

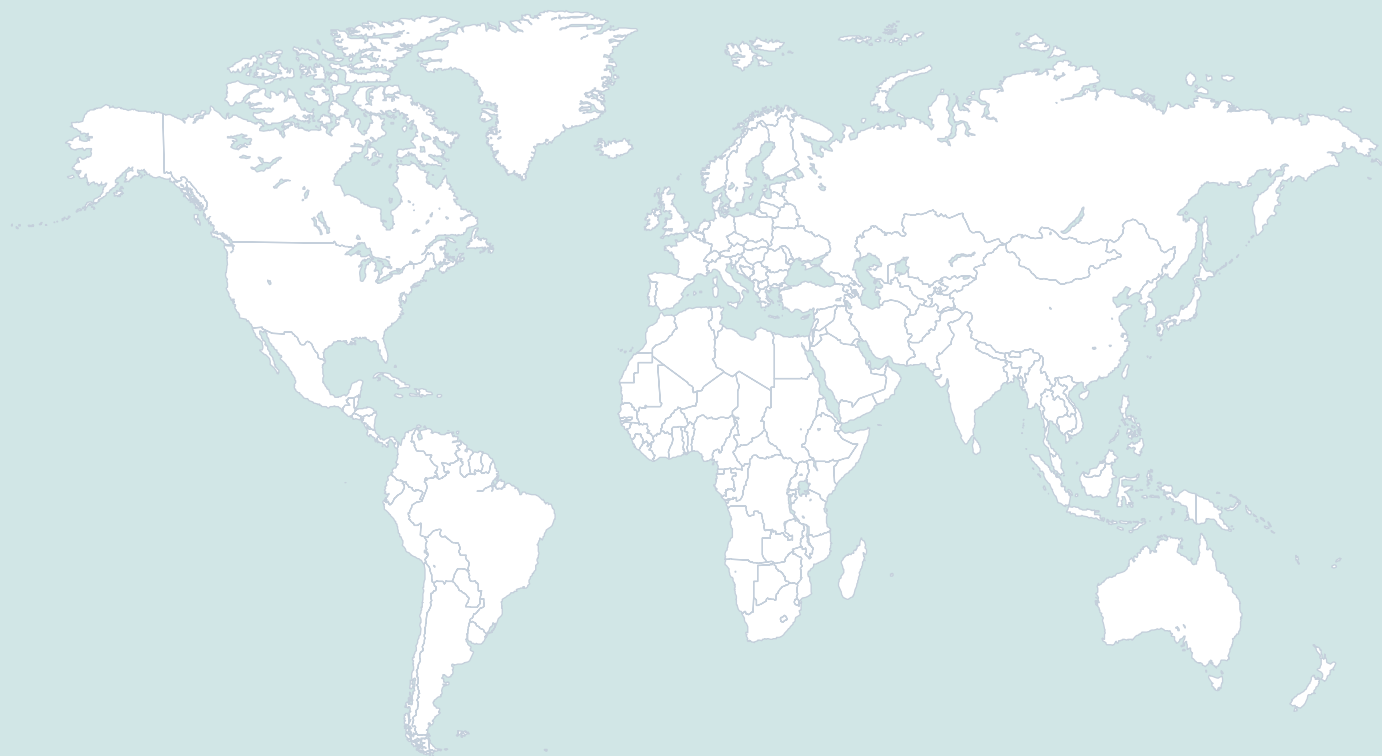


SEW
EURODRIVE

Catalog



Mechatronic Drive System
MOVIGEAR® B





Contents

1	Introduction	4
1.1	The SEW-EURODRIVE Group of Companies	4
1.2	Products and systems from SEW-EURODRIVE	5
1.3	Additional documentation	7
1.4	Copyright	7
2	System Description	8
2.1	MOVIGEAR® – the mechatronic drive system	8
2.2	Advantages at a glance	9
2.3	MOVIGEAR® drive units	10
2.4	MOVIGEAR® DBC-B – Direct Binary Communication	13
2.5	MOVIGEAR® DAC-B – Direct AS-Interface Communication	15
2.6	MOVIGEAR® DSC-B – Direct SBus Communication	18
2.7	MOVIGEAR® SNI-B – Single Line Network Installation	20
2.8	Controller	22
3	Technical Data and Dimension Drawings	25
3.1	Product description and overview of types	25
3.2	Important order information and mounting positions	40
3.3	Design and operating notes	45
3.4	Dimension drawings	51
3.5	Technical data of MOVIGEAR® DBC-B	62
3.6	Technical data of MOVIGEAR® DAC-B	64
3.7	Technical data of MOVIGEAR® DSC-B	67
3.8	Technical data of MOVIGEAR® SNI-B	70
3.9	Technical data of application options	72
3.10	Optional plug connectors	74
3.11	Optional plug connectors for MOVIGEAR® DBC-B	77
3.12	Optional plug connectors for MOVIGEAR® DAC-B	85
3.13	Optional plug connectors for MOVIGEAR® DSC-B	94
3.14	Optional plug connectors for MOVIGEAR® SNI-B	107
3.15	Connection cables	115
4	Project Planning	119
4.1	Preliminary information	119
4.2	MOVIGEAR® load profile	120
4.3	Selecting MOVIGEAR® according to the torque class	121
4.4	Drive selection data	129
4.5	Project planning procedure	130
4.6	Drive selection using the example of a roller conveyor	132
4.7	Regenerative load capacity – integrated braking resistor	137
4.8	DynaStop® – the electrodynamic deceleration function	138
4.9	Applications in wet areas	141
5	Address Directory	145
	Index	165



1 Introduction

1.1 The SEW-EURODRIVE Group of Companies

1.1.1 Global presence

Driving the world – with innovative drive solutions for all branches and for every application. Products and systems from SEW-EURODRIVE are used all over the world. Be it in the automotive, building materials, food and beverage or metal-processing industry – The decision to use drive technology "made by SEW-EURODRIVE" stands for reliability for both functionality and investment.

We are represented in the most important branches of industry all over the world: with 13 manufacturing plants, 67 assembly plants in 47 countries and our comprehensive range of services, which we consider an integrative service that continues our commitment to outstanding quality.

