0.125	0.180

Gear ratio 015 to 040

Order number	8GP70-070h-h015klmm	8GP70-070h-h016klmm	8GP70-070h-h020klmm	8GP70-070h-h025klmm	8GP70-070h-h035klmm	8GP70-070h-h040klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	15	16	20	25	35	40
Nominal output torque T_{2N} [Nm]	29.0	39.0		40.0		39.0
Max. output torque T_{2max} [Nm]	46.0	62.0		64.0		62.0
Emergency switch-off torque T_{2stop} [Nm]	135	150				
Idle torque [Nm] at 20°C and 3000 rpm	0.30	0.40	0.30		0.20	0.15
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500					
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	5					
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	5.0					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	3200					
Max. radial force Fr_{max} [N] for 20,000 h	3200					
Max. axial force Fa_{max} [N] for 30,000 h	3900					
Max. axial force Fa_{max} [N] for 20,000 h	4400					
Operating noise L_{PA} [dB(A)]	57					
Efficiency at full load ŋ [%]	95					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	2.70					
Moment of inertia J_1 [kgcm²]	0.156	0.175	0.152	0.151	0.131	0.123

Gear ratio 050 to 100

Order number	8GP70-070hh050klmm	8GP70-070hh070klmm	8GP70-070hh100klmm
Gearbox			
Number of gear stages		2	
Gear ratio i	50	70	100
Nominal output torque T_{2N} [Nm]	40.0	37.0	28.0
Max. output torque T_{2max} [Nm]	64.0	59.0	45.0
Emergency switch-off torque T_{2stop} [Nm]	150	80	
Idle torque [Nm] at 20°C and 3000 rpm		0.15	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1		4500	
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1		4500	
Max. drive speed n_{1max} [rpm]		14000	
Max. backlash J_t [arcmin]		5	
Reduced backlash J_t [arcmin] less than		2	
Torsional rigidity C_{t21} [Nm/arcmin]		5.0	
Tilting rigidity C_{2K} [Nm/arcmin]		0.0	
Max. breakdown torque M_{2Kmax} [Nm]		0.0	
Max. radial force Fr_{max} [N] for 30,000 h		3200	
Max. radial force Fr_{max} [N] for 20,000 h		3200	
Max. axial force Fa_{max} [N] for 30,000 h		3900	
Max. axial force Fa_{max} [N] for 20,000 h		4400	
Operating noise L_{PA} [dB(A)]		57	
Efficiency at full load ŋ [%]		95	
Min. operating temperature $B_{Tempmin}$ [°C]		-25	
Max. operating temperature $B_{Tempmax}$ [°C]		90	
Mounting orientation		Any	
Degree of protection		IP 65	
Weight m [kg]		2.70	
Moment of inertia J_1 [kgcm²]		0.122	

4.8.11 8GF40, gearbox size 064 - Technical data

Gear ratio 003 to 016

Order number	8GF40-064h-h003klmm	8GF40-064h-h004klmm	8GF40-064h-h007klmm	8GF40-064h-h009klmm	8GF40-064h-h012klmm	8GF40-064h-h016klmm
Gearbox						
Number of gear stages	1				2	
Gear ratio i	3	4	7	9	12	16
Nominal output torque T_{2N} [Nm]	28.0	38.0	25.0		44.0	
Max. output torque T_{2max} [Nm]	45.0	61.0	40.0		70.0	
Emergency switch-off torque T_{2stop} [Nm]	66	88	80		88	
Idle torque [Nm] at 20°C and 3000 rpm	0.30	0.20	0.15			0.10
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3950	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3200	3450	4500	4400	4500	
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	10			12		
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	18.0			12.0		
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	500					
Max. radial force Fr_{max} [N] for 20,000 h	550					
Max. axial force Fa_{max} [N] for 30,000 h	1200					
Max. axial force Fa_{max} [N] for 20,000 h	1200					
Operating noise L_{PA} [dB(A)]	58					
Efficiency at full load ŋ [%]	96			94		
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.10			1.50		
Moment of inertia J_1 [kgcm²]	0.183	0.123	0.084	0.145	0.134	0.101

4.8.12 8GF60, gearbox size 064 - Technical data

Gear ratio 004 to 016

Order number	8GF60-064h-h004klmm	8GF60-064h-h005klmm	8GF60-064h-h007klmm	8GF60-064h-h008klmm	8GF60-064h-h010klmm	8GF60-064h-h016klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	4	5	7	8	10	16
Nominal output torque T_{2N} [Nm]	60.0	65.0	45.0	40.0	27.0	77.0
Max. output torque T_{2max} [Nm]	96.0	104.0	72.0	64.0	43.0	123.0
Emergency switch-off torque T_{2stop} [Nm]	120	130	90			150
Idle torque [Nm] at 20°C and 3000 rpm	0.70	0.55	0.40	0.35	0.30	0.35
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	2100	2450	3200	3550	4100	3700
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	1750	2000	2800	3100	3800	3050
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	3					5
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	16.0					14.0
Tilting rigidity C_{2K} [Nm/arcmin]	117.0					
Max. breakdown torque M_{2Kmax} [Nm]	148.0					
Max. radial force Fr_{max} [N] for 30,000 h	2100					
Max. radial force Fr_{max} [N] for 20,000 h	2400					
Max. axial force Fa_{max} [N] for 30,000 h	3800					
Max. axial force Fa_{max} [N] for 20,000 h	4300					
Operating noise L_{PA} [dB(A)]	65					
Efficiency at full load ŋ [%]	98					95
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	1.50					2.20
Moment of inertia J_1 [kgcm²]	0.290	0.260	0.240	0.220	0.210	0.320

Gear ratio 020 to 064

Order number	8GF60-064h-h020klmm	8GF60-064h-h025klmm	8GF60-064h-h032klmm	8GF60-064h-h040klmm	8GF60-064h-h050klmm	8GF60-064h-h064klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	20	25	32	40	50	64
Nominal output torque T_{2N} [Nm]	77.0	65.0	77.0	65.0		40.0
Max. output torque T_{2max} [Nm]	123.0	104.0	123.0	104.0		64.0
Emergency switch-off torque T_{2stop} [Nm]	150					80
Idle torque [Nm] at 20°C and 3000 rpm	0.30	0.25		0.20		
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4200	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3500	4000	4400	4500		
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	5					
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	14.0					
Tilting rigidity C_{2K} [Nm/arcmin]	117.0					
Max. breakdown torque M_{2Kmax} [Nm]	148.0					
Max. radial force Fr_{max} [N] for 30,000 h	2100					
Max. radial force Fr_{max} [N] for 20,000 h	2400					
Max. axial force Fa_{max} [N] for 30,000 h	3800					
Max. axial force Fa_{max} [N] for 20,000 h	4300					
Operating noise L_{PA} [dB(A)]	65					
Efficiency at full load ŋ [%]	95					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	2.20					
Moment of inertia J_1 [kgcm²]	0.300	0.270	0.290	0.260	0.220	0.230

Gear ratio 100

Order number	8GF60-064hh100klmm
Gearbox	
Number of gear stages	2
Gear ratio i	100
Nominal output torque T_{2N} [Nm]	27.0
Max. output torque T_{2max} [Nm]	43.0
Emergency switch-off torque T_{2stop} [Nm]	80
Idle torque [Nm] at 20°C and 3000 rpm	0.20
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500
Max. drive speed n_{1max} [rpm]	14000
Max. backlash J_t [arcmin]	5
Reduced backlash J_t [arcmin] less than	2
Torsional rigidity C_{t21} [Nm/arcmin]	14.0
Tilting rigidity C_{2K} [Nm/arcmin]	117.0
Max. breakdown torque M_{2Kmax} [Nm]	148.0
Max. radial force Fr_{max} [N] for 30,000 h	2100
Max. radial force Fr_{max} [N] for 20,000 h	2400
Max. axial force Fa_{max} [N] for 30,000 h	3800
Max. axial force Fa_{max} [N] for 20,000 h	4300
Operating noise L_{PA} [dB(A)]	65
Efficiency at full load ŋ [%]	95
Min. operating temperature $B_{Tempmin}$ [°C]	-25
Max. operating temperature $B_{Tempmax}$ [°C]	90
Mounting orientation	Any
Degree of protection	IP 65
Weight m [kg]	2.20
Moment of inertia J_1 [kgcm²]	0.220

4.8.13 8GF70, gearbox size 064 - Technical data

Gear ratio 004 to 020

Order number	8GF70-064h-h004klmm	8GF70-064h-h005klmm	8GF70-064h-h007klmm	8GF70-064h-h010klmm	8GF70-064h-h016klmm	8GF70-064h-h020klmm
Gearbox						
Number of gear stages	1				2	
Gear ratio i	4	5	7	10	16	20
Nominal output torque T_{2N} [Nm]	39.0	40.0	37.0	28.0	39.0	
Max. output torque T_{2max} [Nm]	62.0	64.0	59.0	45.0	62.0	
Emergency switch-off torque T_{2stop} [Nm]	120	130	80	90	150	
Idle torque [Nm] at 20°C and 3000 rpm	0.65	0.50	0.35	0.25	0.45	0.30
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3200	3800	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3000	3600	4500			
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	3				5	
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	16.0				14.0	
Tilting rigidity C_{2K} [Nm/arcmin]	117.0					
Max. breakdown torque M_{2Kmax} [Nm]	148.0					
Max. radial force Fr_{max} [N] for 30,000 h	2100					
Max. radial force Fr_{max} [N] for 20,000 h	2400					
Max. axial force Fa_{max} [N] for 30,000 h	3800					
Max. axial force Fa_{max} [N] for 20,000 h	4300					
Operating noise L_{PA} [dB(A)]	57					
Efficiency at full load ŋ [%]	98				95	
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	1.50				2.20	
Moment of inertia J_1 [kgcm²]	0.192	0.163	0.138	0.125	0.175	0.152

Gear ratio 025 to 100

Order number	8GF70-064h-h025klmm	8GF70-064h-h035klmm	8GF70-064h-h040klmm	8GF70-064h-h050klmm	8GF70-064h-h070klmm	8GF70-064h-h100klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	25	35	40	50	70	100
Nominal output torque T_{2N} [Nm]	40.0		39.0	40.0	37.0	28.0
Max. output torque T_{2max} [Nm]	64.0		62.0	64.0	59.0	45.0
Emergency switch-off torque T_{2stop} [Nm]	150				80	90
Idle torque [Nm] at 20°C and 3000 rpm	0.30	0.20	0.15			
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500					
Max. drive speed n_{1max} [rpm]	14000					
Max. backlash J_t [arcmin]	5					
Reduced backlash J_t [arcmin] less than	2					
Torsional rigidity C_{t21} [Nm/arcmin]	14.0					
Tilting rigidity C_{2K} [Nm/arcmin]	117.0					
Max. breakdown torque M_{2Kmax} [Nm]	148.0					
Max. radial force Fr_{max} [N] for 30,000 h	2100					
Max. radial force Fr_{max} [N] for 20,000 h	2400					
Max. axial force Fa_{max} [N] for 30,000 h	3800					
Max. axial force Fa_{max} [N] for 20,000 h	4300					
Operating noise L_{PA} [dB(A)]	57					
Efficiency at full load ŋ [%]	95					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	2.20					
Moment of inertia J_1 [kgcm²]	0.151	0.131	0.123	0.122		

4.8.14 8GA40, gearbox size 060 - Technical data

Gear ratio 003 to 009

Order number	8GA40-060h-h003klmm	8GA40-060h-h004klmm	8GA40-060h-h005klmm	8GA40-060h-h007klmm	8GA40-060h-h008klmm	8GA40-060h-h009klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	8	9
Nominal output torque T_{2N} [Nm]	14.0	19.0	24.0	25.0	18.0	44.0
Max. output torque T_{2max} [Nm]	22.0	30.0	38.0	40.0	29.0	70.0
Emergency switch-off torque T_{2stop} [Nm]	66	86	80			88
Idle torque [Nm] at 20°C and 3000 rpm	0.25		0.20			0.25
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3900	3950	4000	4500		3550
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16					18
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	1.5					2.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	340					
Max. radial force Fr_{max} [N] for 20,000 h	400					
Max. axial force Fa_{max} [N] for 30,000 h	450					
Max. axial force Fa_{max} [N] for 20,000 h	500					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	94					92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.70					1.90
Moment of inertia J_1 [kgcm²]	0.246	0.204	0.189	0.183	0.176	0.242

Gear ratio 010 to 025

Order number	8GA40-060h-h010klmm	8GA40-060h-h012klmm	8GA40-060h-h015klmm	8GA40-060h-h016klmm	8GA40-060h-h020klmm	8GA40-060h-h025klmm
Gearbox						
Number of gear stages	1	2				
Gear ratio i	10	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	15.0	44.0				40.0
Max. output torque T_{2max} [Nm]	24.0	70.0				64.0
Emergency switch-off torque T_{2stop} [Nm]	70	88				80
Idle torque [Nm] at 20°C and 3000 rpm	0.20	0.25	0.20			
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500	4150	4500			
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16	18				
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	1.5	2.5				
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	340					
Max. radial force Fr_{max} [N] for 20,000 h	400					
Max. axial force Fa_{max} [N] for 30,000 h	450					
Max. axial force Fa_{max} [N] for 20,000 h	500					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	94	92				
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.70	1.90				
Moment of inertia J_1 [kgcm²]	0.175	0.238	0.188	0.199	0.186	

Gear ratio 032 to 100

Order number	8GA40-060h-h032klmm	8GA40-060h-h040klmm	8GA40-060h-h060klmm	8GA40-060h-h064klmm	8GA40-060h-h080klmm	8GA40-060h-h100klmm
Gearbox						
Number of gear stages	2		3	2	3	2
Gear ratio i	32	40	60	64	80	100
Nominal output torque T_{2N} [Nm]	44.0	40.0	44.0	18.0	44.0	15.0
Max. output torque T_{2max} [Nm]	70.0	64.0	70.0	29.0	70.0	24.0
Emergency switch-off torque T_{2stop} [Nm]	88	80	88	80	88	80
Idle torque [Nm] at 20°C and 3000 rpm	0.20					
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500					
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	18		21	18	21	18
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	2.5					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	340					
Max. radial force Fr_{max} [N] for 20,000 h	400					
Max. axial force Fa_{max} [N] for 30,000 h	450					
Max. axial force Fa_{max} [N] for 20,000 h	500					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	92		88	92	88	92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.90		2.10	1.90	2.10	1.90
Moment of inertia J_1 [kgcm²]	0.175		0.187	0.175	0.186	0.175

4.8.15 8GA40, gearbox size 080 - Technical data

Gear ratio 003 to 009

Order number	8GA40-080h-h003klmm	8GA40-080h-h004klmm	8GA40-080h-h005klmm	8GA40-080h-h007klmm	8GA40-080h-h008klmm	8GA40-080h-h009klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	8	9
Nominal output torque T_{2N} [Nm]	40.0	53.0	67.0	65.0	50.0	130.0
Max. output torque T_{2max} [Nm]	64.0	85.0	107.0	104.0	80.0	208.0
Emergency switch-off torque T_{2stop} [Nm]	180	240	220	178	190	260
Idle torque [Nm] at 20°C and 3000 rpm	0.60		0.55	0.50		0.55
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3500	3550	3600	4000		3250
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2500	2450		3100	3800	2100
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	13					15
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	4.5					6.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	650					
Max. radial force Fr_{max} [N] for 20,000 h	750					
Max. axial force Fa_{max} [N] for 30,000 h	900					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	94					92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	4.40					5.00
Moment of inertia J_1 [kgcm²]	1.189	0.939	0.869	0.839	0.809	1.159

Gear ratio 010 to 025

Order number	8GA40-080h-h010klmm	8GA40-080h-h012klmm	8GA40-080h-h015klmm	8GA40-080h-h016klmm	8GA40-080h-h020klmm	8GA40-080h-h025klmm
Gearbox						
Number of gear stages	1	2				
Gear ratio i	10	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	38.0	120.0	110.0	120.0		110.0
Max. output torque T_{2max} [Nm]	61.0	192.0	176.0	192.0		176.0
Emergency switch-off torque T_{2stop} [Nm]	170	240	220	240		220
Idle torque [Nm] at 20°C and 3000 rpm	0.50	0.55	0.50	0.55	0.50	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000	3850	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000	2650	3150	3100	3550	4000
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	13	15				
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	4.5	6.5				
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	650					
Max. radial force Fr_{max} [N] for 20,000 h	750					
Max. axial force Fa_{max} [N] for 30,000 h	900					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	94	92				
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	4.40	5.00				
Moment of inertia J_1 [kgcm²]	0.809	1.139	1.129	0.919	0.859	

Gear ratio 032 to 100

Order number	8GA40-080h-h032klmm	8GA40-080h-h040klmm	8GA40-080h-h064klmm	8GA40-080h-h060klmm	8GA40-080h-h080klmm	8GA40-080h-h100klmm
Gearbox						
Number of gear stages	2			3		2
Gear ratio i	32	40	64	60	80	100
Nominal output torque T_{2N} [Nm]	120.0	110.0	50.0	110.0	120.0	38.0
Max. output torque T_{2max} [Nm]	192.0	176.0	80.0	176.0	192.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	240	220	190	220	240	170
Idle torque [Nm] at 20°C and 3000 rpm	0.45			0.50		0.45
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000					
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	15			17		15
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5			6.3		6.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	650					
Max. radial force Fr_{max} [N] for 20,000 h	750					
Max. axial force Fa_{max} [N] for 30,000 h	900					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	92			88		92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	5.00			5.50		5.00
Moment of inertia J_1 [kgcm²]	0.809			0.929	0.919	0.809

4.8.16 8GA45, gearbox size 067 - Technical data

Gear ratio 003 to 009

Order number	8GA45-067h-h003klmm	8GA45-067h-h004klmm	8GA45-067h-h005klmm	8GA45-067h-h007klmm	8GA45-067h-h008klmm	8GA45-067h-h009klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	8	9
Nominal output torque T_{2N} [Nm]	14.0	19.0	24.0	25.0	18.0	44.0
Max. output torque T_{2max} [Nm]	22.0	30.0	38.0	40.0	29.0	70.0
Emergency switch-off torque T_{2stop} [Nm]	66	86	80			88
Idle torque [Nm] at 20°C and 3000 rpm	0.30	0.25			0.20	0.25
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3700	3800	3850	4500		3500
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16					18
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	1.5					2.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	700					
Max. radial force Fr_{max} [N] for 20,000 h	900					
Max. axial force Fa_{max} [N] for 30,000 h	800					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	94					92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.90					2.10
Moment of inertia J_1 [kgcm²]	0.246	0.204	0.189	0.183	0.176	0.242

Gear ratio 010 to 025

Order number	8GA45-067h-h010klmm	8GA45-067h-h012klmm	8GA45-067h-h015klmm	8GA45-067h-h016klmm	8GA45-067h-h020klmm	8GA45-067h-h025klmm
Gearbox						
Number of gear stages	1	2				
Gear ratio i	10	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	15.0	44.0				40.0
Max. output torque T_{2max} [Nm]	24.0	70.0				64.0
Emergency switch-off torque T_{2stop} [Nm]	70	88				80
Idle torque [Nm] at 20°C and 3000 rpm	0.20	0.25	0.20			
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500	4100	4500			
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16	18				
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	1.5	2.5				
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	700					
Max. radial force Fr_{max} [N] for 20,000 h	900					
Max. axial force Fa_{max} [N] for 30,000 h	800					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	94	92				
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.90	2.10				
Moment of inertia J_1 [kgcm²]	0.175	0.238	0.188	0.199	0.186	

Gear ratio 032 to 100

Order number	8GA45-067h-h032klmm	8GA45-067h-h040klmm	8GA45-067h-h060klmm	8GA45-067h-h064klmm	8GA45-067h-h080klmm	8GA45-067h-h100klmm
Gearbox						
Number of gear stages	2		3	2	3	2
Gear ratio i	32	40	60	64	80	100
Nominal output torque T_{2N} [Nm]	44.0	40.0	44.0	18.0	44.0	15.0
Max. output torque T_{2max} [Nm]	70.0	64.0	70.0	29.0	70.0	24.0
Emergency switch-off torque T_{2stop} [Nm]	88	80	88	80	88	80
Idle torque [Nm] at 20°C and 3000 rpm	0.20					
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500					
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	18		21	18	21	18
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	2.5					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	700					
Max. radial force Fr_{max} [N] for 20,000 h	900					
Max. axial force Fa_{max} [N] for 30,000 h	800					
Max. axial force Fa_{max} [N] for 20,000 h	1000					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	92		88	92	88	92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	2.10		2.30	2.10	2.30	2.10
Moment of inertia J_1 [kgcm²]	0.175		0.187	0.175	0.186	0.175

4.8.17 8GA45, gearbox size 089 - Technical data

Gear ratio 003 to 009

Order number	8GA45-089h-h003klmm	8GA45-089h-h004klmm	8GA45-089h-h005klmm	8GA45-089h-h007klmm	8GA45-089h-h008klmm	8GA45-089h-h009klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	8	9
Nominal output torque T_{2N} [Nm]	40.0	53.0	67.0	65.0	50.0	130.0
Max. output torque T_{2max} [Nm]	64.0	85.0	107.0	104.0	80.0	208.0
Emergency switch-off torque T_{2stop} [Nm]	180	240	220	178	190	260
Idle torque [Nm] at 20°C and 3000 rpm	0.85	0.75	0.65	0.55		0.60
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3100	3250	3350	4000		3150
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2300		2350	3000	3650	2050
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	13					15
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	4.5					6.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	2050					
Max. axial force Fa_{max} [N] for 30,000 h	2000					
Max. axial force Fa_{max} [N] for 20,000 h	2500					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	94					92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	5.50					6.10
Moment of inertia J_1 [kgcm²]	1.189	0.939	0.869	0.839	0.809	1.159

Gear ratio 010 to 025

Order number	8GA45-089h-h010klmm	8GA45-089h-h012klmm	8GA45-089h-h015klmm	8GA45-089h-h016klmm	8GA45-089h-h020klmm	8GA45-089h-h025klmm
Gearbox						
Number of gear stages	1	2				
Gear ratio i	10	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	38.0	120.0	110.0	120.0		110.0
Max. output torque T_{2max} [Nm]	61.0	192.0	176.0	192.0		176.0
Emergency switch-off torque T_{2stop} [Nm]	170	240	220	240		220
Idle torque [Nm] at 20°C and 3000 rpm	0.50	0.55			0.50	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000	3750	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000	2600	3100	3050	3500	4000
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	13	15				
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	4.5	6.5				
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	2050					
Max. axial force Fa_{max} [N] for 30,000 h	2000					
Max. axial force Fa_{max} [N] for 20,000 h	2500					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	94	92				
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	5.50	6.10				
Moment of inertia J_1 [kgcm²]	0.809	1.139	1.129	0.919	0.859	

Gear ratio 032 to 100

Order number	8GA45-089h-h032klmm	8GA45-089h-h040klmm	8GA45-089h-h060klmm	8GA45-089h-h064klmm	8GA45-089h-h080klmm	8GA45-089h-h100klmm
Gearbox						
Number of gear stages	2		3	2	3	2
Gear ratio i	32	40	60	64	80	100
Nominal output torque T_{2N} [Nm]	120.0	110.0		50.0	120.0	38.0
Max. output torque T_{2max} [Nm]	192.0	176.0		80.0	192.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	240	220		190	240	170
Idle torque [Nm] at 20°C and 3000 rpm	0.45		0.50	0.45	0.50	0.45
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000					
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	15		17	15	17	15
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	6.5		6.3	6.5	6.3	6.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	2050					
Max. axial force Fa_{max} [N] for 30,000 h	2000					
Max. axial force Fa_{max} [N] for 20,000 h	2500					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	92		88	92	88	92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	6.10		6.60	6.10	6.60	6.10
Moment of inertia J_1 [kgcm²]	0.809		0.929	0.809	0.919	0.809

4.8.18 8GA50, gearbox size 070 - Technical data

Gear ratio 003 to 009

Order number	8GA50-070h-h003klmm	8GA50-070h-h004klmm	8GA50-070h-h005klmm	8GA50-070h-h007klmm	8GA50-070h-h008klmm	8GA50-070h-h009klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	8	9
Nominal output torque T_{2N} [Nm]	14.0	19.0	24.0	25.0	18.0	33.0
Max. output torque T_{2max} [Nm]	22.0	30.0	38.0	40.0	29.0	53.0
Emergency switch-off torque T_{2stop} [Nm]	66	86	80			88
Idle torque [Nm] at 20°C and 3000 rpm	0.50	0.40	0.35	0.30	0.25	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4200	4500				
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3300	3500	3600	4300	4500	4000
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16					18
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	1.5					2.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	900					
Max. radial force Fr_{max} [N] for 20,000 h	1050					
Max. axial force Fa_{max} [N] for 30,000 h	1000					
Max. axial force Fa_{max} [N] for 20,000 h	1350					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	94					92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	2.30					2.60
Moment of inertia J_1 [kgcm²]	0.157	0.106	0.086	0.077	0.068	0.133

Gear ratio 010 to 025

Order number	8GA50-070h-h010klmm	8GA50-070h-h012klmm	8GA50-070h-h015klmm	8GA50-070h-h016klmm	8GA50-070h-h020klmm	8GA50-070h-h025klmm
Gearbox						
Number of gear stages	1	2				
Gear ratio i	10	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	15.0	33.0				30.0
Max. output torque T_{2max} [Nm]	24.0	53.0				48.0
Emergency switch-off torque T_{2stop} [Nm]	70	88				80
Idle torque [Nm] at 20°C and 3000 rpm	0.25				0.20	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500					
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16	18				
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	1.5	2.5				
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	900					
Max. radial force Fr_{max} [N] for 20,000 h	1050					
Max. axial force Fa_{max} [N] for 30,000 h	1000					
Max. axial force Fa_{max} [N] for 20,000 h	1350					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	94	92				
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	2.30	2.60				
Moment of inertia J_1 [kgcm²]	0.066	0.128	0.078	0.089	0.076	0.075

Gear ratio 032 to 100

Order number	8GA50-070hh032klmm	8GA50-070hh040klmm	8GA50-070hh064klmm	8GA50-070hh100klmm
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	33.0	30.0	18.0	15.0
Max. output torque T_{2max} [Nm]	53.0	48.0	29.0	24.0
Emergency switch-off torque T_{2stop} [Nm]	88	80		
Idle torque [Nm] at 20°C and 3000 rpm	0.20			
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500			
Max. drive speed n_{1max} [rpm]	13000			
Max. backlash J_t [arcmin]	18			
Reduced backlash J_t [arcmin] less than	0			
Torsional rigidity C_{t21} [Nm/arcmin]	2.5			
Tilting rigidity C_{2K} [Nm/arcmin]	0.0			
Max. breakdown torque M_{2Kmax} [Nm]	0.0			
Max. radial force Fr_{max} [N] for 30,000 h	900			
Max. radial force Fr_{max} [N] for 20,000 h	1050			
Max. axial force Fa_{max} [N] for 30,000 h	1000			
Max. axial force Fa_{max} [N] for 20,000 h	1350			
Operating noise L_{PA} [dB(A)]	70			
Efficiency at full load ŋ [%]	92			
Min. operating temperature $B_{Tempmin}$ [°C]	-25			
Max. operating temperature $B_{Tempmax}$ [°C]	90			
Mounting orientation	Any			
Degree of protection	IP54			
Weight m [kg]	2.60			
Moment of inertia J_1 [kgcm^2]	0.064			

4.8.19 8GA50, gearbox size 090 - Technical data

Gear ratio 003 to 009

Order number	8GA50-090h-h003klmm	8GA50-090h-h004klmm	8GA50-090h-h005klmm	8GA50-090h-h007klmm	8GA50-090h-h008klmm	8GA50-090h-h009klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	8	9
Nominal output torque T_{2N} [Nm]	40.0	53.0	67.0	65.0	50.0	97.0
Max. output torque T_{2max} [Nm]	64.0	85.0	107.0	104.0	80.0	155.0
Emergency switch-off torque T_{2stop} [Nm]	180	240	220	178	190	260
Idle torque [Nm] at 20°C and 3000 rpm	1.05	0.85	0.75		0.60	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	3000	3150	3250	3950	4000	3500
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	2200	2250	2300	2900	3550	2450
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	13					15
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	4.5					6.5
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	1900					
Max. axial force Fa_{max} [N] for 30,000 h	1500					
Max. axial force Fa_{max} [N] for 20,000 h	2000					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	94					92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	5.30					6.10
Moment of inertia J_1 [kgcm²]	0.820	0.570	0.480	0.440	0.400	0.750