1.1.2 Always the right drive

The SEW-EURODRIVE modular concept offers millions of combinations. This wide selection enables you to choose the correct drive for all applications, each based on the required speed and torque range, space available and the ambient conditions. Gear units and gearmotors offering a unique and finely tuned performance range and the best economic prerequisites to face your drive challenges.

The gearmotors are electronically empowered by MOVITRAC® frequency inverters, MOVIDRIVE® inverters and MOVIAxis® multi-axis servo inverters, a combination that blends perfectly with the existing SEW-EURODRIVE program. As in the case for mechanical systems, the development, production and assembly is also carried out completely by SEW-EURODRIVE. In combination with our drive electronics, these drives provide the utmost in flexibility.

Products of the servo drive system, such as low backlash servo gear units, compact servomotors or MOVIAxis® multi-axis servo drives provide precision and dynamics. From single-axis or multi-axis applications all the way to synchronized process sequences, servo drive systems by SEW-EURODRIVE offer a flexible and customized implementation of your application.

For economical, decentralized installations, SEW-EURODRIVE offers components from its decentralized drive system, such as MOVIMOT®, the gearmotor with integrated frequency inverter or MOVI-SWITCH®, the gearmotor with integrated switching and protection function. SEW-EURODRIVE hybrid cables have been designed specifically to ensure cost-effective solutions, independent of the philosophy behind or the size of the system. The latest developments from SEW-EURODRIVE: the MOVIGEAR® mechatronic drive system, the decentralized MOVIFIT® drive control, the decentralized MOVIPRO® drive, positioning and application controller, and MOVITRANS® system components for contactless energy transfer.

Power, quality and sturdy design combined in one standard product: With high torque levels, industrial gear units from SEW-EURODRIVE realize major movements. The modular concept will once again provide optimum adaptation of industrial gear units to meet a wide range of different applications.

1.1.3 Your ideal partner

Its global presence, extensive product range and broad spectrum of services make SEW-EURODRIVE the ideal partner for the machinery and plant construction industry when it comes to providing drive systems for demanding drive tasks in all industries and applications.