Gear ratio 010 to 025

Order number	8GA50-090h-h010klmm	8GA50-090h-h012klmm	8GA50-090h-h015klmm	8GA50-090h-h016klmm	8GA50-090h-h020klmm	8GA50-090h-h025klmm
Gearbox						
Number of gear stages	1	2				
Gear ratio i	10	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	38.0	90.0	82.0	90.0		82.0
Max. output torque T_{2max} [Nm]	61.0	144.0	131.0	144.0		131.0
Emergency switch-off torque T_{2stop} [Nm]	170	240	220	240		220
Idle torque [Nm] at 20°C and 3000 rpm	0.55				0.50	
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000	3000	3500	3450	3900	4000
Max. drive speed n_{1max} [rpm]	7000					
Max. backlash J_t [arcmin]	13	15				
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	4.5	6.5				
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	1700					
Max. radial force Fr_{max} [N] for 20,000 h	1900					
Max. axial force Fa_{max} [N] for 30,000 h	1500					
Max. axial force Fa_{max} [N] for 20,000 h	2000					
Operating noise L_{PA} [dB(A)]	73					
Efficiency at full load ŋ [%]	94	92				
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	5.30	6.10				
Moment of inertia J_1 [kgcm²]	0.400	0.730	0.710	0.500	0.440	

Gear ratio 032 to 100

Order number	8GA50-090hh032klmm	8GA50-090hh040klmm	8GA50-090hh064klmm	8GA50-090hh100klmm
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	90.0	82.0	50.0	38.0
Max. output torque T_{2max} [Nm]	144.0	131.0	80.0	61.0
Emergency switch-off torque T_{2stop} [Nm]	240	220	190	170
Idle torque [Nm] at 20°C and 3000 rpm	0.50	0.45		
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4000			
Max. drive speed n_{1max} [rpm]	7000			
Max. backlash J_t [arcmin]	15			
Reduced backlash J_t [arcmin] less than	0			
Torsional rigidity C_{t21} [Nm/arcmin]	6.5			
Tilting rigidity C_{2K} [Nm/arcmin]	0.0			
Max. breakdown torque M_{2Kmax} [Nm]	0.0			
Max. radial force Fr_{max} [N] for 30,000 h	1700			
Max. radial force Fr_{max} [N] for 20,000 h	1900			
Max. axial force Fa_{max} [N] for 30,000 h	1500			
Max. axial force Fa_{max} [N] for 20,000 h	2000			
Operating noise L_{PA} [dB(A)]	73			
Efficiency at full load ŋ [%]	92			
Min. operating temperature $B_{Tempmin}$ [°C]	-25			
Max. operating temperature $B_{Tempmax}$ [°C]	90			
Mounting orientation	Any			
Degree of protection	IP54			
Weight m [kg]	6.10			
Moment of inertia J_1 [kgcm^2]	0.390			

4.8.20 8GA55, gearbox size 064 - Technical data

Gear ratio 003 to 009

Order number	8GA55-064h-h003klmm	8GA55-064h-h004klmm	8GA55-064h-h005klmm	8GA55-064h-h007klmm	8GA55-064h-h008klmm	8GA55-064h-h009klmm
Gearbox						
Number of gear stages	1					2
Gear ratio i	3	4	5	7	8	9
Nominal output torque T_{2N} [Nm]	14.0	19.0	24.0	25.0	18.0	44.0
Max. output torque T_{2max} [Nm]	22.0	30.0	38.0	40.0	29.0	70.0
Emergency switch-off torque T_{2stop} [Nm]	66	86	80			88
Idle torque [Nm] at 20°C and 3000 rpm	0.30	0.25	0.15	0.10	0.40	0.15
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4000	4400	4500			4300
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	3300	3500	3700	4400	4500	3200
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16					18
Torsional rigidity C_{t21} [Nm/arcmin]	11.6	11.9	11.3	10.7	9.8	11.6
Max. radial force Fr_{max} [N] for 30,000 h	500					
Max. radial force Fr_{max} [N] for 20,000 h	550					
Max. axial force Fa_{max} [N] for 30,000 h	1200					
Max. axial force Fa_{max} [N] for 20,000 h	1200					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	93			92	91	92
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.40					2.30
Moment of inertia J_1 [kgcm²]	0.439	0.294	0.265	0.240	0.235	0.359

Gear ratio 010 to 025

Order number	8GA55-064h-h010klmm	8GA55-064h-h012klmm	8GA55-064h-h015klmm	8GA55-064h-h016klmm	8GA55-064h-h020klmm	8GA55-064h-h025klmm
Gearbox						
Number of gear stages	1	2				
Gear ratio i	10	12	15	16	20	25
Nominal output torque T_{2N} [Nm]	15.0	44.0				40.0
Max. output torque T_{2max} [Nm]	24.0	70.0				64.0
Emergency switch-off torque T_{2stop} [Nm]	70	88				80
Idle torque [Nm] at 20°C and 3000 rpm	0.15	0.20	0.40	0.20	0.10	0.35
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500					
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500	3700	4300	4400	4500	
Max. drive speed n_{1max} [rpm]	13000					
Max. backlash J_t [arcmin]	16	18				
Torsional rigidity C_{t21} [Nm/arcmin]	8.9	11.6	11.9			11.3
Max. radial force Fr_{max} [N] for 30,000 h	500					
Max. radial force Fr_{max} [N] for 20,000 h	550					
Max. axial force Fa_{max} [N] for 30,000 h	1200					
Max. axial force Fa_{max} [N] for 20,000 h	1200					
Operating noise L_{PA} [dB(A)]	70					
Efficiency at full load ŋ [%]	90	92	91		90	89
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP54					
Weight m [kg]	1.40	2.30				
Moment of inertia J_1 [kgcm²]	0.228	0.352	0.235	0.244	0.233	0.232

Gear ratio 032 to 100

Order number	8GA55-064hh032klmm	8GA55-064hh040klmm	8GA55-064hh064klmm	8GA55-064hh100klmm
Gearbox				
Number of gear stages	2			
Gear ratio i	32	40	64	100
Nominal output torque T_{2N} [Nm]	44.0	40.0	18.0	15.0
Max. output torque T_{2max} [Nm]	70.0	64.0	29.0	24.0
Emergency switch-off torque T_{2stop} [Nm]	88	80		
Idle torque [Nm] at 20°C and 3000 rpm	0.10	0.35		
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	4500			
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	4500			
Max. drive speed n_{1max} [rpm]	13000			
Max. backlash J_t [arcmin]	18			
Torsional rigidity C_{t21} [Nm/arcmin]	10.5	10.1	9.6	9.1
Max. radial force Fr_{max} [N] for 30,000 h	500			
Max. radial force Fr_{max} [N] for 20,000 h	550			
Max. axial force Fa_{max} [N] for 30,000 h	1200			
Max. axial force Fa_{max} [N] for 20,000 h	1200			
Operating noise L_{PA} [dB(A)]	70			
Efficiency at full load ŋ [%]	89	87	75	64
Min. operating temperature $B_{Tempmin}$ [°C]	-25			
Max. operating temperature $B_{Tempmax}$ [°C]	90			
Mounting orientation	Any			
Degree of protection	IP54			
Weight m [kg]	2.30			
Moment of inertia J_1 [kgcm²]	0.223		0.222	0.220

4.8.21 8GA60, gearbox size 070 - Technical data

Gear ratio 004 to 020

Order number	8GA60-070h-h004klmm	8GA60-070h-h005klmm	8GA60-070h-h008klmm	8GA60-070h-h010klmm	8GA60-070h-h016klmm	8GA60-070h-h020klmm
Gearbox						
Number of gear stages	1				2	
Gear ratio i	4	5	8	10	16	20
Nominal output torque T_{2N} [Nm]	45.0	42.0	27.0	22.0	77.0	
Max. output torque T_{2max} [Nm]	72.0	67.0	43.0	35.0	123.0	
Emergency switch-off torque T_{2stop} [Nm]	100		75		150	
Idle torque [Nm] at 20°C and 3000 rpm	1.50	1.35	1.25	1.20	1.00	0.90
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	1800	2000	2350	2500	1850	2000
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	1450	1650	2100	2300	1550	1700
Max. drive speed n_{1max} [rpm]	16000					
Max. backlash J_t [arcmin]	5				7	
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	2.4					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	3200					
Max. radial force Fr_{max} [N] for 20,000 h	3200					
Max. axial force Fa_{max} [N] for 30,000 h	3700				3900	
Max. axial force Fa_{max} [N] for 20,000 h	4300				4400	
Operating noise L_{PA} [dB(A)]	66					
Efficiency at full load ŋ [%]	96				94	
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	3.00				3.90	
Moment of inertia J_1 [kgcm²]	0.654	0.600	0.532	0.516	0.639	0.591

Gear ratio 025 to 100

Order number	8GA60-070h-h025klmm	8GA60-070h-h032klmm	8GA60-070h-h040klmm	8GA60-070h-h050klmm	8GA60-070h-h064klmm	8GA60-070h-h100klmm
Gearbox						
Number of gear stages	2					
Gear ratio i	25	32	40	50	64	100
Nominal output torque T_{2N} [Nm]	65.0	77.0	65.0		40.0	27.0
Max. output torque T_{2max} [Nm]	104.0	123.0	104.0		64.0	43.0
Emergency switch-off torque T_{2stop} [Nm]	150				80	
Idle torque [Nm] at 20°C and 3000 rpm	0.90	0.80		0.75	0.80	0.75
Max. average drive speed $n_{1N50\%}$ [rpm] at 50% T_{2N} and S1	2150	2300	2400	2500	2600	2700
Max. average drive speed $n_{1N100\%}$ [rpm] at 100% T_{2N} and S1	1900	2000	2200	2300	2500	2650
Max. drive speed n_{1max} [rpm]	16000					
Max. backlash J_t [arcmin]	7					
Reduced backlash J_t [arcmin] less than	0					
Torsional rigidity C_{t21} [Nm/arcmin]	2.4					
Tilting rigidity C_{2K} [Nm/arcmin]	0.0					
Max. breakdown torque M_{2Kmax} [Nm]	0.0					
Max. radial force Fr_{max} [N] for 30,000 h	3200					
Max. radial force Fr_{max} [N] for 20,000 h	3200					
Max. axial force Fa_{max} [N] for 30,000 h	3900					
Max. axial force Fa_{max} [N] for 20,000 h	4400					
Operating noise L_{PA} [dB(A)]	66					
Efficiency at full load ŋ [%]	94					
Min. operating temperature $B_{Tempmin}$ [°C]	-25					
Max. operating temperature $B_{Tempmax}$ [°C]	90					
Mounting orientation	Any					
Degree of protection	IP 65					
Weight m [kg]	3.90					
Moment of inertia J_1 [kgcm²]	0.590	0.528				0.514

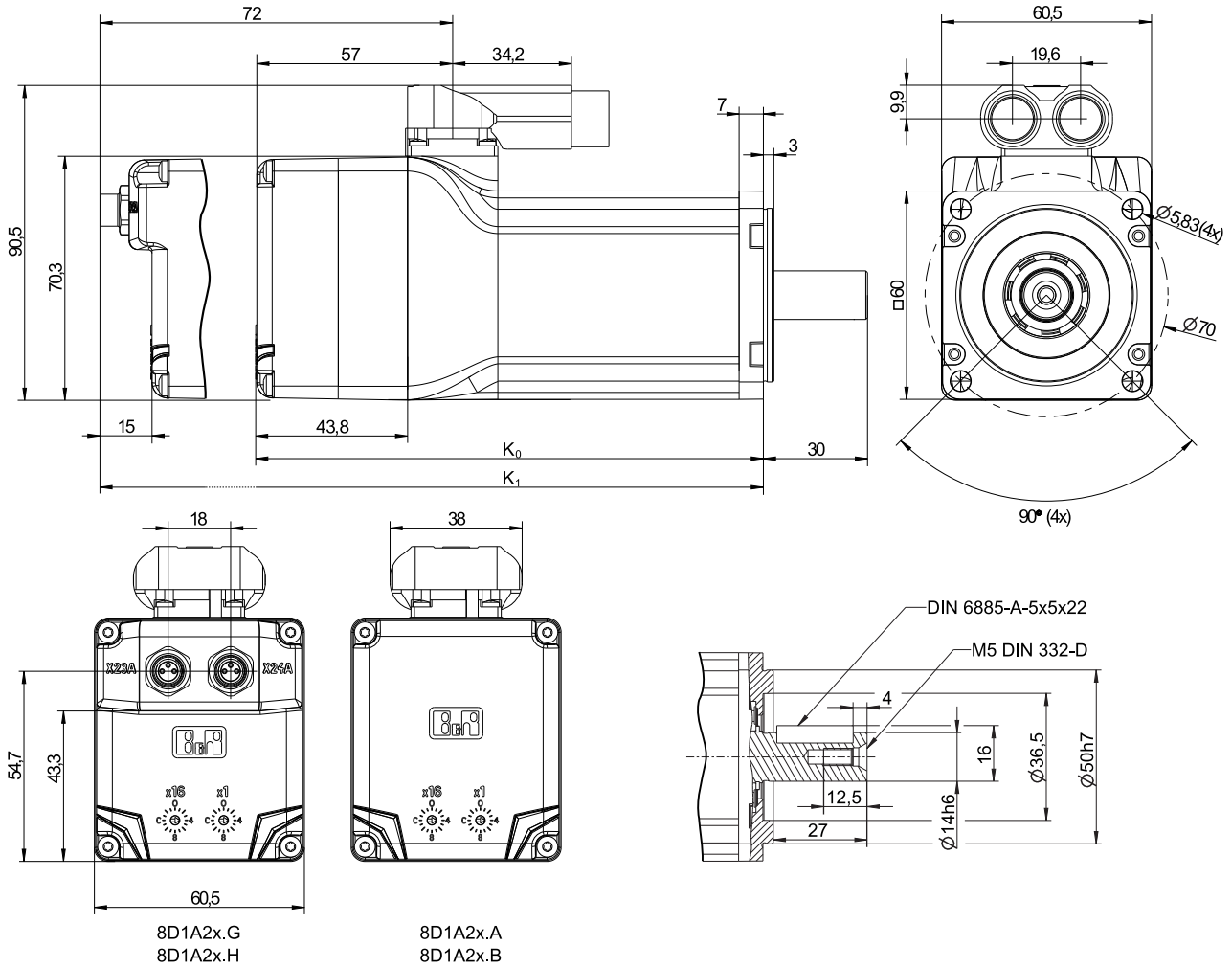
4.9 Dimension diagrams and installation dimensions

4.9.1 Overview

Motor construction type	Order code	Gearbox	Dimension diagrams [1]
8D1**A**2x	8D1A2x.xxx00	Without gearbox	see "8D1A2x" on page 134
8D1**B**2x	8D1B2x.xxxBD	8GM40 (gearbox size 060)	see "8D1B2x.xxxBD - 8GM40 gearbox (gearbox size 060)" on page 135
	8D1B2x.xxxCF	8GM45 (gearbox size 067)	see "8D1B2x.xxxCF - 8GM45 gearbox (gearbox size 067)" on page 136
	8D1B2x.xxxDG	8GM50 (gearbox size 070)	see "8D1B2x.xxxDG - 8GM50 gearbox (gearbox size 070)" on page 137
	8D1B2x.xxxED	8GM55 (gearbox size 060)	see "8D1B2x.xxxED - 8GM55 gearbox (gearbox size 060)" on page 138
	8D1B2x.xxxHE	8GG40 (gearbox size 064)	see "8D1B2x.xxxHE - 8GG40 gearbox (gearbox size 064)" on page 139
8D1**C**2x	8D1C2x.xxxxx	With gearbox	Dimension diagrams can only be retrieved in the CAD configurator at cad.br-automation.com.
8D1A3x	8D1A3x.xxx00	Without gearbox	see "8D1A3x" on page 140
8D1B3x	8D1B3x.xxxBH	8GM40 (gearbox size 080)	see "8D1B3x.xxxBH - 8GM40 gearbox (gearbox size 080)" on page 141
	8D1B3x.xxxCI	8GM45 (gearbox size 089)	see "8D1B3x.xxxCI - 8GM45 gearbox (gearbox size 089)" on page 142
	8D1B3x.xxxDJ	8GM50 (gearbox size 090)	see "8D1B3x.xxxDJ - 8GM50 gearbox (gearbox size 090)" on page 143
	8D1B3x.xxxEH	8GM55 (gearbox size 080)	see "8D1B3x.xxxEH - 8GM55 gearbox (gearbox size 080)" on page 144
	8D1B3x.xxxHJ	8GG40 (gearbox size 090)	see "8D1B3x.xxxHJ - 8GG40 gearbox (gearbox size 090)" on page 145

1) Dimension diagrams can also be retrieved in the CAD configurator at cad.br-automation.com.

4.9.2 8D1A2x



8D1A2x.G
8D1A2x.H

8D1A2x.A
8D1A2x.B

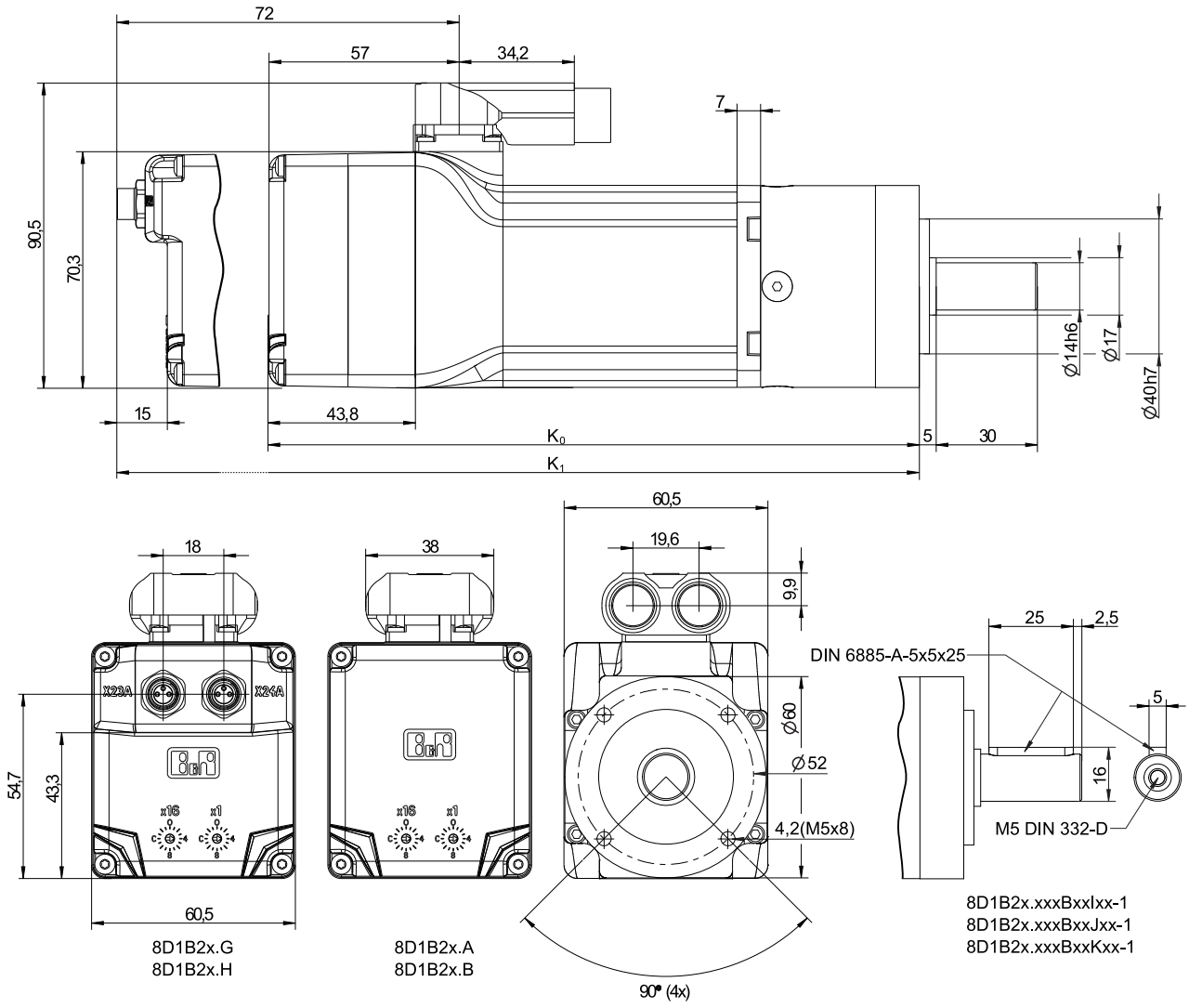
Without electronics option (8D1A2x.A, 8D1A2x.B)

	K_0 [mm]	
	Without holding brake	**With holding brake**
8D1A2**2**	126	159.5
8D1A2**3**	146.5	180

With electronics option (8D1A2x.G, 8D1A2x.H)

	K_1 [mm]	
	Without holding brake	**With holding brake**
8D1A2**2**	141	174.5
8D1A2**3**	161.5	195

4.9.3 8D1B2x.xxxBD - 8GM40 gearbox (gearbox size 060)



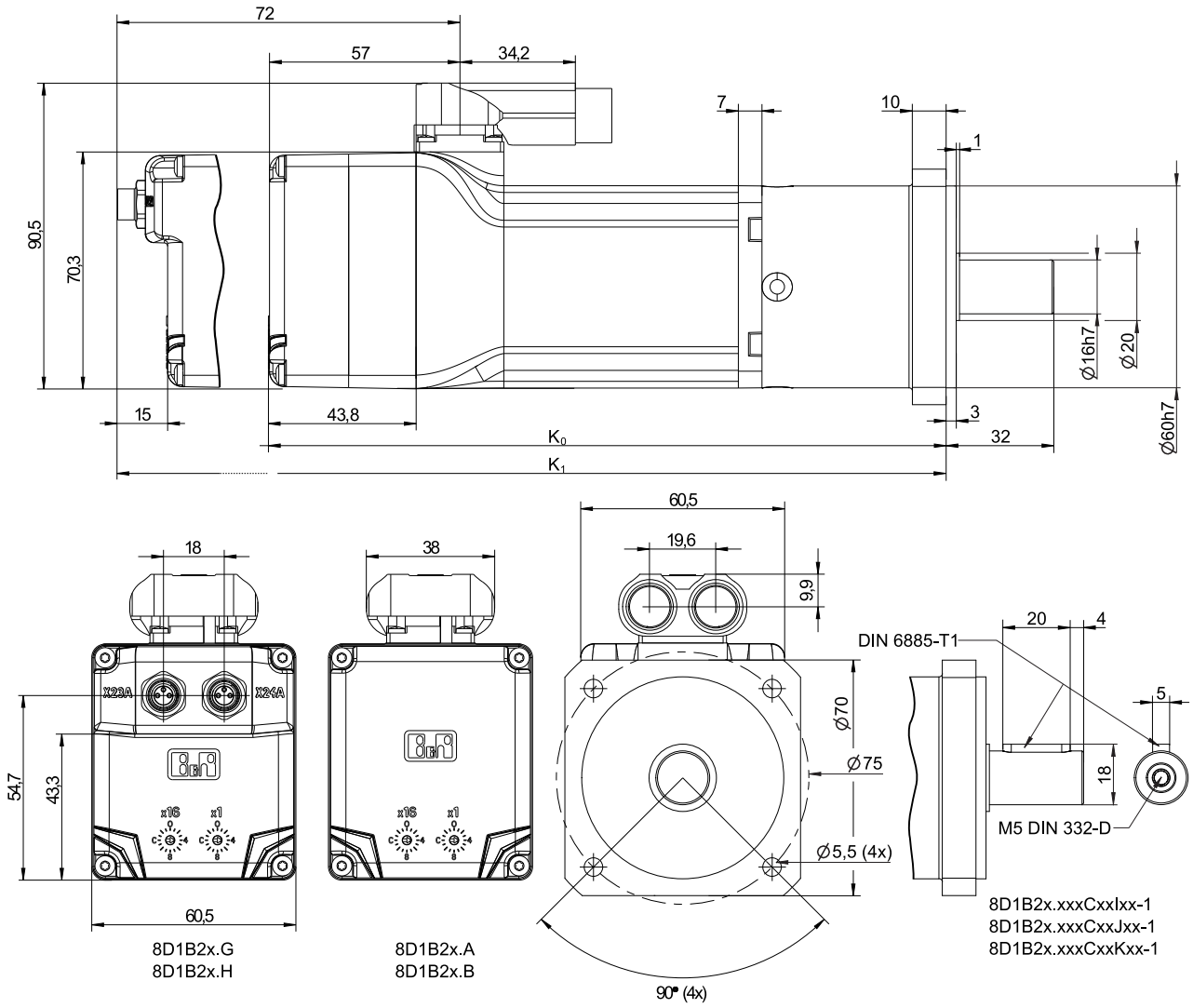
Without electronics option (8D1B2x.A, 8D1B2x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM40 **1**-stage	173	206.5
8D1B2**2** with 8GM40 **2**-stage	185.5	219
8D1B2**3** with 8GM40 **1**-stage	193.5	227
8D1B2**3** with 8GM40 **2**-stage	206	239.5

With electronics option (8D1B2x.G, 8D1B2x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM40 **1**-stage	188	221.5
8D1B2**2** with 8GM40 **2**-stage	200.5	234
8D1B2**3** with 8GM40 **1**-stage	208.5	242
8D1B2**3** with 8GM40 **2**-stage	221	254.5

4.9.4 8D1B2x.xxxCF - 8GM45 gearbox (gearbox size 067)



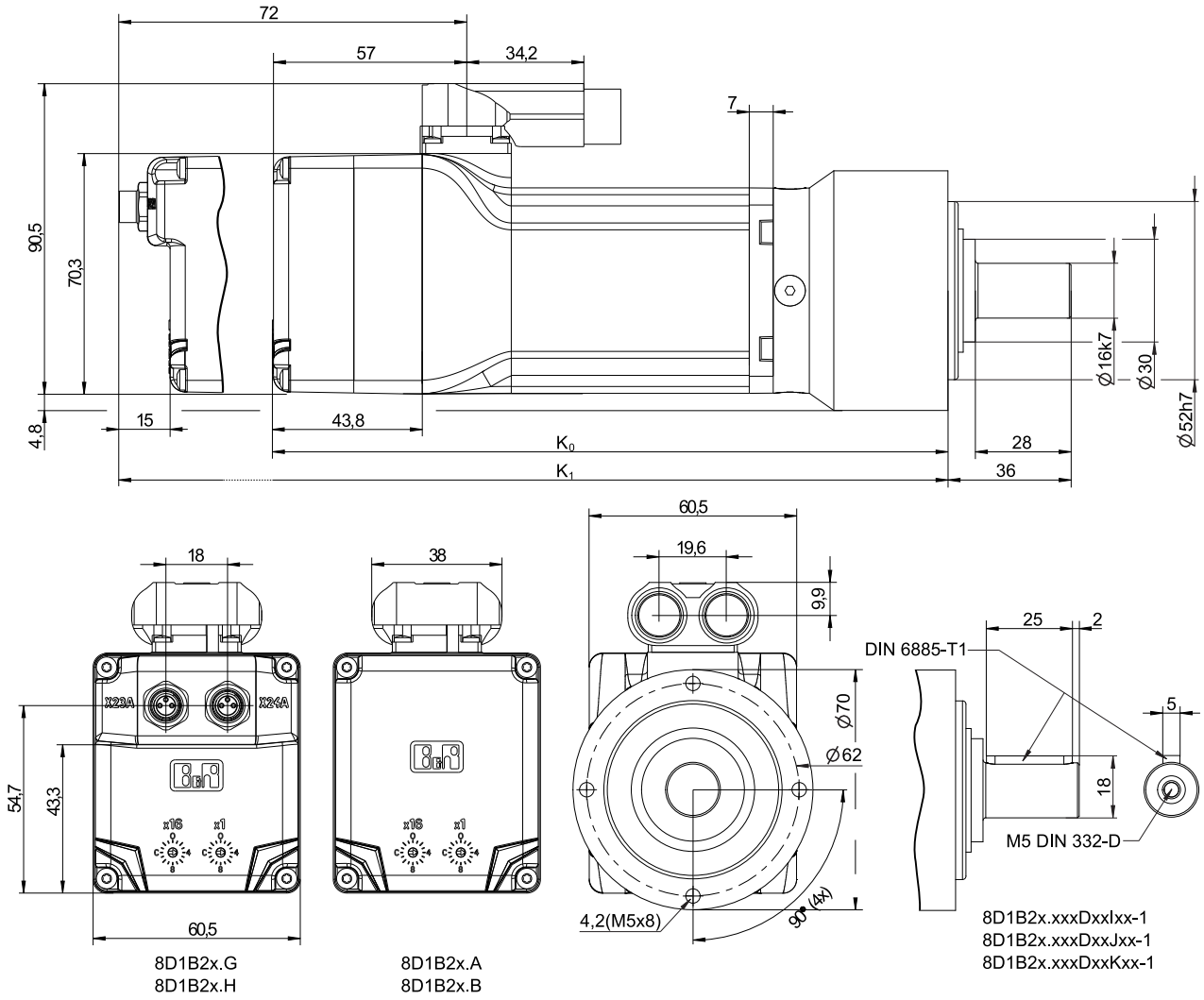
Without electronics option (8D1B2x.A, 8D1B2x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM45 **1**-stage	181	214.5
8D1B2**2** with 8GM45 **2**-stage	193.5	227
8D1B2**3** with 8GM45 **1**-stage	201.5	235
8D1B2**3** with 8GM45 **2**-stage	214	247.5

With electronics option (8D1B2x.G, 8D1B2x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM45 **1**-stage	196	229.5
8D1B2**2** with 8GM45 **2**-stage	208.5	242
8D1B2**3** with 8GM45 **1**-stage	216.5	250
8D1B2**3** with 8GM45 **2**-stage	229	262.5

4.9.5 8D1B2x.xxxDG - 8GM50 gearbox (gearbox size 070)



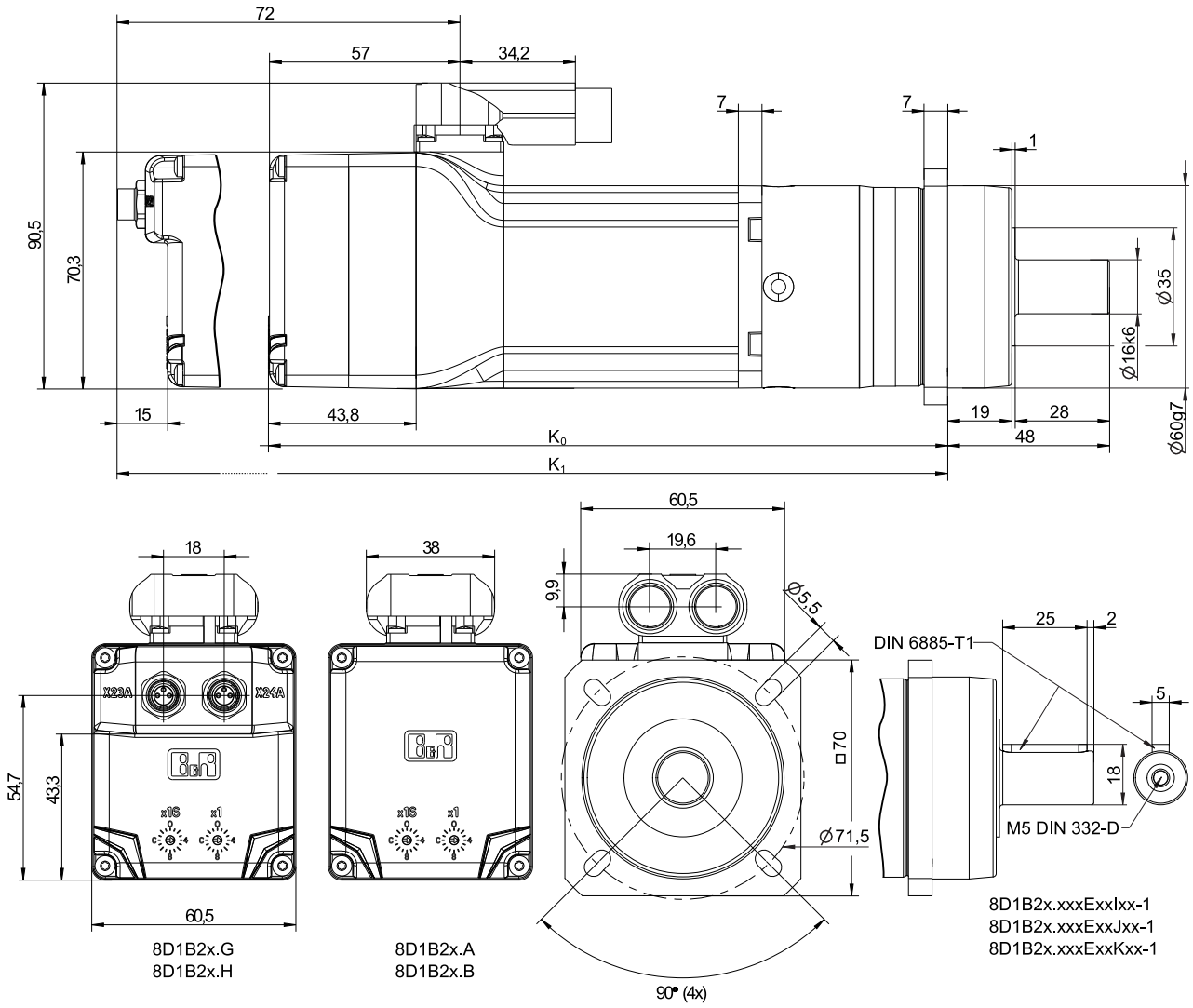
Without electronics option (8D1B2x.A, 8D1B2x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM50 **1**-stage	177	210.5
8D1B2**2** with 8GM50 **2**-stage	190	223.5
8D1B2**3** with 8GM50 **1**-stage	197.5	231
8D1B2**3** with 8GM50 **2**-stage	210.5	244

With electronics option (8D1B2x.G, 8D1B2x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM50 **1**-stage	192	225.5
8D1B2**2** with 8GM50 **2**-stage	205	238.5
8D1B2**3** with 8GM50 **1**-stage	212.5	246
8D1B2**3** with 8GM50 **2**-stage	225.5	259

4.9.6 8D1B2x.xxxED - 8GM55 gearbox (gearbox size 060)



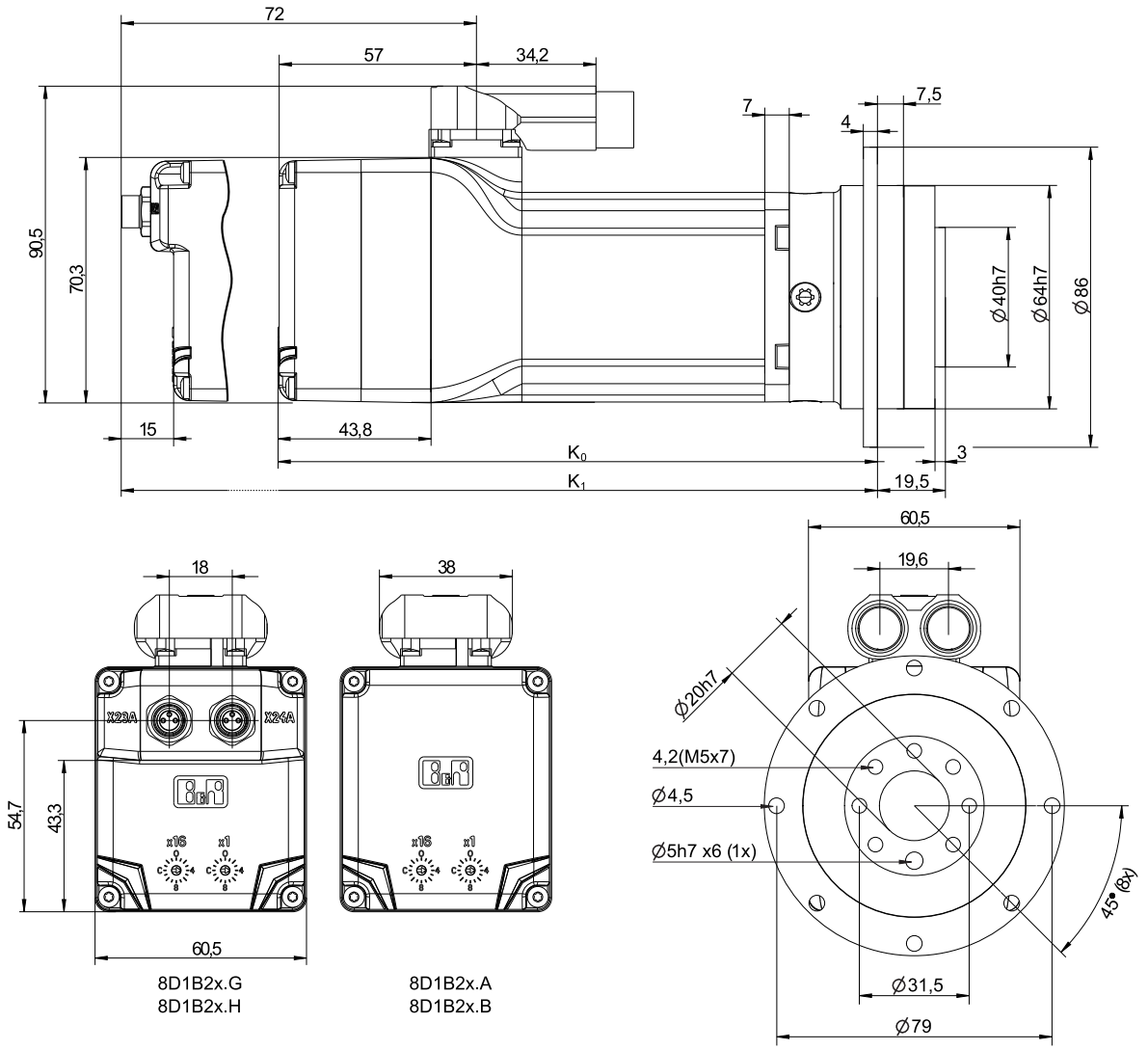
Without electronics option (8D1B2x.A, 8D1B2x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM55 **1**-stage	181	214.5
8D1B2**2** with 8GM55 **2**-stage	193.5	227
8D1B2**3** with 8GM55 **1**-stage	201.5	235
8D1B2**3** with 8GM55 **2**-stage	214	247.5

With electronics option (8D1B2x.G, 8D1B2x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GM55 **1**-stage	196	229.5
8D1B2**2** with 8GM55 **2**-stage	208.5	242
8D1B2**3** with 8GM55 **1**-stage	216.5	250
8D1B2**3** with 8GM55 **2**-stage	229	262.5

4.9.7 8D1B2x.xxxHE - 8GG40 gearbox (gearbox size 064)



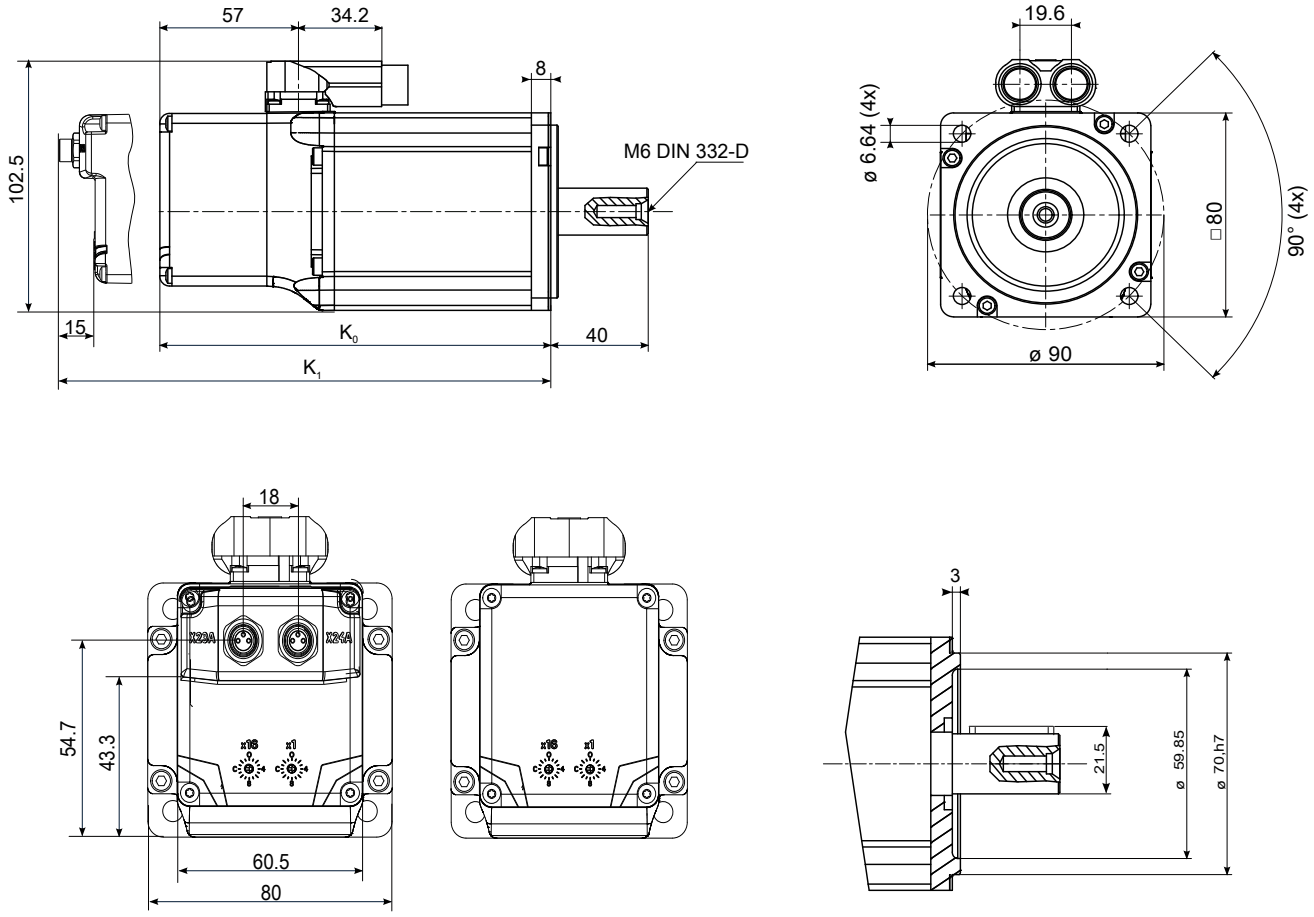
Without electronics option (8D1B2x.A, 8D1B2x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GG40 **1**-stage	151.5	185
8D1B2**2** with 8GG40 **2**-stage	164	197.5
8D1B2**3** with 8GG40 **1**-stage	172	205.5
8D1B2**3** with 8GG40 **2**-stage	184.5	218

With electronics option (8D1B2x.G, 8D1B2x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B2**2** with 8GG40 **1**-stage	166.5	200
8D1B2**2** with 8GG40 **2**-stage	179	212.5
8D1B2**3** with 8GG40 **1**-stage	187	220.5
8D1B2**3** with 8GG40 **2**-stage	199.5	233

4.9.8 8D1A3x



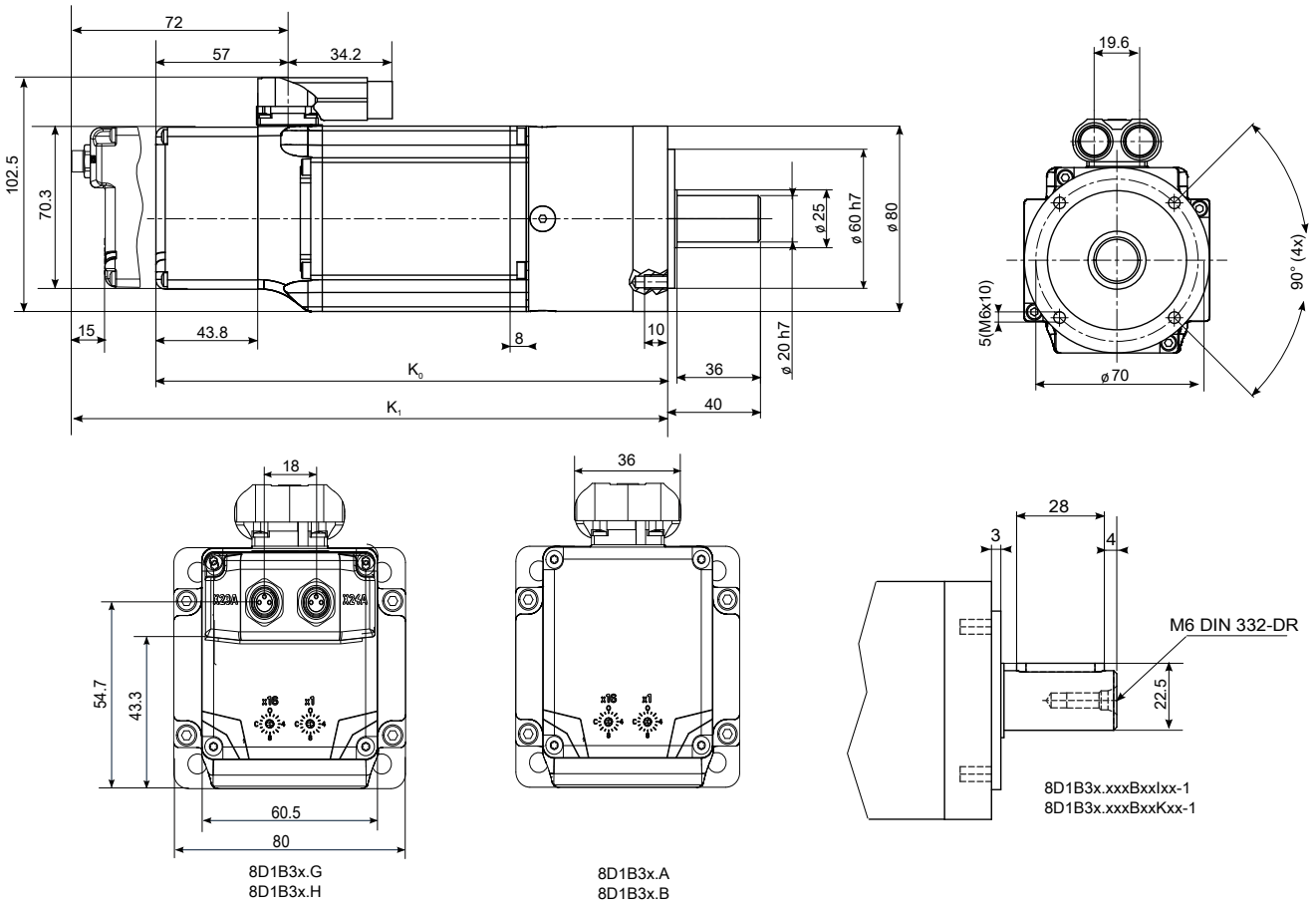
Without electronics option

	K_0 [mm]	
	Without holding brake	**With holding brake**
8D1A3x	161	197

With electronics option

	K_1 [mm]	
	Without holding brake	**With holding brake**
8D1A3x	176	212

4.9.9 8D1B3x.xxxBH - 8GM40 gearbox (gearbox size 080)



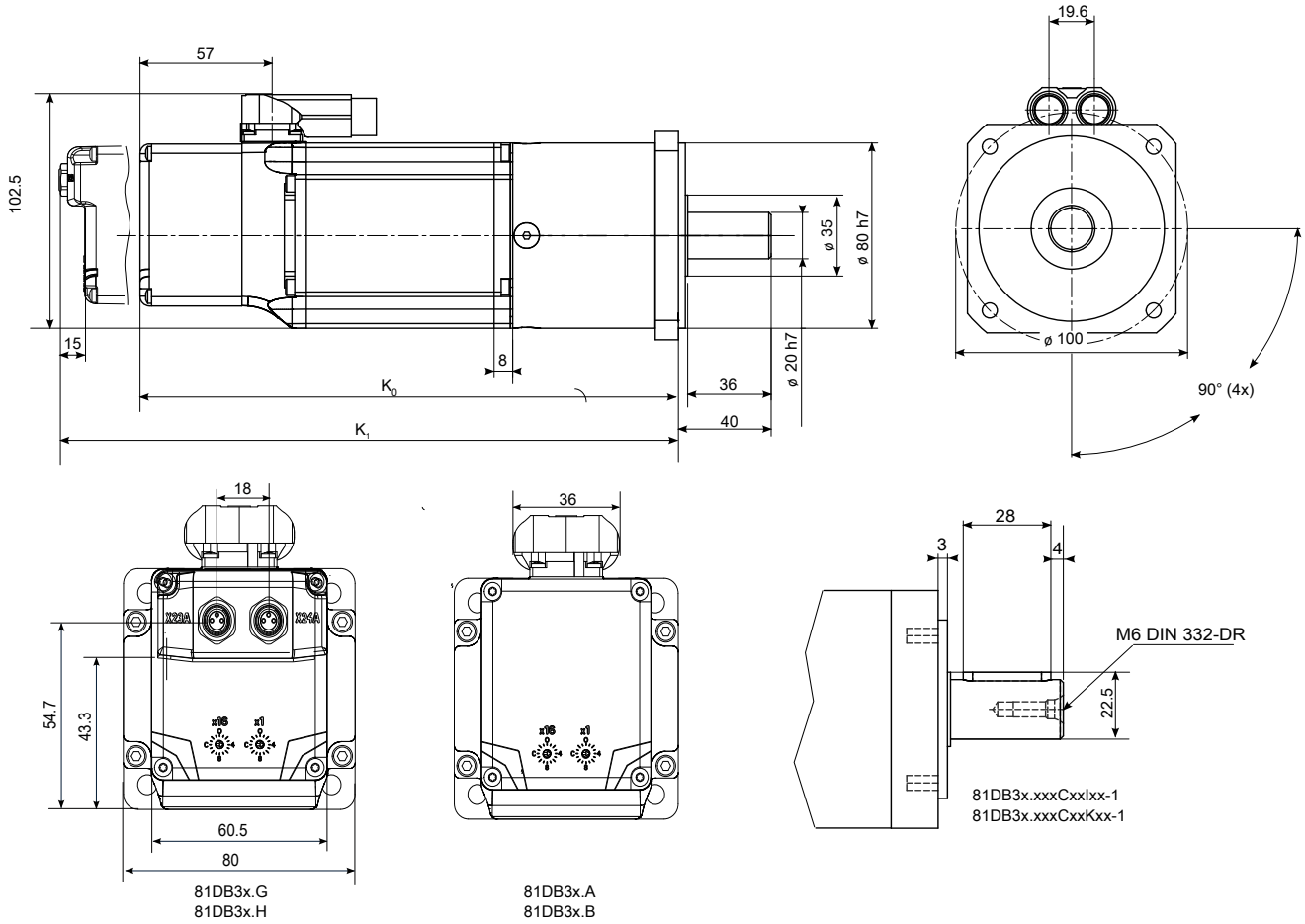
Without electronics option (8D1B3x.A, 8D1B3x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B33 with 8GM40 **1**-stage	221	257
8D1B33 with 8GM40 **2**-stage	238.5	274.5

With electronics option (8D1B3x.G, 8D1B3x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B33 with 8GM40 **1**-stage	236	272
8D1B33 with 8GM40 **2**-stage	253.5	289.5

4.9.10 8D1B3x.xxxCI - 8GM45 gearbox (gearbox size 089)



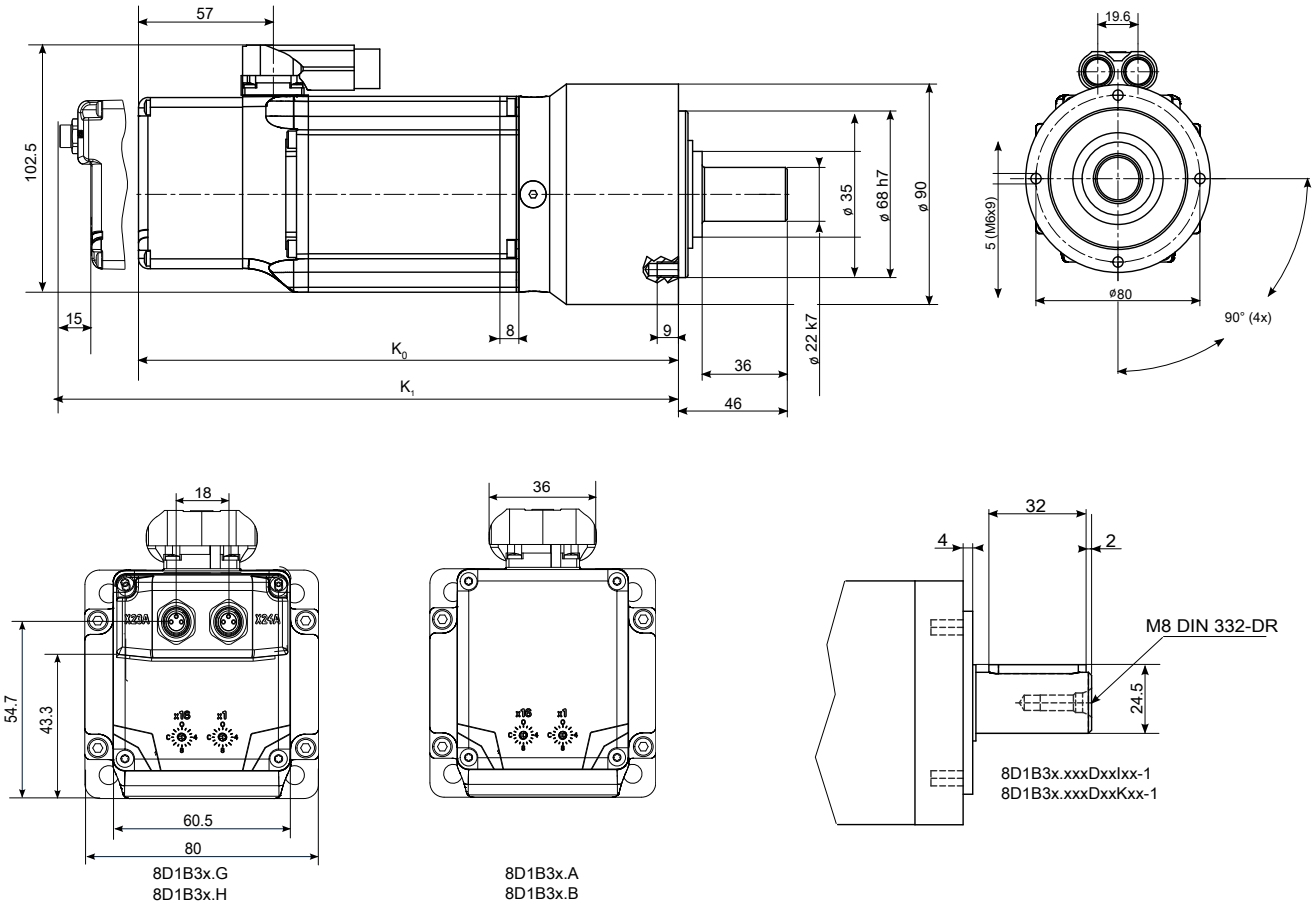
Without electronics option (8D1B3x.A, 8D1B3x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B33 with 8GM45 **1**-stage	232.5	283.5
8D1B33 with 8GM45 **2**-stage	250	286

With electronics option (8D1B3x.G, 8D1B3x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B33 with 8GM45 **1**-stage	247.5	298.5
8D1B33 with 8GM45 **2**-stage	265	301