1.2 Products and systems from SEW-EURODRIVE

The products and systems from SEW-EURODRIVE are divided into the following 4 product groups:

1. Gearmotors and frequency inverters
2. Servo drive systems
3. Decentralized drive systems
4. Industrial gear units

Products and systems used in several group applications are listed in a separate group entitled "products and systems covering several product groups." Consult the following tables to locate the products and systems included in the respective product group:

1. Gearmotors and frequency inverters		
Gear units/gearmotors	Motors	Frequency inverters
• Helical gear units/helical gearmotors • Parallel shaft helical gear units/parallel shaft helical gearmotors • Helical-bevel gear units/helical-bevel gearmotors • Helical-worm gear units/helical-worm gearmotors • SPIROPLAN® right-angle gearmotors • EMS drives • Geared torque motors • Pole-changing gearmotors • Variable speed gear units/variable speed gearmotors • Aseptic gearmotors • ATEX compliant gear units/gearmotors • ATEX compliant variable speed gear units/variable speed gearmotors	• Asynchronous AC motors/ AC brakemotors • Multi-speed AC motors/ AC brakemotors • Energy-efficient motors • Explosion-proof AC motors/ AC brakemotors • Torque motors • Single-phase motors/single-phase brakemotors • Asynchronous linear motors	• MOVITRAC® frequency inverters • MOVIDRIVE® inverters • Control, technology and communication options for inverters

2. Servo drive systems		
Servo gear units/servo gear-motors	Servomotors	Servo drive inverters/servo inverters
• Low backlash servo planetary gear units/planetary gearmotors • Low backlash helical-bevel servo gear units / helical-bevel gearmotors • R, F, K, S, W gear units/gearmotors • Explosion-proof servo gear units/servo gearmotors	• Asynchronous servomotors/ servo brakemotors • Synchronous servomotors/ servo brakemotors • Explosion-proof servomotors/ servo brakemotors • Synchronous linear motors	• MOVIDRIVE® servo inverters • MOVIAxis® multi-axis servo inverters • Control, technology and communication options for servo drive inverters and servo inverters



Introduction

Products and systems from SEW-EURODRIVE

3. Decentralized drive systems		
Decentralized drives	Communication and installation	Contactless energy transfer
• MOVIGEAR[®] mechatronic drive system – MOVIGEAR[®] DBC-B – Direct Binary Communication – MOVIGEAR[®] DAC-B – Direct AS-Interface Communication – MOVIGEAR[®] DSC-B – Direct SBus Communication – MOVIGEAR[®] SNI-B – Single Line Network Installation • MOVIMOT[®] gearmotors with integrated frequency inverter • MOVIMOT[®] motors/brakemotors with integrated frequency inverter • MOVI-SWITCH[®] gearmotors with integrated switching and protection function • MOVI-SWITCH[®] motors/brakemotors with integrated switching and protection function • Explosion-proof MOVIMOT[®] and MOVI-SWITCH[®] gearmotors	• Fieldbus interfaces • Field distributors for decentralized installation • MOVIFIT[®] product range – MOVIFIT[®] SNI for controlling MOVIGEAR[®] SNI drive units – MOVIFIT[®] MC for controlling MOVIMOT[®] drives – MOVIFIT[®] SC with integrated electronic motor switch – MOVIFIT[®] FC with integrated frequency inverter • MOVIPRO[®] product range – MOVIPRO[®] SDC – Decentralized drive and position controller – MOVIPRO[®] ADC – Decentralized drive and application controller	• MOVITRANS[®] system – Stationary components for energy supply – Mobile components for energy consumption – Line cables and installation material

4. Industrial gear units
• Helical gear units • Bevel-helical gear units • Planetary gear units

Products and systems covering several product groups
• Operator terminals • MOVI-PLC[®] drive-based control system

In addition to products and systems, SEW-EURODRIVE offers a comprehensive range of services. These include:

- Technical consulting
- Application software
- Seminars and training
- Extensive technical documentation
- International customer service

Visit our homepage at

→ www.sew-eurodrive.com

The website provides comprehensive information and services.