4.9.11 8D1B3x.xxxDJ - 8GM50 gearbox (gearbox size 090)



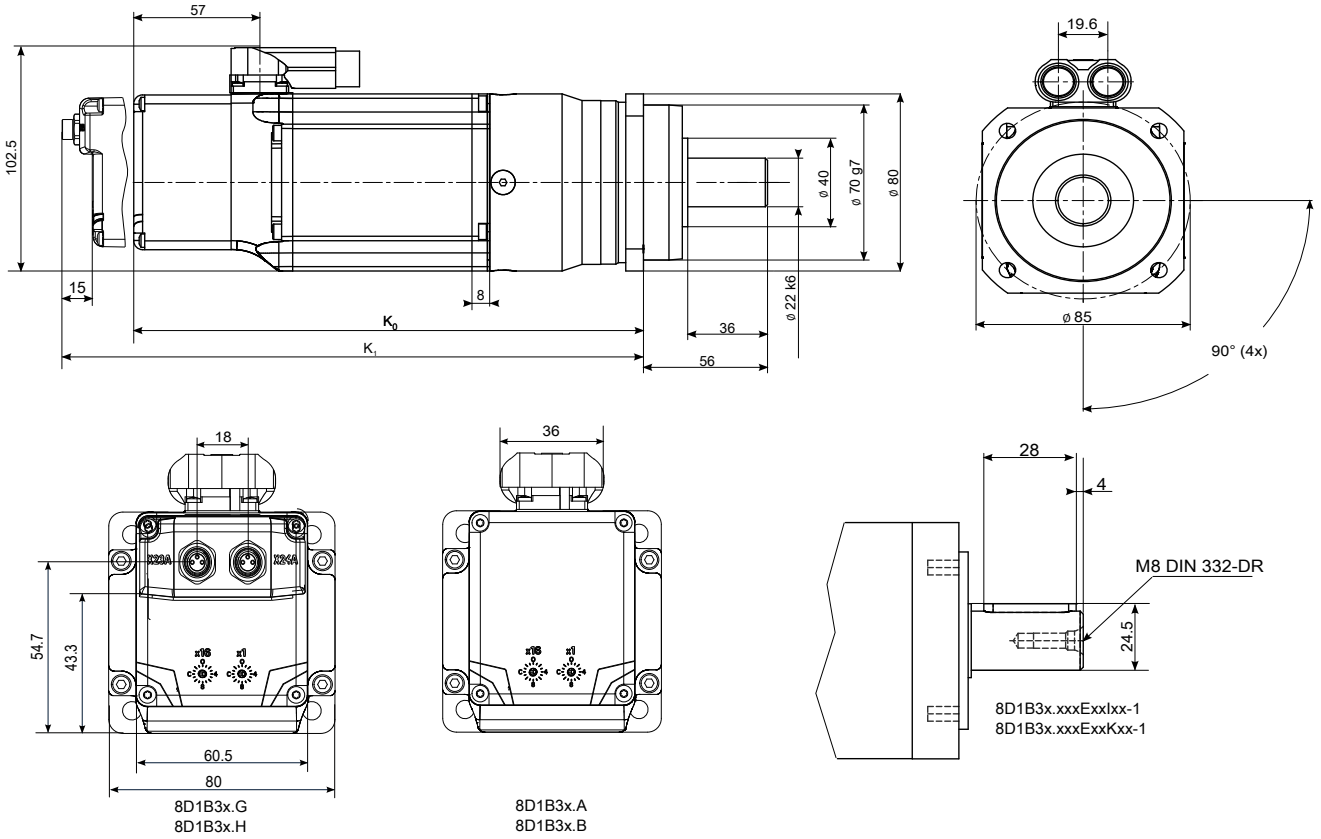
Without electronics option (8D1B3x.A, 8D1B3x.B)

	K_0 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B33 with 8GM50 **1**-stage	228.5	264.5
8D1B33 with 8GM50 **2**-stage	246.5	282.5

With electronics option (8D1B3x.G, 8D1B3x.H)

	K_1 [mm]	
Gearbox motor	**Without holding brake**	**With holding brake**
8D1B33 with 8GM50 **1**-stage	243.5	279
8D1B33 with 8GM50 **2**-stage	261.5	297.5

4.9.12 8D1B3x.xxxEH - 8GM55 gearbox (gearbox size 080)



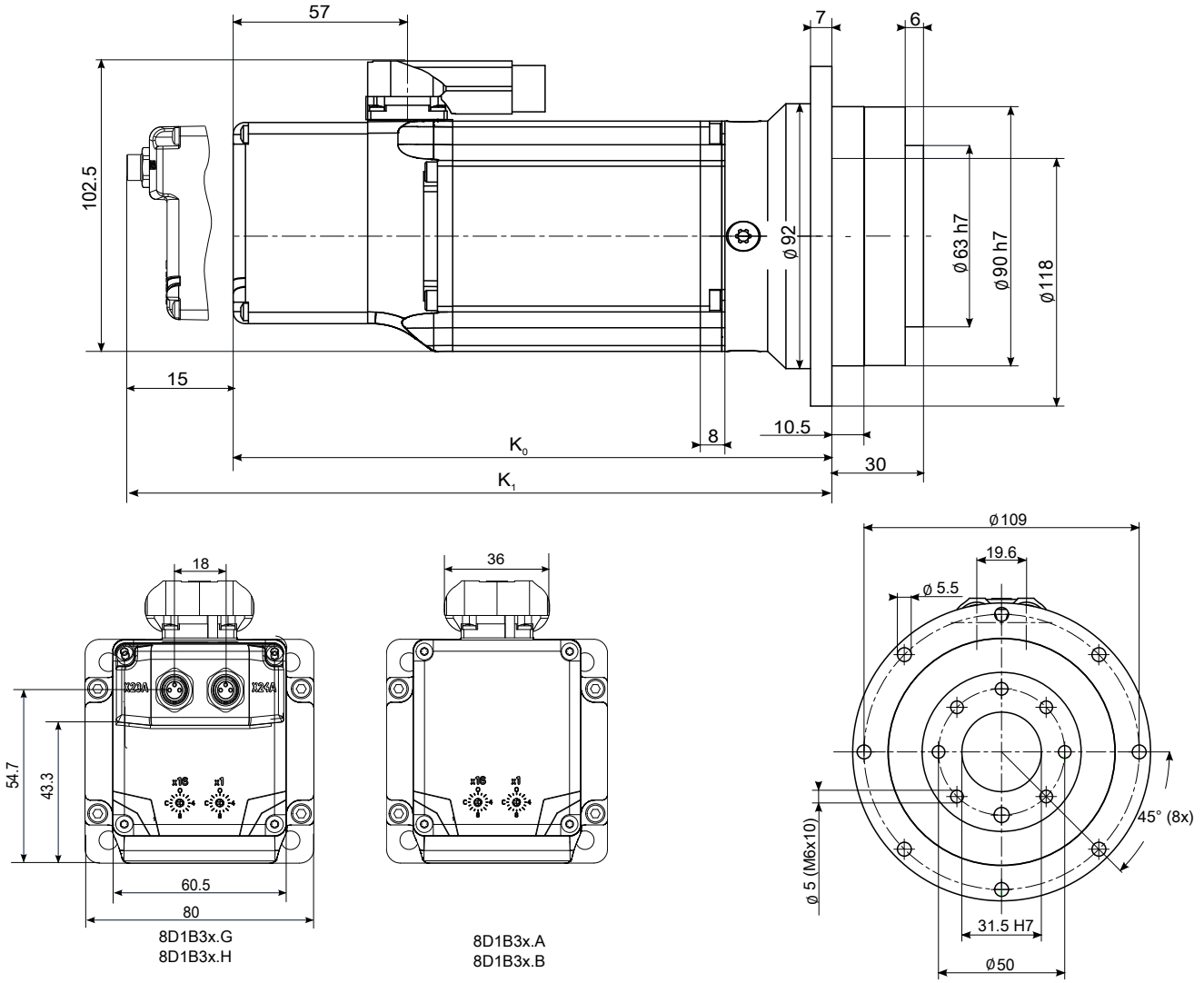
Without electronics option (8D1B3x.A, 8D1B3x.B)

Gearbox motor	K_0 [mm]	
	Without holding brake	With holding brake
8D1B33 with 8GM55 **1**-stage	230.5	266.5
8D1B33 with 8GM55 **2**-stage	248.5	284.5

With electronics option (8D1B3x.G, 8D1B3x.H)

Gearbox motor	K_1 [mm]	
	Without holding brake	With holding brake
8D1B33 with 8GM55 **1**-stage	245.5	281.5
8D1B33 with 8GM55 **2**-stage	263.5	299.5

4.9.13 8D1B3x.xxxHJ - 8GG40 gearbox (gearbox size 090)



Without electronics option (8D1B3x.A, 8D1B3x.B)

Gearbox motor	K_0 [mm]	
	Without holding brake	With holding brake
8D1B33 with 8GG40 **1**-stage	226	262
8D1B33 with 8GG40 **2**-stage	243.5	279.5

With electronics option (8D1B3x.G, 8D1B3x.H)

Gearbox motor	K_1 [mm]	
	Without holding brake	With holding brake
8D1B33 with 8GG40 **1**-stage	241	277
8D1B33 with 8GG40 **2**-stage	258.5	294.5

4.10 Pinouts

Danger!

Before performing service work, disconnect the power supply and wait 5 minutes to ensure that the DC bus of the drive system has discharged. Observe regulations!

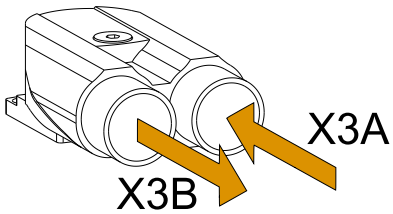
Warning!

Drive systems can carry high levels of electrical voltage.
Never connect or disconnect the connector while voltage is applied!

Information:

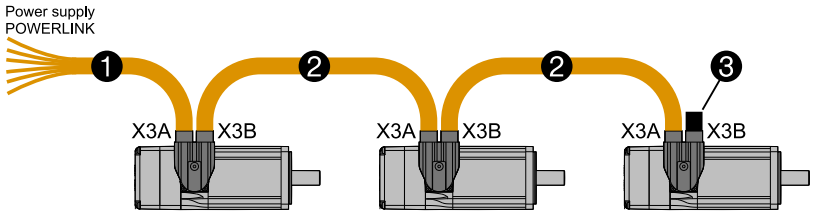
ACOPOSmotor Compact modules are only permitted to be wired using the cables provided by B&R for this purpose.
see "Cables" on page 184

4.10.1 Hybrid cable - Pinout



ACOPOSmotor Compact modules are equipped with two connections for hybrid cables; as a result, only one cable to the control cabinet is needed. The hybrid cable ensures the power supply and transfer of POWERLINK data. Additional ACOPOSmotor Compact modules are easily connected via daisy chaining.

Hybrid cable - Overview

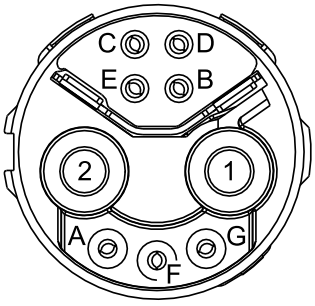
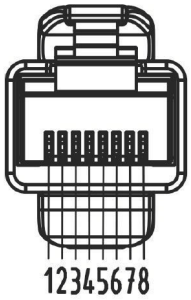


(1) Power supply cable
see "8D1CHxxxx.11120-0 - Order data" on page 184

(2) Power cable
see "8D1CHxxxx.11110-0 - Order data" on page 186

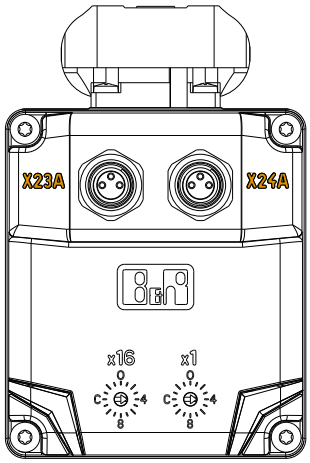
(3) M15 blind plug cap
see "Required accessories" on page 31

(1) Power supply cable (X3A / control cabinet)

915 connector 2+3+Bus female	Pin	Function	Color	Pin	RJ45 connector
	1	DC bus +	Red	---	
	2	DC bus -	Black	---	
	A	BAT[1)]	Pink	---	
	B	Receive signal inverted	---	6	
	C	Receive signal	---	3	
	D	Transmit signal	---	1	
	E	Transmit signal inverted	---	2	
	F	Enable signal -	Brown	---	
	G	Enable signal +	Violet	---	

1) Function BAT is currently not supported. The open cable end must be insulated by the customer.

4.10.2 Electronics option - Pinout

8D1bcd.G..., 8D1bcd.H..., 8D1bcd.I...	
	**X23A** 24 VOut + trigger see "X67CA0D40.0... and X67CA0D50.0" on page 188 - Cables **X24A** 24 VOut + trigger see "X67CA0D40.0... and X67CA0D50.0" on page 188 - Cables

X23A, X24A (trigger)

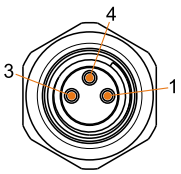
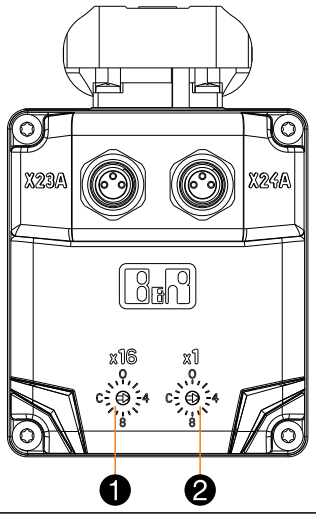
Figure	Pin	Description	Function
	1	+24 V	Sensor/Actuator power supply 24 VDC [1]
	3	GND	GND
	4	Trigger	Trigger input

Table 100: X23A, X24A connector - Pinout

1) The sensor/actuator power supply is not permitted to be external.

4.11 POWERLINK node number setting

The POWERLINK node number can be set using the two hexadecimal coded rotary switches located on the back of the module:

Figure	Coded rotary switches	POWERLINK node number
	1	16s position (high)
	2	1s position (low)
A change to the POWERLINK node number only takes effect the next time the drive system is switched on.		

Information:

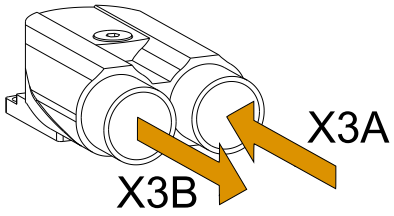
In principle, node numbers in the range between $01 and $FD are permitted.
However, node numbers between $F0 and $FD are intended for future system expansions. To ensure compatibility, these node numbers should be avoided.

Node numbers $00, $FE and $FF are reserved and are therefore not permitted to be set.

Table 101: POWERLINK node number setting

5 Dimensioning

5.1 Power supply



The power supply of ACOPOSmotor Compact modules (8D1) is provided via the X3A connection.

Information:

The permissible supply voltage for ACOPOSmotor Compact 8D1 modules is 24 to 58 VDC.

Warning!

The maximum current-carrying capacity of the power contacts of the 9-pin hybrid connector (connection X3A) is 20 A at 40°C.

Warning!

Fuse protection of the ACOPOSmotor Compact power supply cable must take place in accordance with the national regulations for the installation location.

5.1.1 Power supply unit

The power supply unit must be certified and meet the following requirements:

- Galvanic isolation between input and output
- Max. permissible output voltage: 24 to 58 VDC
- Overvoltage protection max. 60 VDC (also against internal overvoltages)
- Max. permissible output current: 60 A
- Fuse protection output: DC fuse or circuit breaker with max. 35 A
- Output protective measures: No-load proof, overload-proof, continuous short circuit protection and feedback protection
- The power supply unit must have UL certification for the USA.

Information:

ACOPOSmulti auxiliary supply module 8B0C0320Hx00.B00-1 meets these requirements. Output fuse protection is not necessary since 8B0C0320Hx00.B00-1 has module-internal current limitation.

5.2 Fuse protection of the power supply cable

Due to the daisy-chain connection, there is a risk that upstream devices may be damaged in the event of a fault at the end of the connection (e.g. short circuit, defective wiring). For the power connection (DC+ and DC-), this is prevented by an overload and short-circuit shutdown of the supplying module.

Information:

It is recommended that the STO circuit be protected accordingly.

- A max. operating current of 6 mA is expected per connected device.
- The maximum permissible current in the STO line is not permitted to permanently exceed 500 mA.
- The fuse component used must be suitable for DC and have a breaking capacity corresponding to the voltage source.

5.3 Procedure for sizing the DC bus

The dimensioning examples presented in this section are intended to provide a rough estimate of the application sizing based on the power balance of the individual modules for a static operating point. This does not allow a detailed sizing of dynamic operating cycles since this depends on other factors such as the cable lengths used between modules.

The power consumption on the DC bus of an ACOPOSmotor Compact module can be calculated as follows depending on the order option and the static operating point (n > 0):

$$P = P_{mech} / 0.85 + P_{On} \text{ (optional)} + P_{24VDC,Out} \text{ (optional)} + 10 \text{ W}$$
$$P_{mech} = \omega \cdot M = 2\pi \cdot n \text{ [rpm]} / 60 \text{ s} \cdot M$$

Maximum permissible power on the DC bus at 40°C ambient temperature and supply voltage of 58 V:

$$P_{DC\ bus} = U_{DC\ bus} \cdot I_{DC\ bus,max} = 58 \text{ VDC} \cdot 20 \text{ A} = \mathbf{1.16\ kW}$$

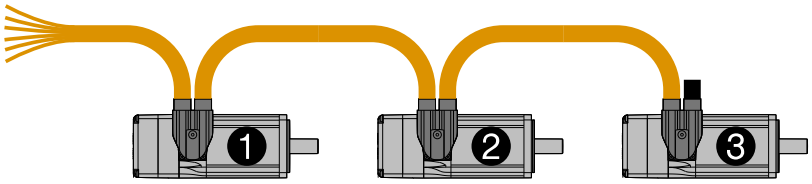
At lower supply voltages, the power on the DC bus is also reduced accordingly.

Formula symbols used

Symbol	Name
P_x	Power requirements [W] of the ACOPOSmotor Compact module
P_{mech}	Mechanical power [W] on the motor shaft
P_{On}	Connection power [W] of the holding brake
$P_{24VDC,Out}$	Maximum power consumption [W] of the 24 VDC output
ω	Angular velocity
M	Torque [Nm]
n	Speed [rpm]
$P_{DC\ bus}$	Permissible power [W] on the DC bus
$U_{DC\ bus}$	DC bus voltage [V]
$I_{DC\ bus,max}$	Maximum permissible DC bus current [A]
P_{sum}	Total power [W] of the ACOPOSmotor Compact modules on a daisy-chain segment

5.3.1 Dimensioning example 1

This dimensioning example assumes simultaneous daisy-chain operation of three ACOPOSmotor Compact modules ($U_{DC\ bus}$ = 54 V).



	ACOPOSmotor Compact		
	Module 1	**Module 2**	**Module 3**
Order code	8D1A22.HI2000000-1	8D1A23.AD0000000-1	8D1A23.HH2000000-1
Size		2	
Gearbox		No	
Electronics option	Yes	No	Yes
Holding brake	Yes	No	Yes
Speed [rpm]	2,500	1,750	3,200
Torque [Nm]	0.49	0.95	0.35

Calculation of power consumption (P_x):

Module 1

$P_{mech1} = 2\pi \cdot 2500 / 60\ s \cdot 0.49\ Nm = 128\ W$

$P_1 = 128\ W / 0.85 + 8.4\ W + 7\ W + 10\ W =$ **176 W**

Module 2

$P_{mech2} = 2\pi \cdot 1750 / 60\ s \cdot 0.95\ Nm = 174\ W$

$P_2 = 174\ W / 0.85 + 10\ W =$ **215 W**

Module 3

$P_{mech3} = 2\pi \cdot 1200 / 60\ s \cdot 0.95\ Nm = 117\ W$

$P_3 = 117\ W / 0.85 + 8.4\ W + 7\ W + 10\ W =$ **163 W**

The total power (P_{sum}) of the three modules is therefore as follows:

$P_{sum} = P_1 + P_2 + P_3 = 176\ W + 215\ W + 163\ W =$ **554 W < 54 V · 20 A = 1.08 kW**

Since the total power (P_{sum}) of the three modules does not exceed the maximum DC bus voltage ($P_{DC\ bus}$) at the considered operating point, static operation is possible in principle in this configuration.

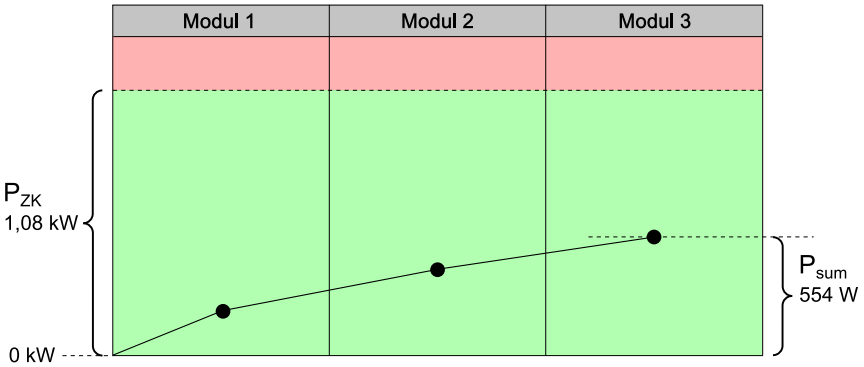
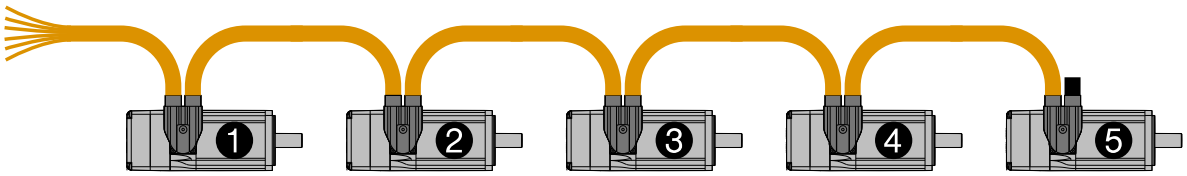


Figure 8: Performance diagram for dimensioning example 1

5.3.2 Dimensioning example 2

This dimensioning example assumes simultaneous daisy-chain operation of five ACOPOSmotor Compact modules ($U_{DC\ bus}$ = 58 V).



	ACOPOSmotor Compact				
	Module 1	**Module 2**	**Module 3**	**Module 4**	**Module 5**
Order code	8D1A23.HH0000000-1	8D1A23.BH2000000-1	8D1A22.BI0000000-1	8D1A23.HD0000000-1	8D1A23.HB2000000-1
Size	2				
Gearbox	No				
Electronics option	Yes	No		Yes	
Holding brake	No	Yes	No		Yes
Speed [rpm]	3,950	2,700	3,750	1,650	1,200
Torque [Nm]	0.65	0.75	0.45	1.00	0.85

Calculation of power consumption (P_x):

Module 1

P_{mech1} = 2π · 3950 / 60 s · 0.65 Nm = 269 W

P_1 = 269 W / 0.85 + 7 W + 10 W = **333 W**

Module 2

P_{mech2} = 2π · 2700 / 60 s · 0.75 Nm = 212 W

P_2 = 212 W / 0.85 + 8.4 W + 10 W = **268 W**

Module 3

P_{mech3} = 2π · 3750 / 60 s · 0.45 Nm = 177 W

P_3 = 177 W / 0.85 + 10 W = **218 W**

Module 4

P_{mech4} = 2π · 1650 / 60 s · 1.00 Nm = 173 W

P_4 = 173 W / 0.85 + 7 W + 10 W = **221 W**

Module 5

P_{mech5} = 2π · 1200 / 60 s · 0.85 Nm = 107 W

P_5 = 107 W / 0.85 + 8.4 W + 7 W + 10 W = **151 W**

The total power (P_{sum}) of the five modules is therefore as follows:

$P_{sum} = P_1 + P_2 + P_3 + P_4 + P_5$ = 333 W + 268 W + 218 W + 221 W + 151 W = **1.19 kW > 1.16 kW**

Since the total power (P_{sum}) of the five modules exceeds the maximum DC bus voltage ($P_{DC\ bus}$) at the considered operating point, continuous operation is not possible in this configuration.

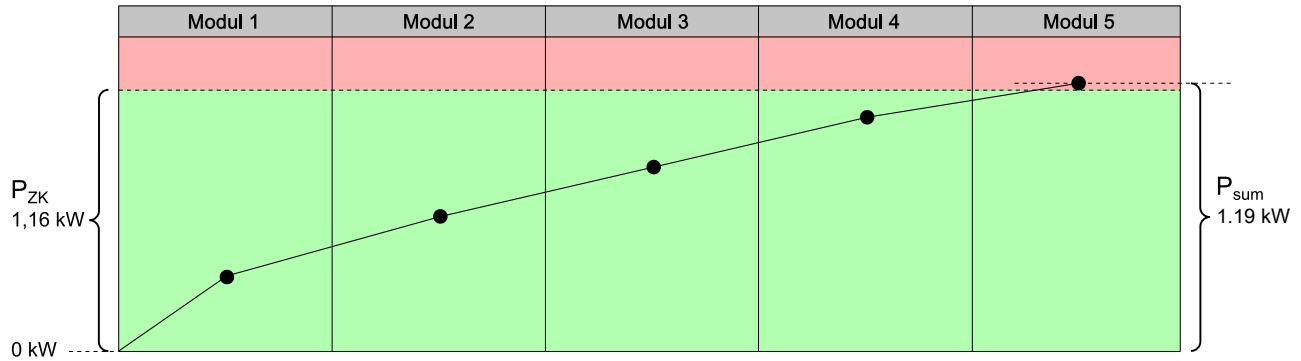


Figure 9: Performance diagram for dimensioning example 2

5.4 Procedure for sizing the STO power supply cable

The number of possible daisy-chain connections is limited by the STO power supply cable, for example.

Two factors play a role in this:

- The maximum current-carrying capacity of 500 mA is not permitted to be exceeded.
- The voltage drop is not permitted to cause the voltage at the last enable input to fall below 15 V.

Factor 1 - Maximum current-carrying capacity

The max. current-carrying capacity[4] (**500 mA**) and max. enable input currents (5.5 or 6.0 mA) result in the following **limit of modules connected via daisy chain:**

24 V enable input voltage - Max. enable input current: 5.5 mA
n = 500 mA / 5.5 mA = 90
The maximum number of modules connected via daisy chain is 90.

30 V enable input voltage - Max. enable input current: 6.0 mA
n = 500 mA / 6.0 mA = 83
The maximum number of modules connected via daisy chain is 83.

Factor 2 - Voltage drop

The voltage drop factor must be calculated separately for each application. This can be done using the following equivalent circuit diagram and analogously to the following dimensioning examples.

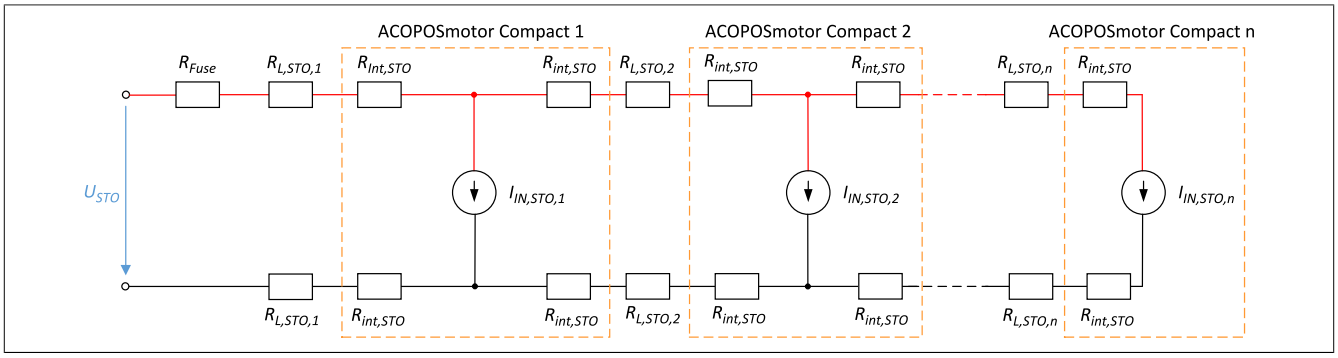


Figure 10: Equivalent circuit diagram

The calculation formulas are listed in the dimensioning examples.