1.3 Additional documentation

1.3.1 Content of this publication

The "MOVIGEAR® B" catalog describes the following products of SEW-EURODRIVE:

- MOVIGEAR® DBC-B – Direct Binary Communication
- MOVIGEAR® DAC-B – Direct AS-Interface Communication
- MOVIGEAR® DSC-B – Direct SBus Communication
- MOVIGEAR® SNI-B – Single Line Network Installation

1.3.2 Additional documentation

You find detailed information on associated controllers and other products for decentralized installation available from SEW-EURODRIVE in the catalog "Drive System for Decentralized Installation".

1.4 Copyright

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2 System Description

2.1 MOVIGEAR® – the mechatronic drive system



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In many industries, such as the automotive, food and beverage industry, airport logistics or general intralogistics, the demands on materials handling systems are becoming both more complex and more specific. At the same time, less installation space is available for accomplishing these tasks. This is why SEW-EURODRIVE researches and develops ideal application solutions. The result is the mechatronic drive system MOVIGEAR®. It has a favorable, compact design and is ideal for planning **efficient materials handling systems**.

The housing has been optimized specifically for these types of applications and can be easily integrated in today's conveyor systems. It also enables **new developments to be implemented from a completely new perspective**. This technology masters high breakaway and acceleration torque levels after longer system downtimes time without any limitations. **The power required to drive the system can be reduced significantly.**

MOVIGEAR® is the next logical step in the development of the economically and technically successful concept of decentralized drive systems.

2.1.1 Mechatronic drive system comprising motor, gear unit and electronics

A systematic development approach was taken right from the design phase. MOVIGEAR® impresses with its high level of system efficiency, which in turn helps **lower the energy costs**. The integration and coordination of all the drive components leads to a long service life and **high system availability**.

MOVIGEAR® is an intelligent device with its own control concept. Its high-quality networking features help **reduce the startup time** and **support the monitoring and maintenance tasks**. Drive tasks can be solved quickly and easily using the corresponding application software.



2.2 Advantages at a glance

- Compact design: Motor, gear unit and electronics are combined in a single mechatronic drive system
- Simplified system planning and design
- A reduction in the number of variants enables the development and design of standard materials handling systems with ready-made and tested standard modules.
- The power of the drive engineering components is optimized to suit the application
- Reduction in storage due to reduced number of variants
- High degree of protection
- Hygienic surface design for applications in hygienic areas
- No air, dirt and germ swirls
- Low noise emission due to operation without fans (suitable for use in manual work stations)
- Reduced energy costs due to high efficiency of all components (gear unit, motor, electronics)
- High degree of reliability due to systematic development of all components
- Reduced total costs and operating costs of the materials handling system



2.3 MOVIGEAR® drive units

MOVIGEAR® is available in 3 sizes and 2 mechanical designs. For more information, see the section "Technical data and dimension sheets."