The following data is available for complying with these conditions:

- Resistance of the STO line in the hybrid cable: $R_L(T_{amb}) = R_L(T_0) \cdot (1+\alpha \cdot (T_{amb}-T_0))$

Where:

$$R_L(T_0) = \frac{\rho \cdot l}{A}$$
$$T_0 = 20\,^\circ C$$
$$\rho = 0,01786 \frac{\Omega\,mm^2}{m}$$
$$\alpha = 3,93 \cdot 10^{-3} \cdot 1/\,^\circ C$$

- The cross-sectional area of the enable stranded wires of offered hybrid cables is 0.34 mm².
- Device-internal resistance in the STO path: R_{int} = 83.3 mΩ

Formula symbols used

Symbol	Name
A	Cross-sectional area [mm²]
α	Temperature coefficient
I_{FUSE}	Fuse protection [mA] of the STO power supply cable
I_{IN}	Max. enable input current [A] at specific voltage
$I_{IN,STO,x}$	Current consumption [A] of the ACOPOSmotor Compact module
l	Line length [m]
n	Limit of modules connected via daisy chain
ρ	Specific resistance

[4] If a fuse with I_{FUSE} < 500 mA is used, this must be taken into account when calculating the limit on modules connected via daisy chain.

Symbol	Name
R_{FUSE}	Resistance [Ω] of the fuse being used
$R_{int,STO}$	Device-internal resistance [Ω] in the STO path
$R_L(T)$	Resistance [Ω] of the STO line in the hybrid cable depending on the ambient temperature
$R_{L,STO,1m}$	Max. cable resistance [Ω] per meter
T_{amb}	Ambient temperature [°C]
T_0	Reference temperature [°C]
U_{STO}	Voltage at the source [V]

5.4.1 Dimensioning example 1

This dimensioning example assumes simultaneous daisy-chain operation of three ACOPOSmotor Compact modules.

Assumptions:

- Fuse used: R_{Fuse} = 15 Ω
- Voltage at the source: U_{STO} = 24 V
- Current consumption: $I_{IN,STO,1} = I_{IN,STO,2} = I_{IN,STO,3} = I_{IN}$ = 5.5 mA (simplifying assumption)
- Ambient temperature: T_{amb} = 40°C

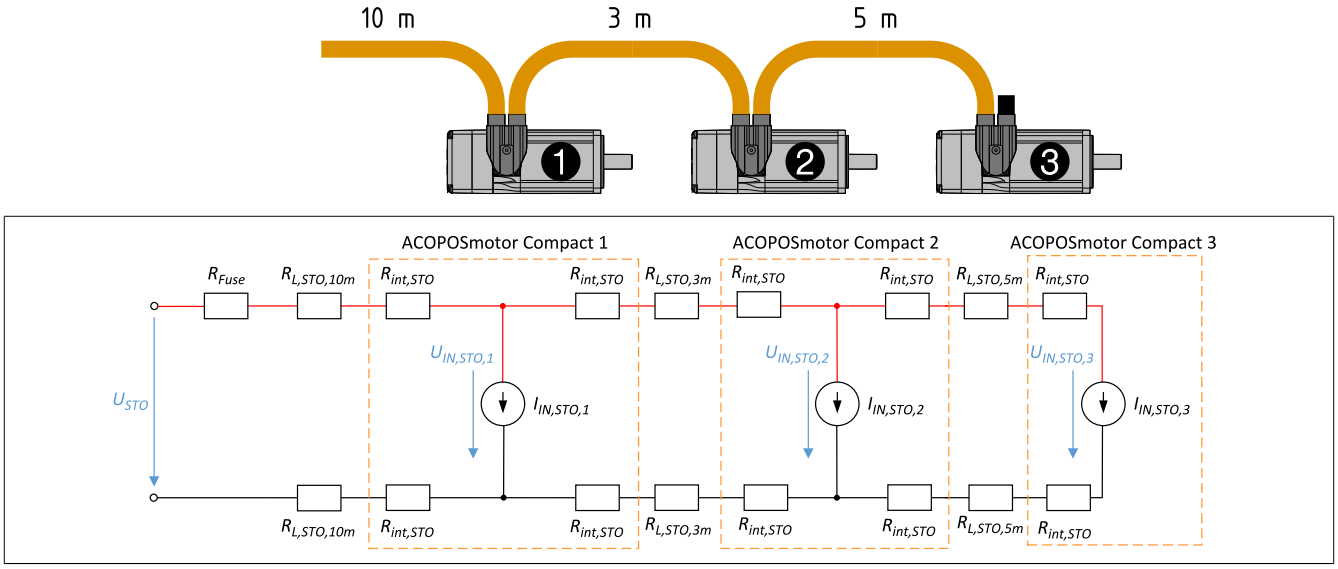


Figure 11: Equivalent circuit diagram for dimensioning example 1

Cable resistance calculation:

Maximum cable resistance per meter:

$$R_{L,STO,1m} = \frac{\rho \cdot l}{A} \cdot (1 + \alpha \cdot (T_{amb} - T_0)) = \frac{0,01786 \frac{\Omega\,mm^2}{m} \cdot 1m}{0,34 mm^2} \cdot \left(1 + 3,93 \cdot 10^{-3} \cdot \frac{1}{K} \cdot (40 - 20) K\right) = \mathbf{56,7\ m\Omega}$$

Calculation of the voltages applied to the enable inputs:

10 m cable

$$U_{IN,STO,1} = U_{STO} - 3 \cdot I_{IN} \cdot (R_{FUSE} + 2 \cdot R_{L,STO,10m} + 2 \cdot R_{int,STO}) = \mathbf{24V} - 3 \cdot 5,5mA \cdot (15\Omega + 20 \cdot 56,7m\Omega + 2 \cdot 83,3m\Omega) = \mathbf{23,731\ V}$$

3 m cable

$$U_{IN,STO,2} = U_{IN,STO,1} - 2 \cdot I_{IN} \cdot (2 \cdot R_{L,STO,3m} + 4 \cdot R_{int,STO}) = \mathbf{23,731V} - 2 \cdot 5,5mA \cdot (2 \cdot 3 \cdot 56,7m\Omega + 4 \cdot 83,3m\Omega) = \mathbf{23,724\ V}$$

5 m cable

$$U_{IN,STO,3} = U_{IN,STO,2} - I_{IN} \cdot (2 \cdot R_{L,STO,5m} + 4 \cdot R_{int,STO}) = \mathbf{23,724V} - 5,5mA \cdot (2 \cdot 5 \cdot 56,7m\Omega + 4 \cdot 83,3m\Omega) = \mathbf{23,719\ V}$$

Operation in this configuration is possible from the point of view of the enable signal because 23.719 V > 15 V.

5.4.2 Dimensioning example 2

This dimensioning example assumes simultaneous daisy-chain operation of five ACOPOSmotor Compact modules.

Assumptions:

- Fuse used: None
- Voltage at the source: U_{STO} = 30 V
- Current consumption: $I_{IN,STO,1} = I_{IN,STO,2} = I_{IN,STO,3} = I_{IN,STO,4} = I_{IN,STO,5} = I_{IN}$ = 6.0 mA (simplifying assumption)
- Ambient temperature: T_{amb} = 20°C

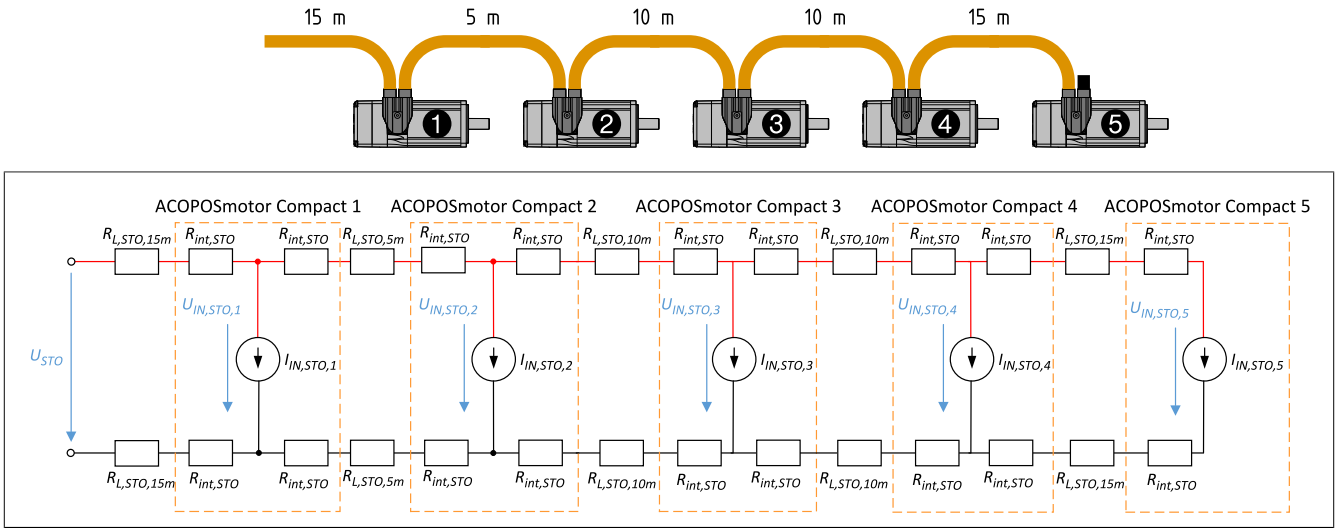


Figure 12: Equivalent circuit diagram for dimensioning example 2

Cable resistance calculation:

Maximum cable resistance per meter:

$$R_{L,STO,1m} = \frac{\rho \cdot l}{A} \cdot (1 + \alpha \cdot (T_{amb} - T_0)) = \frac{0,01786 \frac{\Omega\,mm^2}{m} \cdot 1m}{0,34 mm^2} \cdot \left(1 + 3,93 \cdot 10^{-3} \cdot \frac{1}{K} \cdot (20 - 20)K\right) = \mathbf{52,5\ m\Omega}$$

Calculation of the voltages applied to the enable inputs:

15 m cable

$$U_{IN,STO,1} = U_{STO} - 5 \cdot I_{IN} \cdot (2 \cdot R_{L,STO,15m} + 2 \cdot R_{int,STO}) = \mathbf{30V} - 5 \cdot 6mA \cdot (2 \cdot 15 \cdot 52,5m\Omega + 2 \cdot 83,3m\Omega) = \mathbf{29,948\ V}$$

5 m cable

$$U_{IN,STO,2} = U_{IN,STO,1} - 4 \cdot I_{IN} \cdot (2 \cdot R_{L,STO,5m} + 4 \cdot R_{int,STO}) = \mathbf{29,948V} - 4 \cdot 6mA \cdot (2 \cdot 5 \cdot 52,5m\Omega + 4 \cdot 83,3m\Omega) = \mathbf{29,927\ V}$$

10 m cable

$$U_{IN,STO,3} = U_{IN,STO,2} - 3 \cdot I_{IN} \cdot (2 \cdot R_{L,STO,10m} + 4 \cdot R_{int,STO}) = \mathbf{29,927V} - 3 \cdot 6mA \cdot (2 \cdot 10 \cdot 52,5m\Omega + 4 \cdot 83,3m\Omega) = \mathbf{29,902\ V}$$

10 m cable

$$U_{IN,STO,4} = U_{IN,STO,3} - 2 \cdot I_{IN} \cdot (2 \cdot R_{L,STO,10m} + 4 \cdot R_{int,STO}) = \mathbf{29,902V} - 2 \cdot 6mA \cdot (2 \cdot 10 \cdot 52,5m\Omega + 4 \cdot 83,3m\Omega) = \mathbf{29,885\ V}$$

15 m cable

$$U_{IN,STO,5} = U_{IN,STO,4} - 1 \cdot I_{IN} \cdot (2 \cdot R_{L,STO,15m} + 4 \cdot R_{int,STO}) = \mathbf{29,885V} - 1 \cdot 6mA \cdot (2 \cdot 15 \cdot 52,5m\Omega + 4 \cdot 83,3m\Omega) = \mathbf{29,874\ V}$$

Operation in this configuration is possible from the point of view of the enable signal because 29.874 V > 15 V.

6 Installation and connection

6.1 Before installation

Read this user's manual completely before performing any work activities.

In addition, take into account the technical documentation for all other machine components as well as the finished machine.

6.2 Safety

Work on and wiring of ACOPOSmotor Compact (8DI) modules is only permitted to be carried out when they are in a voltage-free state and only by qualified personnel[2)]. The control cabinet must first be de-energized and secured against being switched on again.

Only use appropriate equipment and tools. Protect yourself with safety equipment.

Warning!

Personal injury and damage to property due to unauthorized modifications!

As a result of unauthorized modifications to the product, the performance and limit values can be negatively affected and dangers can arise. Due to this, severe damage to property and injuries cannot be excluded.

Unauthorized modifications are therefore prohibited!

- **Do not carry out any unauthorized modifications or alterations to the product.**
- **If necessary, contact B&R.**

6.2.1 Noise emissions

Take into account the health of personnel in proximity to the machine.

Warning!

Hearing damage due to noise levels.

During operation, the motor can exceed the permissible workplace noise level and also cause hearing damage.

- **Implement suitable noise reduction measures (e.g. housings, covers or other sound-insulating measures).**
- **Take into account applicable industrial safety regulations.**

6.2.2 General sources of danger

Tampering of protection or safety devices

Protective and/or safety devices protect you and other persons from dangerous voltage, rotating or moving elements and hot surfaces.

Danger!

Personal injury and damage to property due to tampering of protective equipment!

If protective or safety devices are removed or put out of operation, there is no longer any personal protection and serious personal injury and damage to property can occur.

- **Do not remove any safety devices.**
- **Do not put any safety devices out of operation.**
- **Always use all safety devices also for temporary testing and trial operations!**

2) see "Qualified personnel" on page 9

Dangerous voltage

To operate the motors, dangerous voltage must be applied to certain parts.

Danger!

Risk of injury due to electric shock!

If live parts are touched, there is immediate danger of fatal electric shock.

If connections are connected or disconnected in the incorrect order or while voltage is applied, electric arcs can occur and persons and contacts can be damaged.

Even if the motor is not rotating or is running as a generator driven externally, the control and power connections can still carry voltage!

- **Never touch connections when the power is switched on.**
- **Never disconnect or connect electrical connections to the motor and servo drive while voltage is applied!**
- **Do not stay in the danger zone during operation and secure it against access by unauthorized persons.**
- **Always operate the motor with all safety equipment. Do this also for temporary testing and trial operations!**
- **Keep all covers and control cabinet doors closed during operation and as long as the machine is not disconnected from the mains.**
- **Before working on motors, gearboxes or servo drives or in the danger zone of your machine, disconnect them completely from the mains and secure them against being switched on again by other persons or automatic systems.**
- **Note the discharge time of any existing DC bus.**
- **Only connect measuring instruments in a current- and voltage-free state!**

Danger due to electromagnetic fields

Electromagnetic fields are generated by the operation of electrical power engineering equipment such as transformers, inverters and motors.

Danger!

Danger to health due to electromagnetic fields!

The functionality of a heart pacemaker can be impaired by electromagnetic fields to such an extent that the wearer experiences harm to his or her health, possibly with a fatal outcome.

- **Observe relevant national health and safety regulations.**
- **Persons with pacemakers are not allowed to be in endangered areas.**
- **Warn staff by providing information, warnings and safety identification.**
- **Secure the danger zone by means of barriers.**
- **Ensure that electromagnetic fields are reduced at their source (using shields, for example).**

Dangerous motion

By rotating and positioning motions of the motors, machine elements are moved or driven and loads conveyed.

After switching on the machine, movements of the motor shaft must always be expected! For this reason, higher-level protective measures must be put in place to ensure that personnel and the machine are protected. This type of protection can be achieved, for example, by using stable mechanical protective equipment such as protective covers, protective fences, protective gates or photoelectric sensors.

In the immediate vicinity of the machine, provide sufficient and easily accessible emergency switch-off devices to stop the machine as quickly as possible in the event of an accident.

Danger!

Danger of injury due to rotating or moving elements and loads!

By rotating or moving elements, body parts can be drawn in or severed or subjected to impacts.

- **Do not stay in the danger zone during operation and secure it against access by unauthorized persons.**
- **Before working on the machine, secure it against unwanted movements. If a holding brake is available, it must be checked for functionality after machine actuators have been attached and after maintenance and repair work has been carried out!**
- **Keep all covers and control cabinet doors closed during operation and as long as the machine is not disconnected from the mains.**
- **Always operate the motor with all safety equipment. Do this also for temporary testing and trial operations!**
- **Motors can be started automatically via remote control! If appropriate, a corresponding warning symbol must be applied, and protective measures must be implemented to prevent entry into the high-risk area!**

Danger!

Danger of injury due to loads!

Suspended loads can result in personal injury or death if they fall down. Heavy loads can tilt and trap people or severely injure them.

Failure to comply with instructions, guidelines and regulations or use of unsuitable or damaged tools and devices can result in serious injury and/or damage to property.

- **Motors should only be lifted without any additional load from other products (e.g. connection elements).**
- **Only use permitted lifting, transport and aids with sufficient lifting capacity.**
- **Never stand in the danger zone or under suspended loads.**
- **Secure the product against dropping and tilting.**
- **Wear safety shoes, protective clothing and a safety helmet.**
- **Comply with the national and local regulations.**

Warning!

Danger of injury due to incorrect control or a defect!

Improper control of motors or a defect can result in injuries and unintended and hazardous movements of motors.

Such incorrect behavior can be triggered by:

- **Incorrect installation or faults when handling components**
- **Improper or incomplete wiring**
- **Defective devices (servo drive, motor, position encoder, cables, brake)**
- **Incorrect control (e.g. caused by software error)**

Risk due to hot surfaces

Due to the power dissipation from the motor and friction in the gearbox, these components as well as their environment can reach a temperature of more than 100°C.

The resulting heat is released to the environment via the housing and the flange.

Warning!

Risk of burns due to hot surfaces!

Touching hot surfaces (e.g. motor and gearbox housings, as well as connected components), can result in very severe burns due to the very high temperature of these parts.

- **Do not stay in the danger zone during operation and secure it against access by unauthorized persons.**
- **Never touch the motor or gearbox housing as well as adjacent surfaces during nominal load operation.**
- **Be aware of hot surfaces also during standstill.**
- **Allow the motor and gearbox to cool down sufficiently before working on them; there remains the risk of burns for a long period of time after they are switched off.**
- **Always operate the motor or gearbox with all safety devices. Do this also for temporary testing and trial operations!**

6.3 Shaft end and bearing

The motor shaft is supported on both sides with grease-lubricated grooved ball bearings. Protect the motor from damage due to excessive radial and axial forces!

Under all circumstances, avoid the following loads on the front shaft end or the rear motor housing cover:

- Excessive pressure
- Impacts
- Hammer blows

Warning!

Damage due to excessive axial forces!

The motor bearings can be damaged or the service life reduced by excessive axial forces (e.g. by impacting or pressing) on the shaft. Damage to the encoder or any installed options (holding brake, gearbox) is also possible.

- **Do not hit the motor or output shaft with a hammer. The impact of a hammer certainly exceeds the permissible values.**
- **In addition, avoid impact and excessive pressure on the motor and output shaft.**

Overdetermined bearing

Avoid an overdetermined bearing when attaching drive elements onto the output shaft!. The necessarily occurring tolerances cause additional forces on the output shaft bearing. This can damage or significantly reduce the service life of the bearings!

Lifting and transporting

The weight of attachment elements (toothed gears, pulleys, couplings, etc.) can have a harmful effect on the bearing during lifting and transportation from the motor. Take into account these radial and axial loads during these operations!

Installing and removing attachment elements

Always install and remove the attachment elements (toothed gears, pulleys, couplings, etc.) at the shaft end without any axial load on the motor bearings and all other parts installed in the motor. For this, use suitable clamping sets, pressure sleeves, other clamping elements, retractors, etc. The centering hole on the face side of the shaft end can be used for this work.

Pay attention to balanced connection elements or corresponding assembly.

Secure the attachments against unintended loosening after installation and before operation.

6.4 Installing in the system

Before working on motors, gearboxes or servo drives or in the danger zone of your machine, disconnect them completely from the mains and secure them against being switched on again by other persons or automatic systems.

Inspection

Before installation, inspect the components to determine whether they are suitable and undamaged.

> **Warning!**
>
> **Personal injury and damage to property due to damaged or unsuitable machine components!**
>
> **Operating a machine with damaged or unsuitable components is a safety risk and can result in failures. Severe damage to property and injuries cannot be excluded.**
>
> - **Never operate a machine with a damaged motor or gearbox or any other damaged component.**
> - **Never install a damaged component in a machine.**
> - **Do not use motors or gearboxes that have already been overloaded during operation.**
> - **Before installation, ensure that the motor or gearbox is suitable for the machine.**
> - **It is better not to carry out short-term test and trial operations with damaged or inappropriate machine components.**
> - **Label damaged or non-operational components in a readily visible location and clearly.**

Cleaning

Clean anti-corrosive agents and dirt off the output shaft and flange of the motor as well as the opposite side of the shaft and flange on the machine.

> **Caution!**
>
> **Damage to property caused by improper cleaning.**
>
> **Contact with cleaning agents can damage oil seals, sealing lips and gaskets.**
>
> - **Only use suitable and material-friendly cleaning agents.**
> - **Ensure that oil seals, sealing lips and gaskets do not come into contact with cleaning agents.**

Installation with the mounting flange

Attach the motor with the motor flange, which also serves as a cooling surface, directly onto the machine.

For this, the motor must be screwed to the machine via the flange.

Apply tightening torque in accordance with the standard when tightening the screws and use a screw locking mechanism.

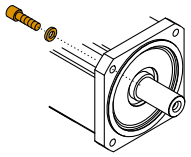
> **Note:**
>
> **The nameplate should be visible at all times in installed state.**

Safety notices

A "hot surface" warning label is provided with the product. Attach it to the assembled product so that it is visible at all times.

"Hot surface" warning label

6.4.1 Fasteners and tightening torques



Use socket head cap screws (ISO 4762 - Property class min. 8.8) and flat washers.

Tighten the screws evenly in diagonally opposite sequence and with the correct tightening torque to avoid distorting the flange and excessively straining screws.

The specified values for screws are calculated values and based on the following requirements:

- Coefficient of friction μ = 0.14
- Screwing into steel

If the motor is screwed onto other materials or if there are different surface roughnesses, the user must determine the correct tightening torque.

ACOPOSmotor Compact

	Screw	Flat washer [mm]	Tightening torque [Nm]
8D1x2	M5	5.3 x 9	6
8D1x3	M6	6.4 x 11	10

6.5 Connecting and disconnecting the motor

Observe the following safety guidelines and instructions when connecting and disconnecting the motor:

The module must be connected to ground potential.

Danger!

Personal injury and damage to property due to missing ground potential!

If there is no proper ground potential on the module, fault currents can result in serious personal injury and damage to property.

- **Connect the ACOPOSmotor Compact module (8D1) properly to ground potential (PE rail) via the module motor flange (also for temporary testing and trial operations!).**

Danger!

Risk of injury due to electric shock!

If live parts are touched, there is immediate danger of fatal electric shock.

If connections are connected or disconnected in the incorrect order or while voltage is applied, electric arcs can occur and persons and contacts can be damaged.

Even if the motor is not rotating or is running as a generator driven externally, the control and power connections can still carry voltage!

- **Never touch connections when the power is switched on.**
- **Never disconnect or connect electrical connections to the motor and servo drive while voltage is applied!**
- **Do not stay in the danger zone during operation and secure it against access by unauthorized persons.**
- **Always operate the motor with all safety equipment. Do this also for temporary testing and trial operations!**
- **Keep all covers and control cabinet doors closed during operation and as long as the machine is not disconnected from the mains.**
- **Before working on motors, gearboxes or servo drives or in the danger zone of your machine, disconnect them completely from the mains and secure them against being switched on again by other persons or automatic systems.**
- **Note the discharge time of any existing DC bus.**
- **Only connect measuring instruments in a current- and voltage-free state!**

Warning!

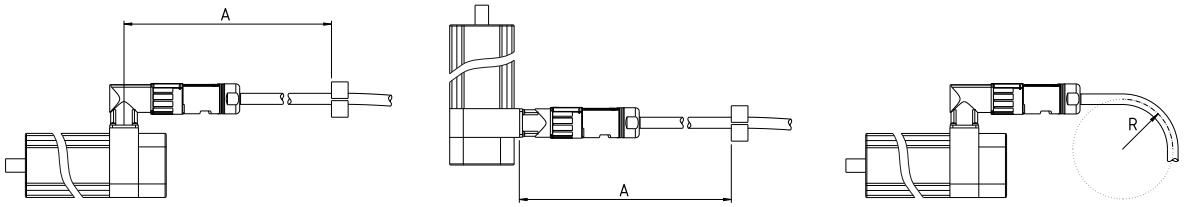
Risk of burns due to hot surfaces!

Touching hot surfaces (e.g. motor and gearbox housings, as well as connected components), can result in very severe burns due to the very high temperature of these parts.

- **Do not stay in the danger zone during operation and secure it against access by unauthorized persons.**
- **Never touch the motor or gearbox housing as well as adjacent surfaces during nominal load operation.**
- **Be aware of hot surfaces also during standstill.**
- **Allow the motor and gearbox to cool down sufficiently before working on them; there remains the risk of burns for a long period of time after they are switched off.**
- **Always operate the motor or gearbox with all safety devices. Do this also for temporary testing and trial operations!**

6.6 Cable clamp and bend radius

To ensure that cables and connectors are not exposed to harmful loads, the cable clamp **(A)** and minimum bend radius **(R)** must be observed during installation.



Cable clamp (A)

- A = Max. 300 mm along longitudinal axis of connector
- The connection must be free of force and torque.
- Movement relative to the connector is not permitted!
- Tensile stress on cables and connectors is not permitted!

Bend radius (R)

- For the minimum radius values, see the current technical data sheet for the cable.

7 Safety technology

7.1 Standard safety technology ("hardwired safety technology")

Motor-integrated ACOPOSmotor Compact (8D1) drives with standard safety technology implement safety function Safe Torque Off (STO) per EN 61800-5-2. The cutoff corresponds to stop category 0 per EN 60204-1.

Safety functions SS1, SS2, SLS, SOS (EN 61800-5-2) and stop categories 1 and 2 (EN 60204-1) can also be implemented through the use of additional components (time relays, speed monitors, etc.) (see "Wiring the enable inputs per required safety category / SIL / PL and functionality (STO, SS1, SS2, SLS, SOS)" on page 171).

Caution!

Safety function STO does not protect against faults that occur in non-safety-related functions of motor-integrated ACOPOSmotor Compact drives with standard safety technology!

Danger!

Especially in the area of safety technology, always consult the most current version of this document on the B&R website for valid specifications (www.br-automation.com)! The specifications in this version of the document are not necessarily current. The user must verify the correctness of specifications before implementing safety functions!

7.1.1 General information

Safety function STO (safe pulse disabling) is integrated in 8D1 modules for safe stopping. This is designed to satisfy the following safety classifications depending on the external wiring: [5)]

Criteria	Characteristic values [2)]
	ACOPOSmotor Compact (8D1)
Maximum safety category per EN ISO 13849	Cat. 3
Maximum performance level per EN ISO 13849	PL e
Maximum safety integrity level per IEC 61800-5-2	SIL 3
Maximum safety integrity level per IEC 62061	SIL 3
Maximum safety integrity level per IEC 61508	SIL 3
PFH (probability of dangerous failure per hour)	$<6 * 10^{-9}$
PFD (probability of dangerous failure on demand) depending on the proof test interval (PTI) For a PTI of 20 years	$<4 * 10^{-4}$
PTI (proof test interval) [1)]	Max. 20 years
DC (diagnostic coverage)	>90%
Diagnostic test interval	Max. 3 months
MTTFd (mean time to dangerous failure)	>500 years

Table 102: Safety classifications, criteria and characteristic values for safety function STO

1) Corresponds to the mission time of the module.
2) These characteristic values are only valid if a diagnostic test interval of max. 3 months is observed - see "Testing" (Page 165).

The following table provides an overview of the individual safety functions that can be implemented:

Name per standard		Short description
EN 61800-5-2	EN 60204-1	
STO (Safe Torque Off)	Stop category 0	Cuts off the power supply
SS1 (Safe Stop 1)	Stop category 1	Initiates active braking and activates function STO after a defined amount of time has passed
SS2 (Safe Stop 2)	Stop category 2	Initiates active braking and activates function SOS after a defined amount of time has passed
SLS (Safely Limited Speed)	---	Protection against exceeding a defined speed limit
SOS (Safe Operating Stop)	---	Protection against impermissible position deviation

Table 103: Overview of safety functions per standard

Safety function STO (safe pulse disabling) interrupts the power supply to the motor by preventing the pulses to the power output stage over two channels. This means that a rotating field and thus electrical torque can no longer be built up in 8D1 modules.

5) For detailed information about the listed standards and safety functions, see section Standards and certifications.

As a result, the requirements regarding the stop functions of category 0 per EN 60204-1 are met with safety function STO present. With the use of additional components, the requirements of category 1 per EN 60204-1 are also met. Both stop functions require switching off the power supply to the machine drive elements (immediately for category 0 and after reaching standstill for category 1).

The terminology of EN 61800-5-2 (STO, SS1, SS2, SLS, SOS) will be used in the following.

Danger!

If the safety functions integrated in the drive system are used in an application, then the safety functions must be fully validated before the drive system is switched on for the first time. There is a risk of death, serious injury or damage to property.

Information:

If module-internal hardware errors occur, safety function STO switches to the safe state and interrupts the supply of power to the drive (failsafe principle). If a hardware defect occurs, then the entire module must be replaced.

7.1.2 Principle - Implementing the safety function

Safety function STO (safe pulse disabling) is achieved by interrupting the pulse patterns to the power output stage in the ACOPOSmotor Compact. The internal power supply for the drivers (Vcc_{HS}/Vcc_{LS}) is safely switched via terminals "Enable signal+" and "Enable signal-" so that the pulse patterns can be transferred to the power output stage.

8D1

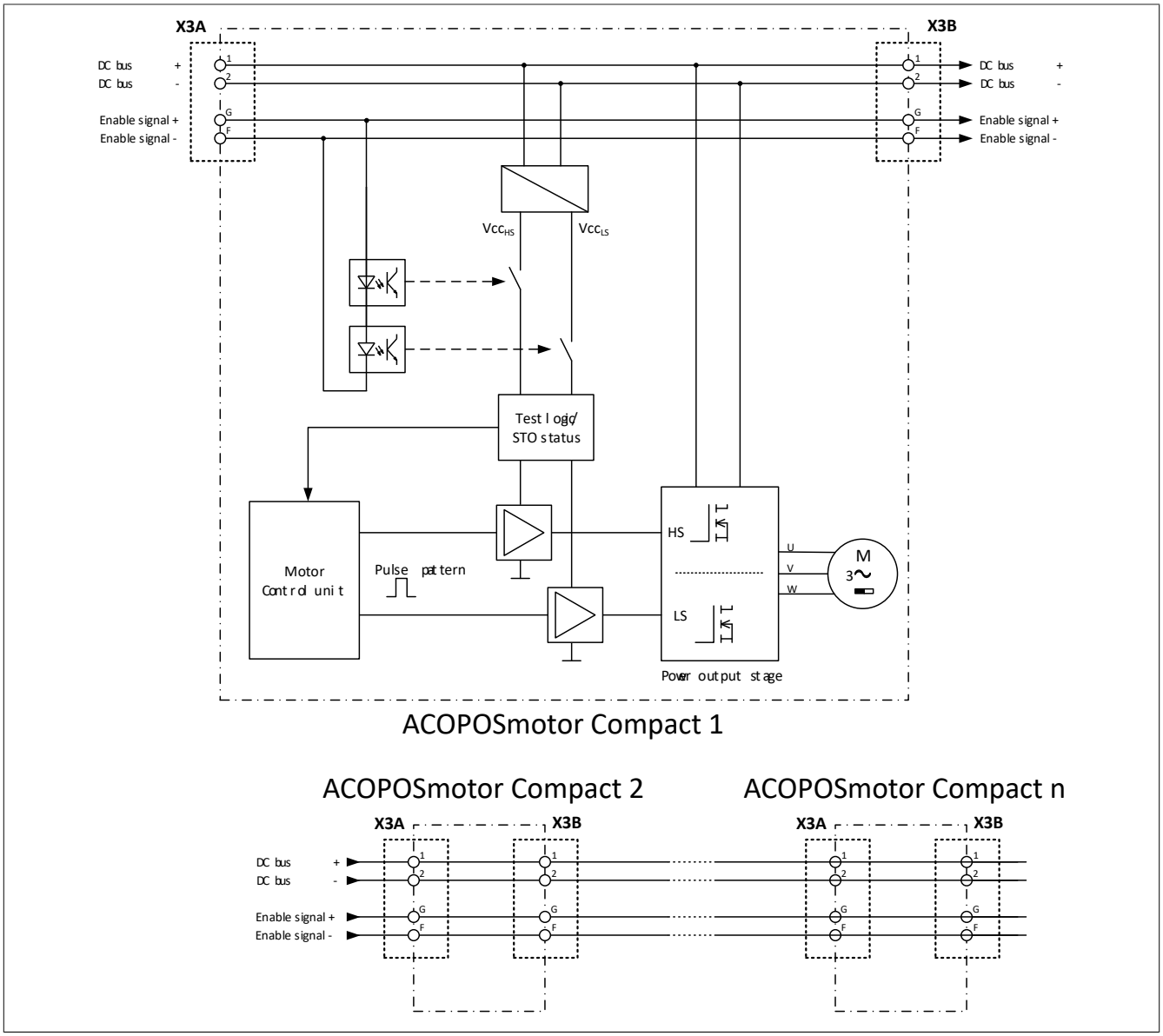


Figure 13: Block diagram of safety function STO - 8D1

If control at the "Enable signal+" and "Enable signal-" terminals drops out, the driver supply is reliably interrupted and the pulse patterns are no longer transferred. It is then no longer possible to transfer the pulse pattern needed to generate the rotating field to the power output stage. This cuts off the supply of power to the motor.

7.1.2.1 Additional functions

The presence of the driver supply voltages is queried by the control unit. If no voltage is applied, generation of the pulse patterns by the control system is also suppressed.

Testing
The two switches for switching off the driver power supply are checked for plausibility by test logic. Testing is active when function STO is activated. In the event of an invalid test result – e.g. due to a defective semiconductor switch – the safe state is assumed by switching off the driver power supply. This state is locked, i.e. it can only be unlocked by removing the module power supply. In the safely locked state, "Enable off" is reported as the STO status, even if the STO input is supplied with power.

To achieve the specified safety characteristics, the diagnostic test interval of max. 3 months must be observed. Since diagnostics is only active when the safety function is activated, it must be enabled cyclically.
The user must perform the following test routine or automatic test for this.

Manual test - Test routine

Step 1	Apply the module power supply or check for its presence.
Step 2	Activate STO: Low level (<5 V) between terminals "Enable signal+" and "Enable signal-"
Step 3	Deactivate STO: High level (>15 V) between terminals "Enable signal+" and "Enable signal-"
Step 4	Check for an error-free drive (STO status correct or enabling the controller possible without errors). The supply voltage is only permitted to be reapplied after this control step; otherwise, the test result loses its validity!

Notice!

If the drive cannot be put into service at step 4 due to a missing enable, there is a potentially dangerous error and the module must be replaced immediately or reported to B&R customer support.

Notice!

If an error message related to the enable input occurs during operation or after activation of safety function STO, a manual test routine must be performed.

Automatic test
Alternatively, the test routine can be automated by using a safe output module with OSSD functionality. The OSSD test gaps in the signal of the STO control ensure cyclic activation of the test logic, which is why the manual test routine is permitted to be omitted. In the event of a module fault, the safe state is achieved by switching off the driver power supply. The module can no longer be put into service and must be replaced.

Wiring example see Fig. 15 "STO, category 3 / SIL 3 / PL e (variant B)" on page 169

For a list of safe and compatible B&R output modules, see chapter "Connection examples" → "Connecting drive systems" → "Tested products" → "B&R" → "ACOPOSmotor Compact" in the "Integrated safety technology user's manual".
The most current version of the "Integrated safety technology user's manual" is available for download - see the B&R website (www.br-automation.com).

Notice!

It is necessary to configure parameter "Disable OSSD = No".

7.1.3 General danger notices

Danger!

After activating safety function STO (safe pulse disabling) via terminals "Enable signal+" and "Enable signal-", the motor is de-energized and therefore not generating torque. If the motor was moving before safety function STO is activated, it is only stopped by a safe operational brake (if available) or by the friction of the complete system. The motor is therefore not able to hold suspended loads. Safe holding brakes must be used for this purpose.

Danger!

The switch-off time of the enable inputs must be taken into account since it has a substantial effect on the response time of the safety functions and therefore the remaining distances and times to be considered! In order to calculate the total safety response time, the user must validate the rundown time of the complete system!

The switch-off time for the enable inputs is listed in the technical data.

Danger!

Activating safety function STO (safe pulse disabling) via terminals "Enable signal+" and "Enable signal-" is not suitable for de-energizing the motor and therefore does not provide sufficient protection against electrical shock!

Danger!

Depending on the application, it is possible for the motor to restart after safety function STO (safe pulse disabling) is deactivated.

Danger!

The C standards relevant to applications must be observed!

Danger!

Note that multiple errors in the power output stage can cause a brief forward movement. Maximum angle of rotation φ of the motor shaft during this forward movement depends on the motor used. For permanent magnet synchronous motors, φ = 360°/2p (for B&R 8D1 motors, p = 4 so that the angle is 45°).

This short forward movement can be excluded as a fault per EN ISO 13849-1, among other things due to the improbability that this would occur and due to general technical experience.

7.1.4 Wiring the enable inputs to the required safety category / SIL / PL

This section uses the example of safety function STO to illustrate the different wiring variations of the enable inputs on the 8D1 module to achieve the required safety category / SIL / PL.

Danger!

All faults (e.g. cross faults) that are not detected can result in the loss of the safety function.

Appropriate measures must be taken to justify the exclusion of errors. For instance, faults caused by a short circuit between any two wires can be excluded per EN ISO 13849-2, appendix D.5, if one of the following conditions is met:

- **The wires are permanently installed and protected against external damage (e.g. using a cable duct or armored conduit).**
- **The wires are installed in different plastic-sheathed cables or within an area for electrical equipment[6)].**
- **The wires are each individually protected by a ground connection.**

For more fault exclusions, see EN ISO 13849-2, appendix D.5.

Danger!

In order to achieve safety category 3 / SIL 3 / PL 3, it must be ensured that an individual fault does not result in loss of the safety function.

7.1.4.1 STO, category 3 / SIL 3 / PL e (variant A)

An enable input on the 8D1 module is supplied with +24 V via a switching contact of a safe emergency switching-off device. Activating emergency switch-off S1 opens both switching contacts of the emergency switching-off device and disconnects the enable input over two channels.

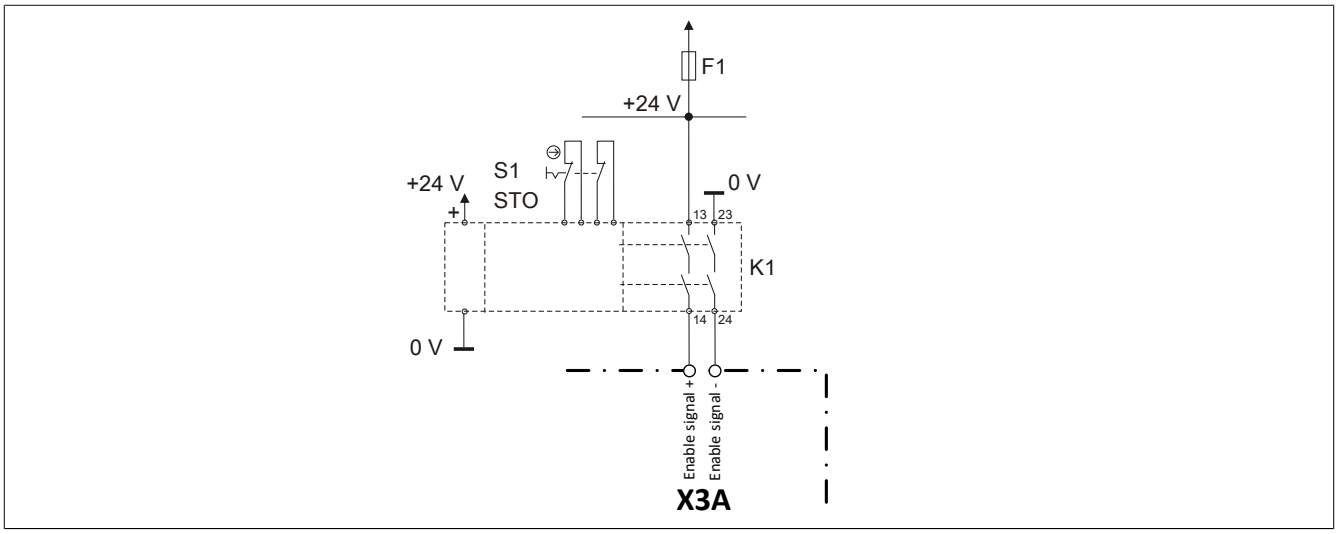


Figure 14: STO, category 3 / SIL 3 / PL e (variant A)

This circuit covers a portion of the wiring and insulation faults for the supply lines to the emergency switching-off device and to the enable inputs.

[6)] Prerequisite: Both the lines and the area for electrical equipment must meet the respective requirements (see IEC 60204-1).

The following fault events can occur in the external wiring:[7)]

Fault event	Error description	Effect
1	Interruption of the power supply cable to connection 13	Power to the motor is cut off.
2	Interruption of the power supply cable to connection 23	Power to the motor is cut off.
3	Short circuit between connections 13 and 23	Fuse F1 is triggered immediately.
4	Short circuit between connections 13 and 0 V	Fuse F1 is triggered immediately.
5	Short circuit between connections 23 and +24 V	Fuse F1 is triggered immediately.
6	Short circuit between connections 13 and 24	Fuse F1 is triggered in the operating state. Power to the motor is cut off.
7	Short circuit between connections 23 and 14	Fuse F1 is triggered in the operating state. Power to the motor is cut off.
8	**Short circuit between connections 13 and 14**	**Error not detected**
9	**Short circuit between connections 23 and 24**	**Error not detected**
10	Interruption of the power supply cable to connection 14	Power to the motor is cut off.
11	Interruption of the power supply cable to connection 24	Power to the motor is cut off.
12	Short circuit between connections 14 and 0 V	Fuse F1 is triggered in the operating state. Power to the motor is cut off.
13	Short circuit between connections 24 and +24 V	Fuse F1 is triggered in the operating state. Power to the motor is cut off.
14	**Short circuit between connections 14 and +24 V**	**Error not detected**
15	**Short circuit between connections 24 and +0 V**	**Error not detected**
16	Short circuit between connections 14 and 24	Fuse F1 is triggered in the operating state. Power to the motor is cut off.

Table 104: List of possible fault events

Danger!

A 2-pole category 3 or 4 / SIL 3 / PL e switching device with a positively driven normally closed contact must be used for the shown S1 switch per EN 60947-5-1. A 2-pole category 3 or 4 / SIL 3 / PL e switching device must be used for the shown K1 relay.

The information in the user documentation for the switching devices must be observed!

The following fault events (per List of possible fault events) must be evaluated with regard to the safety-critical influence on switching device K1 or must be able to be excluded by suitable wiring measures (short-circuit-proof wiring).

- **Fault event 8**
- **Fault event 9**
- **Fault event 14**
- **Fault event 15**

7.1.4.2 STO, category 3 / SIL 3 / PL e (variant B)

The enable input of the 8D1 module is supplied via a safe digital output (Out1+, Out1-). If the safety function is requested, then the safe digital output cuts off the enable input.

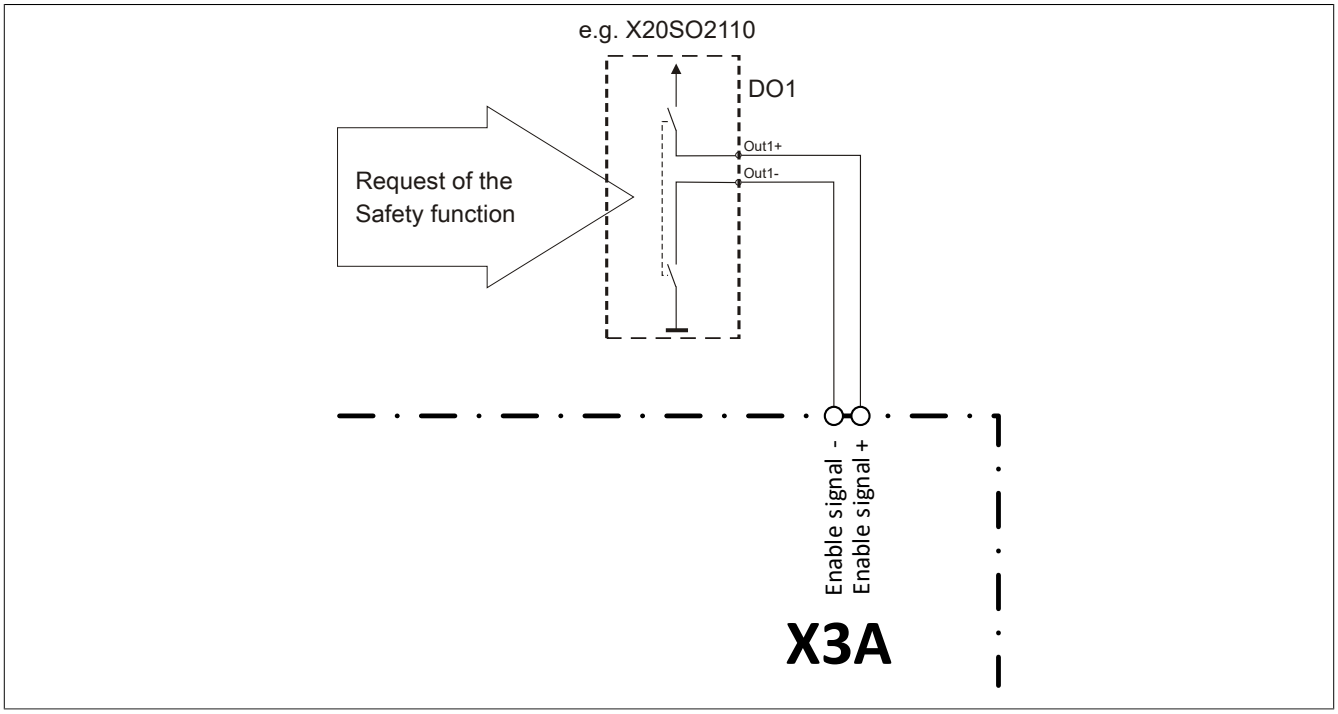


Figure 15: STO, category 3 / SIL 3 / PL e (variant B)

[7)] The numbers for the connections refer to "STO, category 3 / SIL 3 / PL e (variant A)".

The consideration of fault events in the external wiring for fault exclusion purposes is not necessary since faults are detected by the safe digital output.

For additional information about the use, compatibility and wiring of safe output modules, see the "Integrated safety technology user's manual".
The most current version of the "Integrated safety technology user's manual" is available for download on the B&R website (www.br-automation.com)!

Danger!

A safe category 3 or 4 / SIL 3 / PL e digital output module must be used for the shown DO1 safe digital output.

The information in the user documentation for the safe digital output module must be observed!

7.1.5 Wiring the enable inputs per required safety category / SIL / PL and functionality (STO, SS1, SS2, SLS, SOS)

The following illustrates exemplary circuit suggestions for the external wiring of the enable input of the 8D1 module. They vary in their safety classification per EN 60204-1, ISO 13849 and EN 61800-5-2 as well as with regard to the safety function (STO, SS1, SS2, SLS, SOS).

Information:

The following wiring suggestions do not include a line contactor since one is not necessary to comply with the required safety category / SIL / PL.

7.1.5.1 STO, SLS, SOS - Safety category 3 / SIL 3 / PL e

8D1

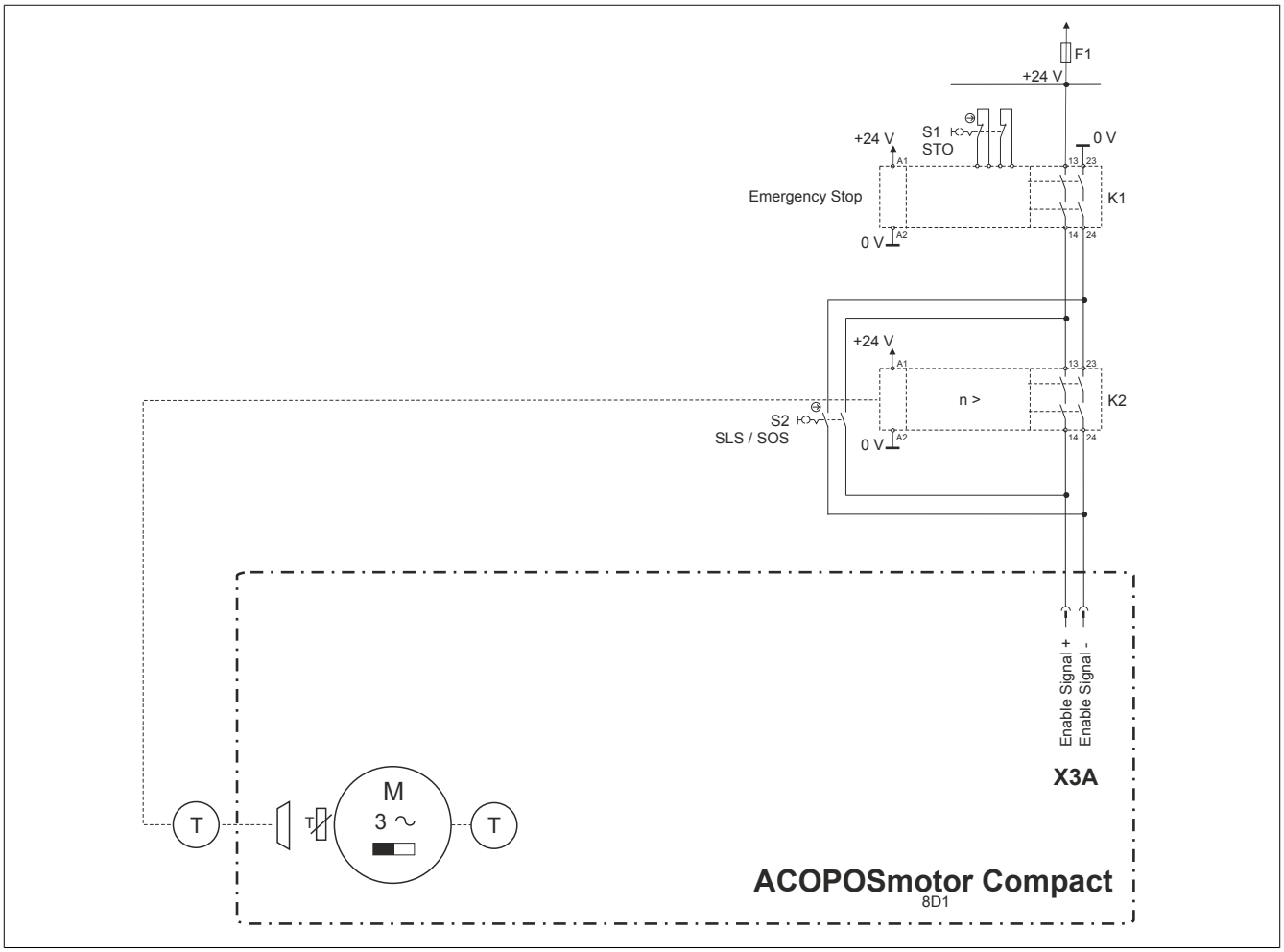


Figure 16: STO, SLS, SOS - Safety category 3 / SIL 3 / PL e

Danger!

The brake shown in this figure as well as the brake controller provided by the ACOPOSmotor Compact module (8D1) are not part of the safety function!

Information:

The module-internal encoder of the ACOPOSmotor Compact module (8D1) does not have certification for safe position evaluation and is therefore not suitable for implementing this safety function.

STO

Activating emergency switch-off S1 de-energizes the switching contacts of emergency switching-off device K1. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case.

SLS

Safety function SLS is activated by opening switch S2. The switching contacts of overspeed monitor K2 are opened if the monitor's set speed limit is exceeded. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor K2 is exceeded.

SOS

Safety function SOS is activated by opening switch S2. The switching contacts of standstill monitor K2 are opened when the standstill monitor is activated. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor K2 is activated.

Information:

Safety function SLS or SOS can be implemented depending on the function of switching device K2 (overspeed monitor or standstill monitor).

Danger!

2-pole category 3 or 4 / SIL 3 / PL e switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 2-pole category 3 or 4 / SIL 3 / PL e switching devices must be used for the shown K1 and K2 relays.

The information in the user documentation for the switching devices must be observed!

7.1.5.2 SS1, SLS, SS2 - Safety category 3 / SIL 3 / PL e (variant A)

8D1 with electronics option

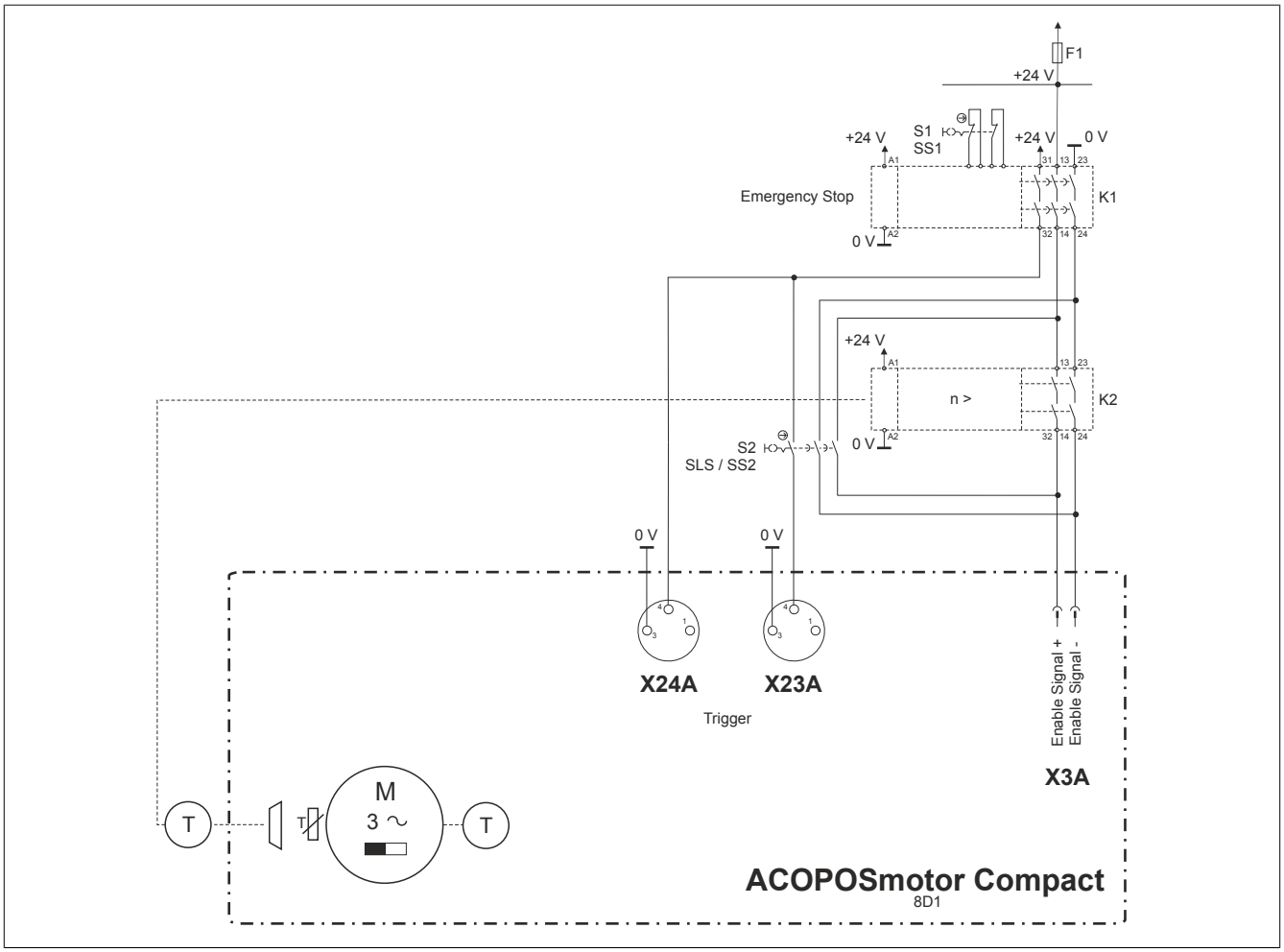


Figure 17: SS1, SLS, SS2 - Safety category 3 / SIL 3 / PL e (variant A)

Danger!