2.3.1 MOVIGEAR® sizes

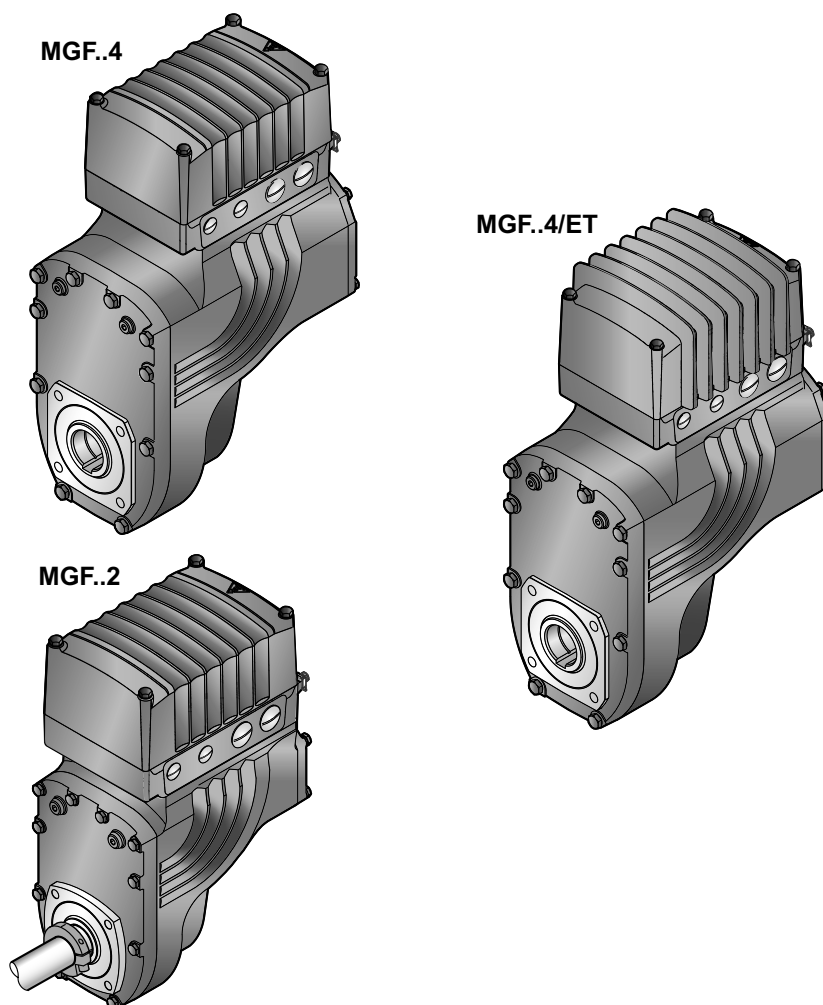
- MGF.2 (torque class: 200 Nm)
- MGF.4 (torque class: 400 Nm)
- MGF.4/ET¹⁾ (torque class: 400 Nm)

2.3.2 MOVIGEAR® design types

- MOVIGEAR® with hollow shaft and keyway
- MOVIGEAR® with TorqLOC® hollow shaft mounting system

2.3.3 Examples

The following figure shows a MOVIGEAR® MGFT.2 unit with TorqLOC® and a MOVIGEAR® MGFA.4 and MGFA.4/ET unit with hollow shaft and keyway:



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1) /ET = "Increased torque" option (expanded rated motor torque in continuous duty)



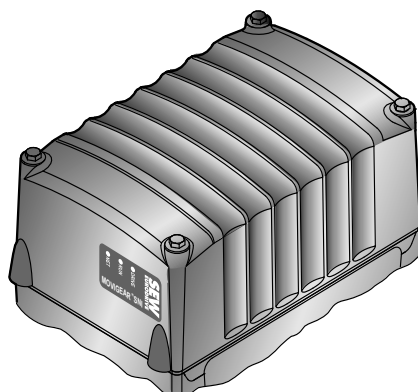
2.3.4 Design type with/without application slot

The following types of electronics covers are available for all MOVIGEAR® DSC-B and MOVIGEAR® SNI-B sizes (MGF.2, MGF.4 and MGF.4/ET):

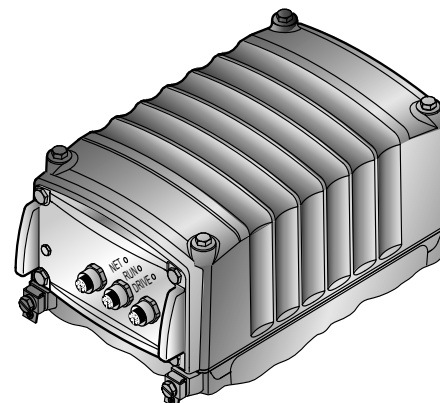
- Electronics cover without application slot
- Electronics cover with application slot

The electronics cover of MOVIGEAR® DBC-B and MOVIGEAR® DAC-B is designed without application slot.