The brake shown in this figure as well as the brake controller provided by the ACOPOSmotor Compact module (8D1) are not part of the safety function!

Information:

The module-internal encoder of the ACOPOSmotor Compact module (8D1) does not have certification for safe position evaluation and is therefore not suitable for implementing this safety function.

Information:

With this wiring, input X24A / Trigger of the 8D1 module must be configured as quick stop for the respective axis.

SS1

Activating emergency switch-off S1 triggers an active braking procedure via an undelayed switching contact of emergency switching-off device K1 on input X24A / Trigger of the 8D1 module. After a defined amount of time, the delayed switching contacts of emergency switching-off device K1 are de-energized. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

SLS

Opening switch S2 activates safety function SLS and triggers an active braking procedure on input X23A / Trigger of the 8D1 module. After a defined amount of time, speed monitoring is activated on overspeed monitor K2. If the configured speed limit is exceeded, the enable input of the 8D1 module is cut off via the undelayed switching contacts of overspeed monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor K2 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure on input X23A / Trigger of the 8D1 module. After a defined amount of time, standstill monitoring is activated on standstill monitor K2. If the configured tolerance limit is exceeded (standstill monitor K2 is activated), the enable input of the 8D1 module is cut off via the undelayed switching contacts of standstill monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor K2 is activated.

Information:

Safety function SLS or SS2 can be implemented depending on the function of switching device K2 (overspeed monitor or standstill monitor).

Danger!

2-pole category 3 or 4 / SIL 3 / PL e switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 2-pole category 3 or 4 / SIL 3 / PL e switching devices must be used for the shown K1 and K2 relays.

The information in the user documentation for the switching devices must be observed!

7.1.5.3 SS1, SLS, SS2 - Safety category 3 / SIL 3 / PL e (variant B)

8D1

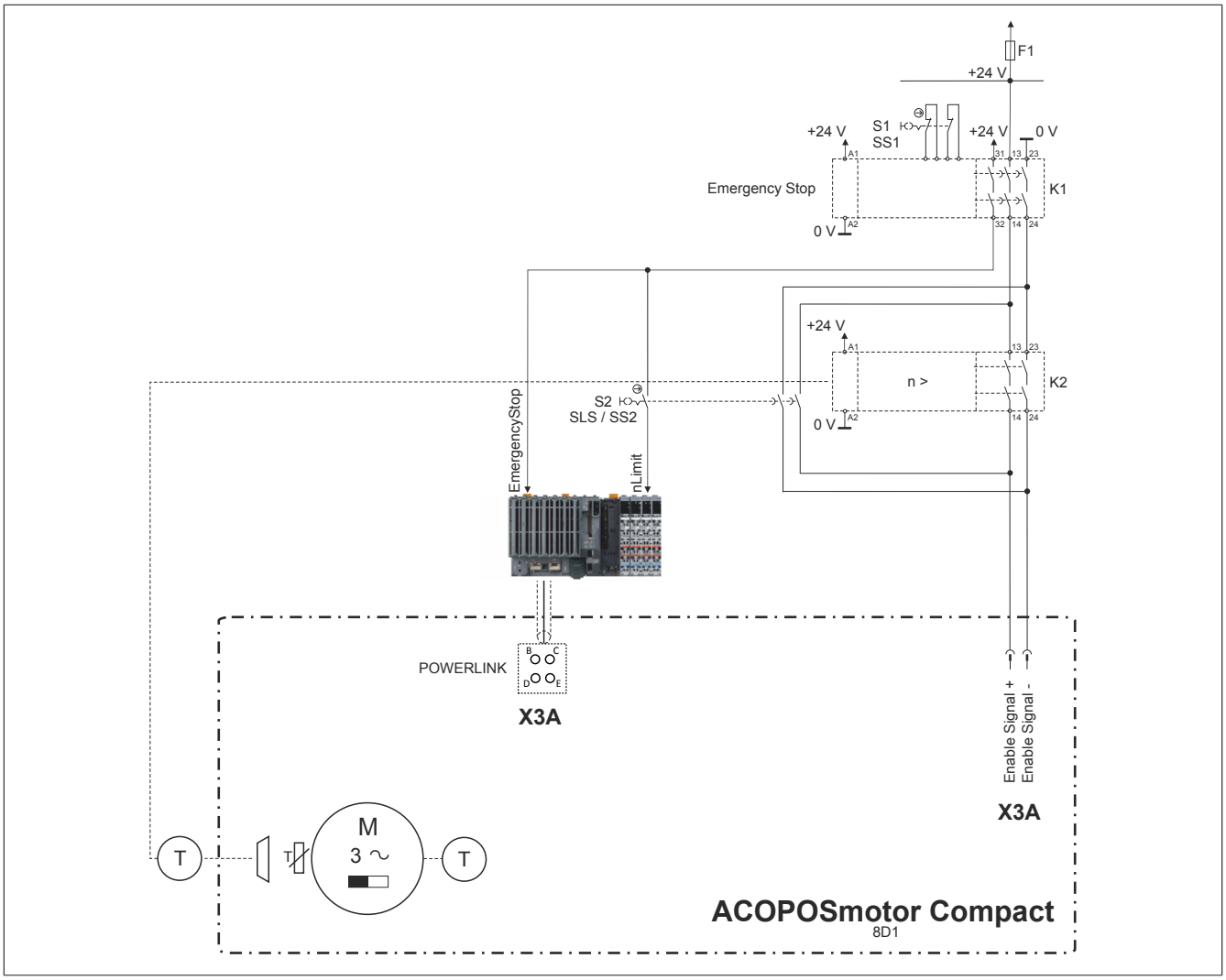


Figure 18: SS1, SLS, SS2 - Safety category 3 / SIL 3 / PL e (variant B)

Danger!

The brake shown in this figure as well as the brake controller provided by the ACOPOSmotor Compact module (8D1) are not part of the safety function!

Information:

The module-internal encoder of the ACOPOSmotor Compact module (8D1) does not have certification for safe position evaluation and is therefore not suitable for implementing this safety function.

SS1

Activating emergency switch-off S1 triggers an active braking procedure over the POWERLINK network via an un-delayed switching contact of emergency switching-off device K1 on digital input "EmergencyStop" on the controller (see "Example code" on page 177). After a defined amount of time, the delayed switching contacts of emergency switching-off device K1 are de-energized. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

SLS

Opening switch S2 activates safety function SLS and triggers active braking via the POWERLINK network on digital input "nLimit" on the controller (see "Example code" on page 177). After a defined amount of time, speed monitoring is activated on overspeed monitor K2. If the configured speed limit is exceeded, the enable input of the 8D1 module is cut off via the undelayed switching contacts of overspeed monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor K2 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure via the POWERLINK network on digital input "nLimit" on the controller (see "Example code" on page 177). After a defined amount of time, standstill monitoring is activated on standstill monitor K2. If the configured tolerance limit is exceeded (standstill monitor K2 is activated), the enable input of the 8D1 module is cut off via the undelayed switching contacts of standstill monitor K2. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor K2 is activated.

Information:

Safety function SLS or SS2 can be implemented depending on the function of switching device K2 (overspeed monitor or standstill monitor).

Danger!

2-pole category 3 or 4 / SIL 3 / PL e switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 2-pole category 3 or 4 / SIL 3 / PL e switching devices must be used for the shown K1 and K2 relays.

The information in the user documentation for the switching devices must be observed!

Example code

Issuing the stop command via POWERLINK:

```
if ( ! statStopActive )
{
    /* Move stop not active: check move stop inputs */
    if ( DI_EmergencyStop == INPUT_LEVEL_LOW )
    {
        /* Move stop with emergency stop deceleration */
        MC_Stop_0.Deceleration = E_STOP_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
    else if ( cmdStopAxis1 )
    {
        /* Move stop with application deceleration */
        MC_Stop_0.Deceleration = APPLICATION_DECELERATION;
        MC_Stop_0.Execute = 1;
        statStopActive = 1;
    }
}
else
{
    /* Move stop is active, wait until it is finished */
    if ( DI_EmergencyStop == INPUT_LEVEL_HIGH &&
        cmdStopAxis1 == 0 &&
        MC_Stop_0.Done == 1 )
    {
        /* Move stop complete */
        MC_Stop_0.Execute = 0;
        statStopActive = 0;
    }
}
...
MC_Stop_0.Axis = AxisRef1;
MC_Stop( &MC_Stop_0 );
...
```

7.1.5.4 STO, SLS, SOS - Safety category 3 / SIL 2 / PL d

8D1

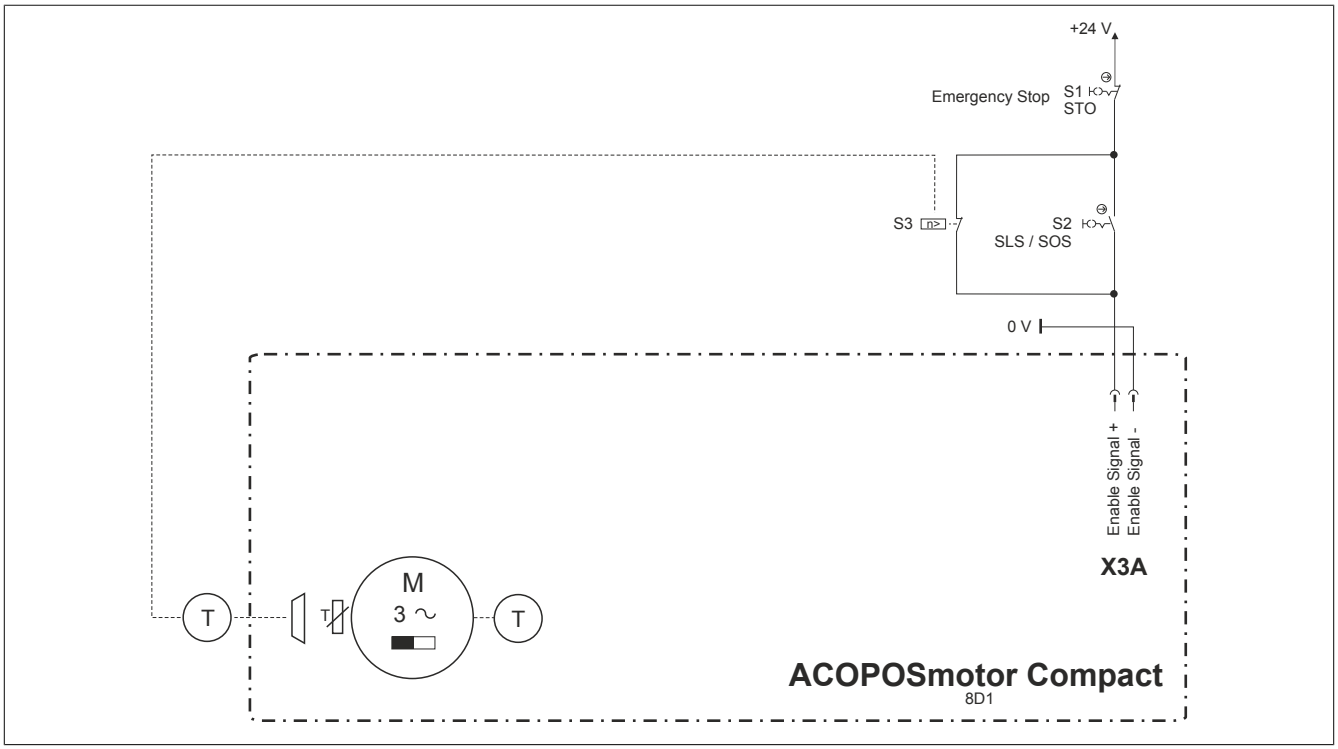


Figure 19: STO, SLS, SOS - Safety category 3 / SIL 2 / PL d

Danger!

The brake shown in this figure as well as the brake controller provided by the ACOPOSmotor Compact module (8D1) are not part of the safety function!

Information:

The module-internal encoder of the ACOPOSmotor Compact module (8D1) does not have certification for safe position evaluation and is therefore not suitable for implementing this safety function.

STO

The enable input of the 8D1 module is cut off by activating emergency switch-off S1. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case.

SLS

Safety function SLS is activated by opening switch S2. The switching contact of overspeed monitor S3 is opened if the monitor's configured speed limit is exceeded. The enable input of the 8D1 module is cut off. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor S3 is exceeded.

SOS

Safety function SOS is activated by opening switch S2. If standstill monitor S3 is activated, then the switching contact of the overspeed monitor is opened. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor S3 is activated.

Information:

Safety function SLS or SOS can be implemented depending on the function of switching device S3 (overspeed monitor or standstill monitor).

Danger!

1-pole category 3 / SIL 2 / PL d switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. A 1-pole category 3 / SIL 2 / PL d switching device must be used for the shown S3 switching device.

The information in the user documentation for the switching device must be observed!

7.1.5.5 SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant A)

8D1 with electronics option

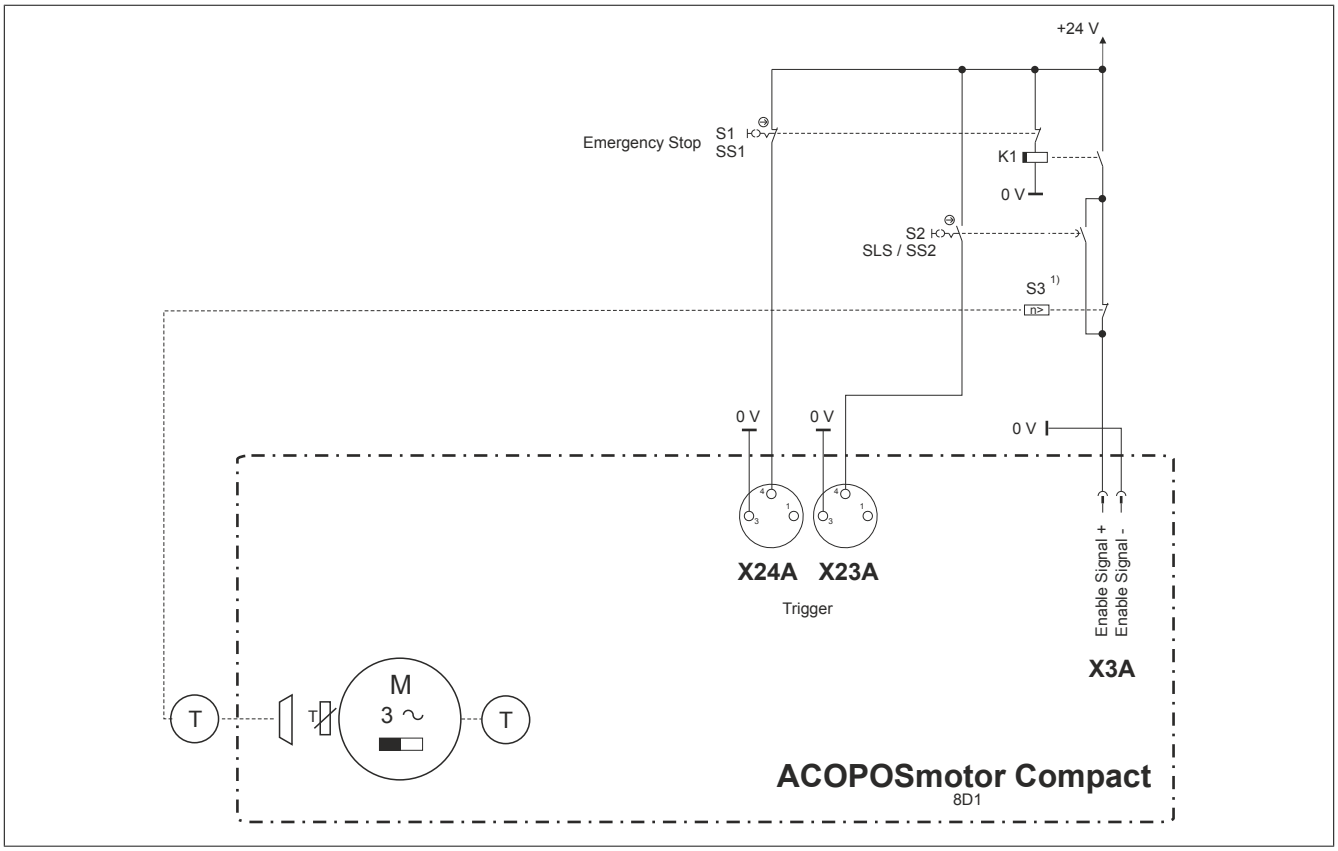


Figure 20: SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant A)

Danger!

The brake shown in this figure as well as the brake controller provided by the ACOPOSmotor Compact module (8D1) are not part of the safety function!

Information:

The module-internal encoder of the ACOPOSmotor Compact module (8D1) does not have certification for safe position evaluation and is therefore not suitable for implementing this safety function.

Information:

With this wiring, input X24A / Trigger of the 8D1 module must be configured as quick stop for the respective axis.

SS1

Activating emergency switch-off S1 causes relay K1 to drop out. This triggers an active braking procedure via input X24A / Trigger of the 8D1 module.

After a defined amount of time, auxiliary dropout delay relay K1 is de-energized. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

SLS

Opening switch S2 activates safety function SLS and triggers an active braking procedure via input X23A / Trigger of the 8D1 module. After a defined amount of time, speed monitoring is activated on overspeed monitor S3. If the configured speed limit is exceeded, the enable input of the 8D1 module is cut off via the undelayed switching contact of overspeed monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor S3 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure via input X23A / Trigger of the 8D1 module. After a defined amount of time, standstill monitoring is activated on standstill monitor S3. If the configured tolerance limit is exceeded (standstill monitor S3 is activated), the enable input of the 8D1 module is cut off via the undelayed switching contact of standstill monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor S3 is activated.

Information:

Safety function SLS or SS2 can be implemented depending on the function of switching device S3 (overspeed monitor or standstill monitor).

Danger!

1-pole category 3 / SIL 2 / PL d switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 1-pole category 3 / SIL 2 / PL d switching devices must be used for the shown K1 relay and switching device S3.

The information in the user documentation for the switching devices must be observed!

7.1.5.6 SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant B)

8D1

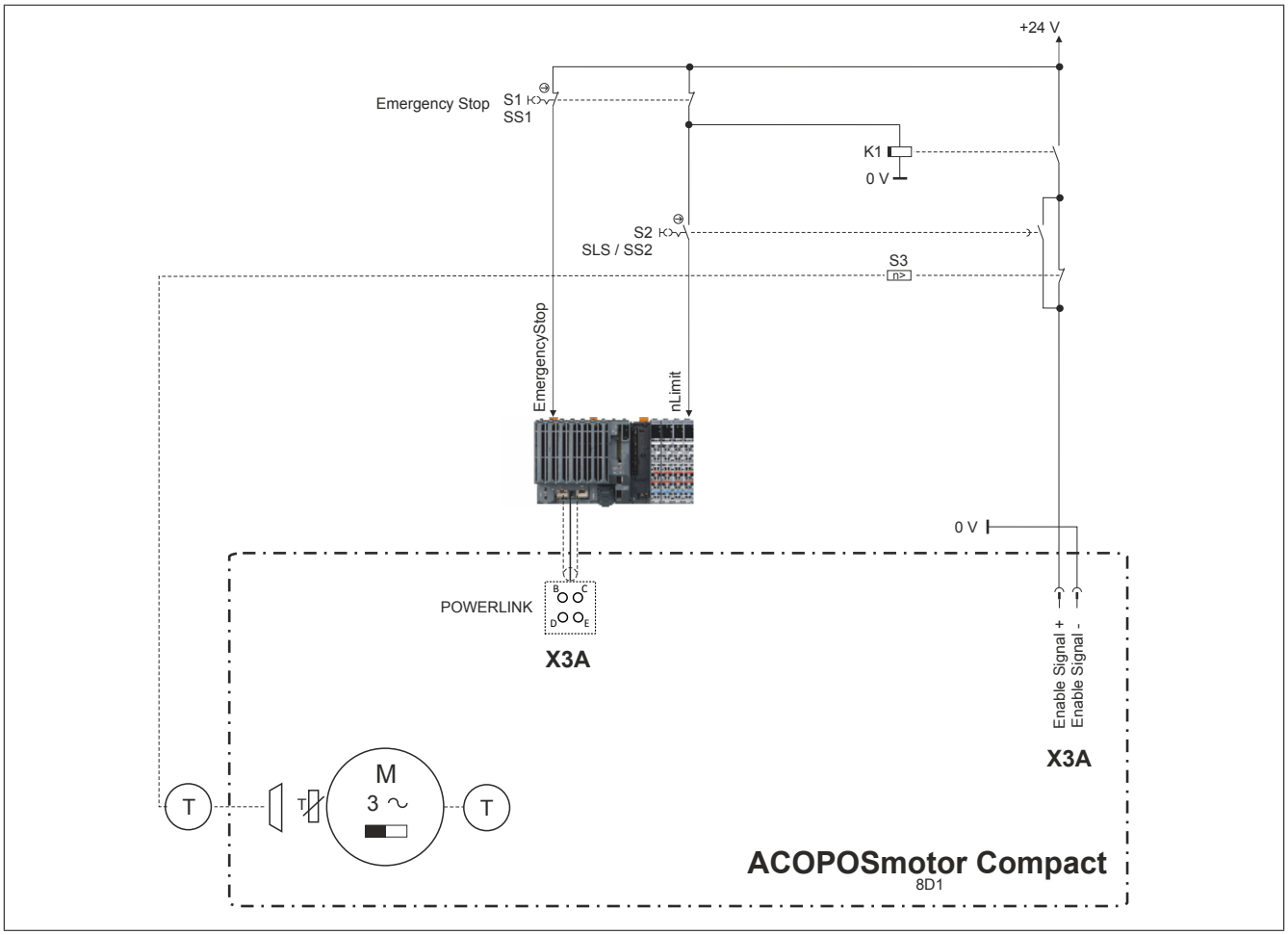


Figure 21: SS1, SLS, SS2 - Safety category 3 / SIL 2 / PL d (variant B)

Danger!

The brake shown in this figure as well as the brake controller provided by the ACOPOSmotor Compact module (8D1) are not part of the safety function!

Information:

The module-internal encoder of the ACOPOSmotor Compact module (8D1) does not have certification for safe position evaluation and is therefore not suitable for implementing this safety function.

SS1

Activating emergency switch-off S1 triggers an active braking procedure via digital input "EmergencyStop" on the controller (see "Example code" on page 177).

After a defined amount of time, auxiliary dropout delay relay K1 is de-energized. This cuts off the enable input of the 8D1 module. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off in every case after a defined amount of time.

SLS

Opening switch S2 activates safety function SLS and triggers an active braking procedure via digital input "nLimit" on the controller (see "Example code" on page 177). After a defined amount of time, speed monitoring is activated on overspeed monitor S3. If the configured speed limit is exceeded, the enable input of the 8D1 module is cut off via the undelayed switching contact of overspeed monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case when the speed limit set on overspeed monitor S3 is exceeded.

SS2

Opening switch S2 activates safety function SS2 and triggers an active braking procedure via digital input "nLimit" on the controller (see "Example code" on page 177). After a defined amount of time, standstill monitoring is activated on standstill monitor S3. If the configured tolerance limit is exceeded (standstill monitor S3 is activated), the enable input of the 8D1 module is cut off via the undelayed switching contact of standstill monitor S3. The supply of power to the motor is cut off as a result.

This ensures that the supply of power to the motor is cut off immediately in every case if standstill monitor S3 is activated.

Safety function SLS or SS2 can be implemented depending on the function of switching device S3 (overspeed monitor or standstill monitor).

Danger!

2-pole or 1-pole category 3 / SIL 2 / PL d switching devices with a positively driven normally closed contact must be used for the shown S1 and S2 switches per EN 60947-5-1. 1-pole category 3 / SIL 2 / PL d switching devices must be used for the shown K1 relay and switching device S3.

The information in the user documentation for the switching devices must be observed!

8 Accessories

8.1 Cables

8.1.1 Hybrid cable

8.1.1.1 Power supply cables

8.1.1.1.1 8D1CHxxxx.11120-0 - Order data

Order number	Short description	Figure
	Supply cable	
8D1CH0003.11120-0	ACOPOSmotor compact power supply cable, length 3 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	
8D1CH0005.11120-0	ACOPOSmotor compact power supply cable, length 5 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	
8D1CH0010.11120-0	ACOPOSmotor compact power supply cable, length 10 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	
8D1CH0015.11120-0	ACOPOSmotor compact power supply cable, length 15 m, 2x 2.5 mm² + 1x (4x 0.34 mm²) + 1x (2x 0.34 mm²) + 1x 0.34 mm² + PA pipe 2.0 mm / 1.0 mm, 1x 9-pin female hybrid connector, can be used in cable drag chains	

Table 105: 8D1CH0003.11120-0, 8D1CH0005.11120-0, 8D1CH0010.11120-0, 8D1CH0015.11120-0 - Order data

8.1.1.1.2 8D1CHxxxx.11120-0 - Technical data

Order number	8D1CH0003.11120-0	8D1CH0005.11120-0	8D1CH0010.11120-0	8D1CH0015.11120-0
General information				
Cable cross section	2x2.5 + 1x(4x0.34)St-C + 1x(2x0.34)C + 1x0.34qmm + PA pipe 2.0/1.0			
Durability	Oil resistant per DIN EN 60811-404 Halogen-free per DIN EN 60754-1 Flame-retardant per DIN EN IEC 60332-1-2 Hydrolysis resistance per DIN EN 50396 Microbial resistance per DIN EN 50396 Silicone-free / PWIS per VW PV 3.7.10			
Certification	E170315 cRUus AWM STYLE 20233 AWM I/II A/B 80°C 300 V FT1 [1]			
Certifications				
CE	Yes			
UKCA	Yes			
UL	cULus E225616 Power conversion equipment			
cULus	In preparation			
Cable construction				
Outer jacket				
Material	TPU, flame-retardant, halogen-free			
Color	Orange similar to RAL 2003			
Connector				
Type	9-pin female hybrid connector			
Mating cycles	<500			
Contacts	9			
Additional connectors	RJ45			
Degree of protection per EN 60529	IP66/67 when connected			
Electrical properties [1]				
Nominal current	20 A (power) 0.5 A (signal)			
Operating voltage	Max. 58 VDC (power) Max. 30 VDC (signal)			
Ambient conditions [1]				
Temperature				
Moving	-30°C to +80°C (drag chain: -20°C to +60°C)			
Static	-40°C to +90°C			

Table 106: 8D1CH0003.11120-0, 8D1CH0005.11120-0, 8D1CH0010.11120-0, 8D1CH0015.11120-0 - Technical data

Order number	8D1CH0003.11120-0	8D1CH0005.11120-0	8D1CH0010.11120-0	8D1CH0015.11120-0
Mechanical properties [1]				
Dimensions				
Length	3 m	5 m	10 m	15 m
Diameter	11.7 mm ±0.3 mm			
Bend radius				
Single bend	≥3x cable diameter			
Moving	≥12.5x cable diameter			
Drag chain data				
Acceleration	50 m/s² (depends on the length of the travel path)			
Flex cycles	≥3,000,000			
Velocity	Max. 300 m/min			
Torsional strength	±30°/m			
Weight	0.950 kg	1.4 kg	2.60 kg	3.75 kg

Table 106: 8D1CH0003.11120-0, 8D1CH0005.11120-0, 8D1CH0010.11120-0, 8D1CH0015.11120-0 - Technical data

1) Values refer to the raw cable being used.

8.1.1.2 Power cables

8.1.1.2.1 8D1CHxxxx.11110-0 - Order data

Order number	Short description	Figure
	Power cable	
8D1CH00X5.11110-0	ACOPOSmotor compact power cable, length 0.5 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0001.11110-0	ACOPOSmotor compact power cable, length 1 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0002.11110-0	ACOPOSmotor compact power cable, length 2 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0003.11110-0	ACOPOSmotor compact power cable, length 3 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0005.11110-0	ACOPOSmotor compact power cable, length 5 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0010.11110-0	ACOPOSmotor compact power cable, length 10 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	
8D1CH0015.11110-0	ACOPOSmotor compact power cable, length 15 m, 1x 9-pin female hybrid connector, 1x 9-pin male hybrid connector, can be used in cable drag chains	

Table 107: 8D1CH00X5.11110-0, 8D1CH0001.11110-0, 8D1CH0002.11110-0, 8D1CH0003.11110-0, 8D1CH0005.11110-0, 8D1CH0010.11110-0, 8D1CH0015.11110-0 - Order data

8.1.1.2.2 8D1CHxxxx.11110-0 - Technical data

Order number	8D1CH00X5.11110-0	8D1CH0001.11110-0	8D1CH0002.11110-0	8D1CH0003.11110-0	8D1CH0005.11110-0	8D1CH0010.11110-0	8D1CH0015.11110-0
General information							
Cable cross section	2x2.5 + 1x(4x0.34)St-C + 1x(2x0.34)C + 1x0.34qmm + PA pipe 2.0/1.0						
Durability	Oil resistant per DIN EN 60811-404 Halogen-free per DIN EN 60754-1 Flame-retardant per DIN EN IEC 60332-1-2 Hydrolysis resistance per DIN EN 50396 Microbial resistance per DIN EN 50396 Silicone-free / PWIS per VW PV 3.7.10						
Certification	E170315 cRUus AWM STYLE 20233 AWM I/II A/B 80°C 300 V FT1 [1]						
Certifications							
CE	Yes						
UKCA	Yes						
UL	cULus E225616 Power conversion equipment						
cULus	In preparation						
Cable construction							
Outer jacket							
Material	TPU, flame-retardant, halogen-free						
Color	Orange similar to RAL 2003						
Connector							
Type	9-pin female hybrid connector						
Mating cycles	<500						
Contacts	9						
Additional connectors	9-pin male hybrid connector Mating cycles: <500 Contacts: 9 Degree of protection per EN 60529: IP66/67 when connected						
Degree of protection per EN 60529	IP66/67 when connected						
Electrical properties [1]							
Nominal current	20 A (power) 0.5 A (signal)						
Operating voltage	Max. 58 VDC (power) Max. 30 VDC (signal)						
Ambient conditions [1]							
Temperature							
Moving	-30°C to +80°C (drag chain: -20°C to +60°C)						
Static	-40°C to +90°C						
Mechanical properties [1]							
Dimensions							
Length	0.5 m	1 m	2 m	3 m	5 m	10 m	15 m
Diameter	11.7 mm ±0.3 mm						

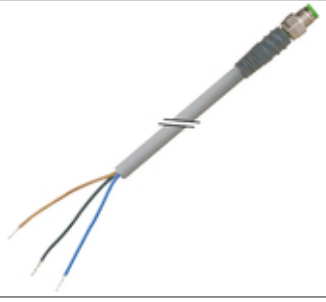
Table 108: 8D1CH00X5.11110-0, 8D1CH0001.11110-0, 8D1CH0002.11110-0, 8D1CH0003.11110-0, 8D1CH0005.11110-0, 8D1CH0010.11110-0, 8D1CH0015.11110-0 - Technical data

Order number	8D1CH00X5.11110-0	8D1CH0001.11110-0	8D1CH0002.11110-0	8D1CH0003.11110-0	8D1CH0005.11110-0	8D1CH0010.11110-0	8D1CH0015.11110-0
Bend radius							
Single bend	≥3x cable diameter						
Moving	≥12.5x cable diameter						
Drag chain data							
Acceleration	50 m/s² (depends on the length of the travel path)						
Flex cycles	≥3,000,000						
Velocity	Max. 300 m/min						
Torsional strength	±30°/m						
Weight	0.55 kg	0.65 kg	0.90 kg	1.15 kg	1.40 kg	2.75 kg	3.90 kg

Table 108: 8D1CH00X5.11110-0, 8D1CH0001.11110-0, 8D1CH0002.11110-0, 8D1CH0003.11110-0, 8D1CH0005.11110-0, 8D1CH0010.11110-0, 8D1CH0015.11110-0 - Technical data

1) Values refer to the raw cable being used.

8.1.2 M8 sensor cables

	Short description	
Length	M8 sensor cables	
2 m	X67CA0D40.0020	X67CA0D50.0020
5 m	X67CA0D40.0050	X67CA0D50.0050
10 m	X67CA0D40.0100	X67CA0D50.0100
15 m	X67CA0D40.0150	X67CA0D50.0150
20 m	X67CA0D40.0200	X67CA0D50.0200
		

Length	Tolerances for cable lengths
0 to <1 m	+2 cm
1 m to <10 m	+5 cm
10 m to xx m	+10 cm

8.1.2.1 Technical data

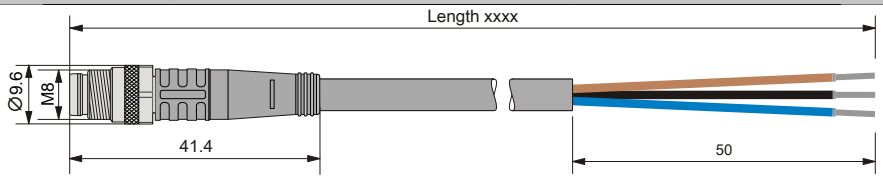
Product ID	X67CA0D40	X67CA0D50
General information		
Note	PVC- and silicone-free PWIS- and halogen-free	
Durability	Good chemical and oil resistance Flame-retardant Good UV and ozone resistance	
Connection	M8, 3-pin, straight	M8, 3-pin, angled
Type	Attachment cable	
Cable cross section		
AWG	3x 22 AWG	
mm²	3x 0.34 mm²	
Cable construction		
Cable shield	Not shielded	
Outer jacket		
Material	Polyurethane (PUR)	
Color	Gray	
Labeling	B&R X67CA0Dxx.xxxx Rev. G0 ESCHA FC[1)]	
Wires		
Wire insulation	Polypropylene (PP) 9Y	
Wire colors	Brown, black, blue	
Type	Uncoated copper ETP1 Fine stranded wire (42x 0.1 mm / 42x 38 AWG), class 5	
Stranding	3 wires, stranded	
Electrical properties		
Nominal current	Max. 4 A / Contact at 40°C	
Operating voltage	Max. 60 V	
Degree of insulation	Category II per IEC 61076-2	
Conductor resistance	≤57 Ω/km	
Insulation resistance	≥100 MΩ	
Operating conditions		
Degree of protection per EN 60529		
Connector/Coupling	IP67, only when screwed in	
Ambient conditions		
Temperature		
Transport	-40 to 90°C	
Fixed installation	-30 to 90°C	
Flexible installation[2)]	-25 to 60°C	
Mechanical properties		
Dimensions		
Length	Various	
Diameter	4.3 mm ±0.2 mm	
Bend radius	≥10x outer diameter	
Drag chain data		
Acceleration	Max. 5 m/s²	
Flex cycles	5 million	
Velocity	Max. 3.3 m/s	

Table 109: X67CA0Dxx - Technical data

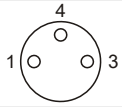
1) xx.xxxx: Group number and cable length
2) In cable drag chain operation

8.1.2.2 X67CA0D40.xxxx

Dimensions

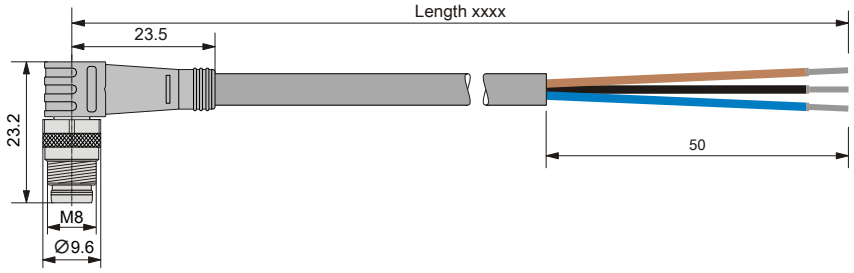


Pinout

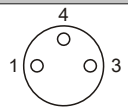
Connector	Pin	Name	Wire colors	Open
	1	Sensor/Actuator power supply 24 VDC	Brown	For custom wiring
	3	GND	Blue	
	4	Input/Output x	Black	

8.1.2.3 X67CA0D50.xxxx

Dimensions



Pinout

Connector	Pin	Name	Wire colors	Open
	1	Sensor/Actuator power supply 24 VDC	Brown	For custom wiring
	3	GND	Blue	
	4	Input/Output x	Black	

9 Standards and certifications

9.1 International and national certifications

Products and services from B&R comply with applicable regulations, directives and standards. These are national, European and international regulations, mainly from organizations such as ISO, IEC and CENELEC. We are committed to ensuring the reliability of our products in industrial environments.

Information:

Certifications that apply to a particular module are available at the following places:

- **The data sheet's technical data under "General information → Certifications"**
- **At www.br-automation.com under "Products" in the "General information → Certifications" area of the technical data**
- **On the side of the module housing**

9.1.1 EU directives and standards (CE)

CE marking

Europe (EU)

The respective product complies with all applicable EU directives and relevant harmonized standards.

Certification of these products is performed in cooperation with accredited testing laboratories.

EMC Directive 2014/30/EU

All devices meet the protection requirements of the "Electromagnetic Compatibility" directive and are designed for typical industrial use.

Applicable standards from this directive:

EN 61800-3	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods

Low Voltage Directive 2014/35/EU

The low voltage directive applies to electrical equipment with a nominal voltage from 50 to 1000 VAC and from 75 to 1500 VDC.
All devices within the area of application of this directive satisfy the its protection requirements.

Applicable standard from this directive:

EN 61800-5-1	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy

The corresponding declaration of conformity is available for download on the B&R website. The editions of the applied standards are located in the declaration of conformity.

Declaration of conformity

Website > Downloads > Certificates > Declarations of conformity > Declaration Servos ACOPOSmotor Compact

Ecodesign Directive (EU) No. 2019/1781

Decentralized motion control does not have a nominal voltage range of 100 VAC to 1000 VAC. The devices are operated with DC voltage from an ACOPOSmulti system, ACOPOS P3 or power supply unit.

Decentralized motion control is thus excluded from the scope of Regulation (EU) 2019/1781.

Machinery Directive 2006/42/EC

Standard safety technology	Functional safety
No mark	open SAFETY certified product
Europe (EU)	Europe (EU)

In accordance with the Machinery Directive, safety technology products are designed, developed, tested and labeled for special applications providing protection to machinery and personnel.

Certification of these products is performed exclusively in cooperation with EU-authorized bodies (notified bodies).

Applicable standards from this directive:

IEC 61508-1	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements
IEC 61508-2	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
IEC 61508-3	Functional safety of electrical / electronic / programmable electronic safety-related systems - Part 3: Software requirements
IEC 61508-4	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations
EN 61800-5-2	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional
EN 62061	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 13849-1	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

The declaration of conformity, certificates and additional safety-related information are available for download on the B&R website. The editions of the applied standards are located in the declaration of conformity.

Declaration of conformity

Website > Downloads > Certificates > Declarations of conformity > Declaration FS Servos ACOPOSmotor Compact

Certificates

Website > Downloads > Certificates > Safety technology > ACOPOSmotor Compact > TÜV certificate - Functional safety ACOPOSmotor Compact

9.1.1.1 Requirements for immunity to interference

- EN 61800-3 requirements apply.
- For all modules that have certified safety functions, stricter requirements apply for section "High-frequency disturbances" per EN 61800-5-2.

Immunity	Testing performed per	Requirements per
Electrostatic discharge (ESD)	EN 61000-4-2	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
High-frequency electromagnetic fields (HF field)	EN 61000-4-3	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
High-speed transient electrical disturbances (Burst)	EN 61000-4-4	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
Surge voltages (Surge)	EN 61000-4-5	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems
Conducted disturbances	EN 61000-4-6	EN 61800-3: Product standard - Adjustable speed electrical power drive systems
		EN 61800-5-2: Product standard - Adjustable speed electrical power drive systems

Performance criteria for operating behavior

Criteria (PC)	During test	After test
A	The system shall continue to operate as intended. No loss of function or operating behavior.	The system shall continue to operate as intended.
B	Degradation of operating behavior accepted. The operating mode is not permitted to change. Irreversible loss of stored data is not permitted.	The system shall continue to operate as intended. Temporary degradation of operating behavior must be self-recoverable.
C	Loss of functions accepted, but no destruction of hardware or software (program or data).	The system shall continue to operate as intended automatically, after manual restart or power off / power on.
FS	Functional safety - Behavior of test object per EN 61800-5-2, item 6.2.5.3	

9.1.1.1.1 High-frequency interference

The following limit values are applicable for industrial environments (category C3).

Electrostatic discharge (ESD)

Testing performed per EN 61000-4-2	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 [1] Increased immunity to interference	PC
Contact discharge (CD) on conductive accessible parts	±4 kV	B	±6 kV	FS
Air discharge (AD) on insulating accessible parts	±8 kV		±15 kV	

1) The total number of discharges depends on the required safety integrity level (SIL) and listed in EN 61800-5-2.

High-frequency electromagnetic fields (HF field)

Testing performed per EN 61000-4-3	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 Increased immunity to interference	PC
Housing, completely wired	80 MHz to 1 GHz 10 V/m 80% amplitude modulation (1 kHz)	A	80 MHz to 1 GHz 20 V/m 80% amplitude modulation (1 kHz)	FS
	1.4 GHz to 2 GHz 3 V/m 80% amplitude modulation (1 kHz)		1.4 GHz to 2 GHz 10 V/m 80% amplitude modulation (1 kHz)	
	2 GHz to 2.7 GHz 1 V/m 80% amplitude modulation (1 kHz)		2 GHz to 6 GHz 3 V/m 80% amplitude modulation (1 kHz)	

High-speed transient electrical disturbances (Burst)

Testing performed per EN 61000-4-4	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 [1] Increased immunity to interference	PC
Power supply connections	±2 kV 1 min Direct coupling	B	±4 kV Direct coupling	FS
Connections for process measurement, open-loop and closed-loop process control	±2 kV 1 min		±4 kV	
Signal interfaces	±1 kV 1 min		±2 kV	

1) The duration of the effect depends on the required safety integrity level (SIL) and listed in EN 61800-5-2.

Surge voltages (Surge)

Testing performed per EN 61000-4-5	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 [1] Increased immunity to interference	PC
Power supply connections	±1 kV DM Symmetrical	B	±2 kV DM Symmetrical	FS
	±2 kV CM Asymmetrical		±4 kV CM Asymmetrical	
Connections for process measurement, open-loop and closed-loop process control	±1 kV CM Asymmetrical		±2 kV CM Asymmetrical	
Signal interfaces	---		±0.5 kV CM Asymmetrical	

1) The number of pulses depends on the required safety integrity level (SIL) and listed in EN 61800-5-2.

Conducted disturbances

Testing performed per EN 61000-4-6	Requirements per EN 61800-3	PC	Requirements per EN 61800-5-2 Increased immunity to interference	PC
Power supply connections	150 kHz to 80 MHz 10 V 80% amplitude modulation (1 kHz)	A	150 kHz to 80 MHz 20 V 80% amplitude modulation (1 kHz)	FS
Connections for process measurement, open-loop and closed-loop process control				
Signal interfaces				

9.1.1.2 Emission requirements

Phenomenon	Testing performed per	Limit values per
Radiated emissions	EN 55011	EN 61800-3: Product standard - Adjustable speed electrical power drive systems

The following limit values are applicable for industrial environments (category C3).

Radiated emissions

Testing performed per EN 55011	Limit values per EN 61800-3	
	Frequency band	Quasi-peak value
Electric field / Measured from 10 m 30 MHz to 1 GHz	30 MHz to 230 MHz	50 dB (µV/m)
	230 MHz to 1 GHz	60 dB (µV/m)

9.1.1.3 Climate conditions

Test	Testing performed per	Requirements per
Operation	---	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-3 / class 3K3
Storage	---	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-1 / class 1K4 / class 1K3
Transport	---	EN 61800-2: Product standard - Adjustable speed electrical power drive systems
		EN 60721-3-2 / class 2K3

Operation

	Requirements per EN 60721-3-3 / class 3K3
Ambient temperature during operation	5 to 40°C
Relative humidity during operation	5 - 85%, non-condensing

Storage

	Requirements per EN 60721-3-1 / class 1K4	Requirements per EN 60721-3-1 / class 1K3
Storage temperature	-25 to 55°C	---
Relative humidity during storage	---	5 to 95%, non-condensing

Transport

	Requirements per EN 60721-3-2 / class 2K3
Transport temperature	-25 to 70°C
Relative humidity during transport	Max. 95% at 40°C

9.1.1.4 Electrical safety

Overvoltage category

Requirement per EN 61800-2	Explanation
Overvoltage category III	Equipment supplied from the mains power supply and permanently connected in fixed installations (including and downstream of the main distribution board).

Pollution degree

Requirement per EN 61800-2	Explanation
Pollution degree 2	Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected when the module is out of operation.

Degree of protection provided by enclosures (IP code)

Requirement	Explanation of code numbers per EN 60529	Explanation for the protection of equipment	Explanation for the protection of personnel
IP 65	First number IP**6**x	Dust-proof.	Protected against touching dangerous parts with fingers.
	Second number IP x**5**	Protection against water jets (nozzle) from any angle.	---

9.1.2 UL / CSA - ACOPOSmotor Compact (8D1)

Underwriters Laboratories (UL)
Products with this mark are tested by Underwriters Laboratories and listed with the file number E225616.

POWER CONVERSION EQUIPMENT E225616

The mark is valid for the **USA and Canada** and simplifies the certification of your machines and systems in this economic area.

Standards applied:

UL 61800-5-1	Standard for adjustable speed electrical power drive systems
CSA-C22.2 No. 274	Adjustable speed drives

Certificate
Website > Downloads > Certificates > UL > ACOPOSmotor > E225616 UL certificate of compliance ACOPOSmotor Compact

CONDITIONS OF ACCEPTABILITY for 8D1

For use only in complete equipment where the acceptability of the combination is determined by UL LLC.

1. These devices shall not to be directly connected to the supply mains of OVC III. Instead they are intended for connection to UL certified dc sources. The power supply shall provide galvanic isolation from mains, its maximum ampacity shall not exceed 60A at 58VDC. The devices shall be protected by supplementary or a branch circuit type dc fuse or circuit breaker with maximum rating not exceeding 35A. This supplementary fuse or circuit breaker are not necessary for 8B0C0320Hx00.B00 or 80PS080X3.
2. Enclosure Type rating 1

9.1.3 UKCA

UK Conformity Assessed (UKCA)
All directives applicable to the respective product and their relevant standards are met.
Products with this marking are permitted to be imported into Great Britain (England, Wales, Scotland).
Certification of these products is carried out exclusively in cooperation with accredited testing laboratories.

The corresponding UK declaration of conformity is available for download on the B&R website. For information about the editions of applicable standards, see the UK declaration of conformity.

UK Declaration of Conformity
Website > Downloads > Certificates > Declarations of conformity > ACOPOSmotor Compact

9.2 Standards and definitions for safety technology

Stop functions per EN 60204-1 (Electrical equipment of machines, Part 1: General requirements)

There are three categories of stop functions:

Category	Description
0	Stopping by immediate removal of power to the machine actuators (i.e. an uncontrolled stop).
1	A controlled stop with power left available to the machine actuators to allow for stopping. Power is only interrupted when standstill is achieved.
2	A controlled stop with power left available to the machine actuators.

Table 110: Overview of stop function categories

The necessary stop functions must be determined based on a risk assessment of the machine. Category 0 and category 1 stop functions must be functional regardless of operating mode. A category 0 stop must have priority. Stop functions must have priority over assigned start functions. Resetting the stop function is not permitted to trigger a dangerous state.

Emergency stops per EN 60204-1 (Electrical equipment of machines - Part 1: General requirements)

In addition to the requirements for stop functions, the emergency stop function has the following requirements:

- It must have priority over all other functions and operations in all operating modes.
- Power to the machine actuators that can cause a hazardous situation shall be removed as quickly as possible without creating other hazards.
- A reset is not permitted to initiate a restart.

Emergency stops must be category 0 or category 1 stop functions. The necessary stop function must be determined based on a risk assessment of the machine.

Performance levels (PL) per EN ISO 13849-1 (Safety of machinery - Safety-related parts of control systems, Part 1: General principles for design)

The safety-related parts of control systems must meet one or more of the requirements for five defined performance levels. These performance levels define the required behavior of safety-related controller parts with regard to their resistance to errors.

Performance level (per EN ISO 13849-1)	Safety integrity level - SIL (per IEC 61508-2)	Short description	System behavior
a	---	Safety-related components must be designed and built in such away that they can meet the expected operational requirements (no specific safety measures are implemented).	**Caution!** **The occurrence of a fault can result in the loss of the safety function.**
b	1	Safety-related components must be designed and built in such a way that only reliable components and safety principles are used (e.g. preventing short circuits by using sufficient distances, reducing the probability of errors by using oversized components, defining the failure route, idle current principle).	**Caution!** **The occurrence of a fault can result in the loss of the safety function.**
c	1	Safety-related components must be designed so that their safety functions are checked at suitable intervals by the machine control system (e.g. automatic or manual check during startup).	**Caution!** **An error between checks can result in the loss of the safety function. The loss of the safety function is detected during the check.**
d	2	Safety-related parts shall be designed so that a single fault does not result in the loss of the safety function. Individual errors should – if possible – be detected the next time (or before) the safety function is required.	**Caution!** **The safety function is always retained when a fault occurs. Some but not all errors are detected. An accumulation of undetected errors can result in loss of the safety function.**
e	3	Safety-related parts shall be designed so that a single fault does not result in the loss of the safety function. Individual errors must be detected the next time (or before) the safety function is required. If this type of detection is not possible, an accumulation of faults is not permitted to result in the loss of the safety function.	**Information:** **The safety function is always retained when a fault occurs. The faults are detected in time to prevent loss of the safety function.**

Table 111: Overview of performance levels (PL)

A suitable performance level must be selected separately for each drive system (or for each axis) based on a risk assessment. This risk assessment is a part of the total risk assessment for the machine.

The following risk graph (per EN ISO 13849-1, appendix A) provides a simplified procedure for risk assessment:

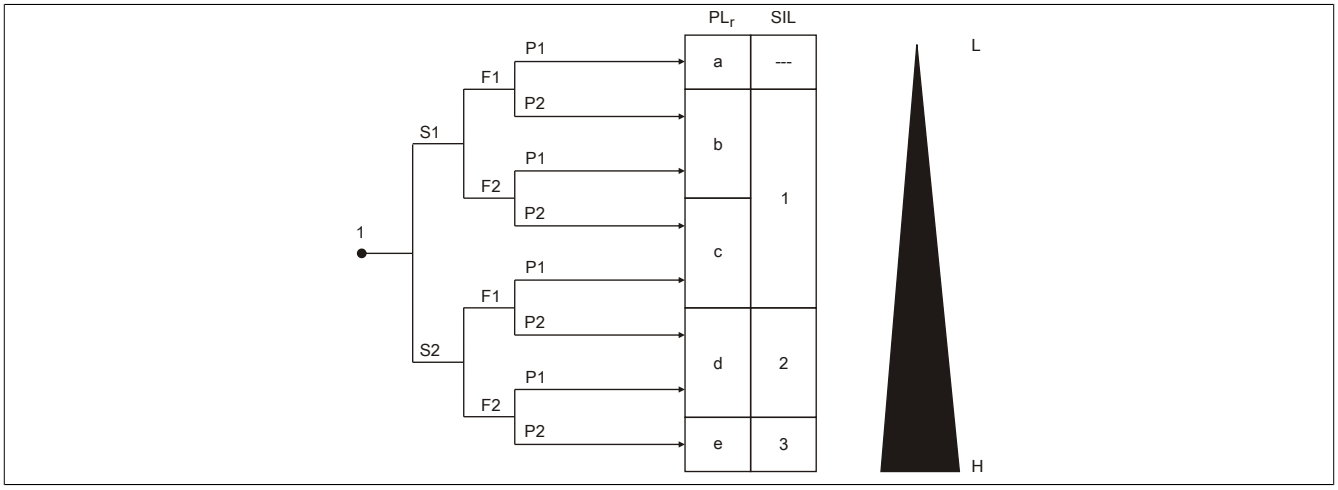


Figure 22: Risk diagram for determining the PL_r for each safety function per EN ISO 13849-1, appendix A

Legend

1 Starting point for assessing the impact on risk reduction
L Low contribution to risk reduction
H High contribution to risk reduction
PL_r Required performance level
SIL Safety Integrity Level per IEC 61508-2

Risk parameters

S Severity of injury
S1 Slight (normally reversible injury)
S2 Serious (normally irreversible injury or death)
F Frequency and/or duration of the exposure to the hazard
F1 Seldom to less often and/or exposure time is short.
F2 Frequent to continuous and/or exposure time is long.
P Possibility of avoiding hazard or limiting harm
P1 Possible under specific conditions
P2 Scarcely possible

The performance level to be used is determined by starting at the specified starting point and taking the risk parameters S, F and P into account.

10 Disposal

Separation of materials

To ensure that devices can be recycled in an environmentally friendly manner, it is necessary to separate out the different materials. Disposal must be carried out in accordance with applicable legal regulations.

Component	Disposal	Note
Motors	Electronic recycling	A magnetized rotor is not permitted to be transported or delivered outside the stator under any circumstances!
Gearbox (without oil)	Metal waste	
Waste oil (gearbox)	Special waste	
Coolant	Special waste	For liquid-cooled motors only. Consists of water / oil with additives.
Modules, cables	Electronic recycling	
Batteries	Special waste	Danger of fire: Do not store batteries together with conductive materials during disposal.
Cardboard/Paper packaging	Paper/Cardboard recycling	

10.1 Safety

10.1.1 Protective equipment

Always wear suitable safety clothing and equipment for your personal protection.

10.1.2 Rotor with rare earth magnets

In B&R motors, rotors are installed with rare earth magnets with high magnetic energy densities.

Warning!

Personal injury and damage to property due to rare earth magnets!

The motors are not permitted to be disassembled into individual parts.

A magnetized rotor is not permitted to be transported or delivered outside the stator under any circumstances!

- **Due to the surrounding magnetic fields, the functionality of a pacemaker can be impaired in such a way that it can result in bodily harm or even death of the carrier.**
- **The surrounding magnetic fields can affect or destroy electronic and mechanical measuring instruments.**
- **The strong magnetic attractive force can result in uncontrolled movements of the magnet or the attraction of other objects. Personal injury due to impacts or trapping is possible. If magnets are splintered during collision, personal injury cannot be ruled out.**
- **In potentially explosive atmospheres, a spark generated by magnets can result in serious explosions and cause personal injury and damage to property.**