The following figure shows the possible designs:



MOVIGEAR® electronics cover
without application slot



MOVIGEAR® electronics cover
with application slot
(in this case with GIO12A option)

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2.3.5 Application options

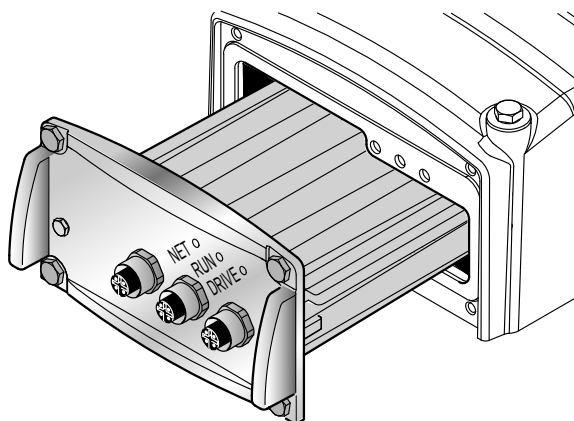
Application options are installed in the application slot of MOVIGEAR® and implement specific interfaces, such as binary inputs or binary outputs.

The energy supply of the option as well as the communication between MOVIGEAR® and the option are contactless.

GIO12A application option

The GIO12A application option allows for controlling up to 2 digital actuators and processing up to 4 digital sensors.

The following figure shows the GIO12A application option:



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System Description

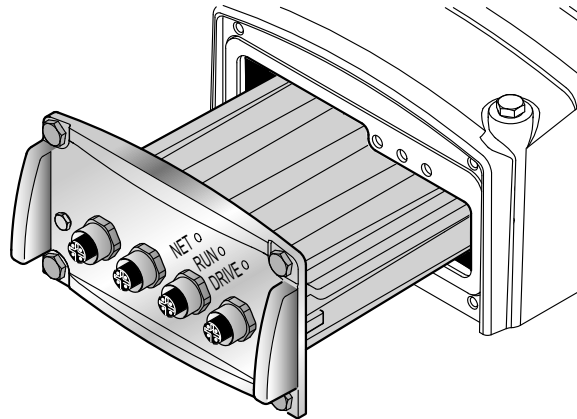
MOVIGEAR® drive units

GIO13A application option

The GIO13A application option is equipped with the following interfaces:

- 1 digital output
- 4 digital inputs (two of them can be used as primary frequency input)
- 1 analog output
- 1 analog input

The following figure shows the GIO13A application option:



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2.3.6 General unit properties

- Wide voltage range 3 x AC 380 V to AC 500 V
- High overload capacity for all sizes
- 4Q capability due to integrated brake chopper and braking resistor installed as standard
- Line filter integrated as standard. EMC-compliant installation ensures compliance with limit class C3 to EN 61800-3 (class A, group 2 according to EN 55011).
- LED display for operating and fault states
- Protective features for complete protection of the frequency inverter and motor (short-circuit, overload, overvoltage/undervoltage, excess temperature in the frequency inverter, excess temperature in the drive unit).
- IPOS^{plus}® integrated positioning and sequence control
- Integrated STO safety function
 - **STO** (safe torque off according to IEC 61800-5-2) by disconnecting the STO input.
 - Performance level e according to EN ISO 13849-1.
 - **SS1(c)** (safe stop 1, function variant c according to IEC 61800-5-2) by means of suitable external control (e.g. safety relay with delayed disconnection)

You find the specific unit properties of DBC-B, DAC-B, DSC-B and SNI-B in the subsequent chapters.



2.4 MOVIGEAR® DBC-B – Direct Binary Communication

SEW-EURODRIVE has developed the mechatronic drive solution MOVIGEAR® DBC-B specifically for stand-alone applications and for applications with simple functionalities. DIP switches and potentiometers allow for simple and fast startup – without the need of a PC. The unit is controlled via the binary inputs either by a central PLC or in local/manual mode.

2.4.1 Characteristics

- Simple startup without PC via DIP switches and potentiometer
- Parameterizable fixed speeds and ramps
- Binary input control and signal relay evaluation via PLC
- Local mode via binary inputs
- Interface for diagnostics and parameterization

2.4.2 Fields of application

- Simple stand-alone applications and single applications
- For applications that require soft start-up behavior
- Applications with 2 fixed speeds
- For applications with high breakaway torques
- Applications with/without STO safety function

2.4.3 Application examples

- Simple conveyors
- Rotary tables
- Drives for infrequent speed variations
- Agitators and mixers
- Crushers and shredders
- Presses

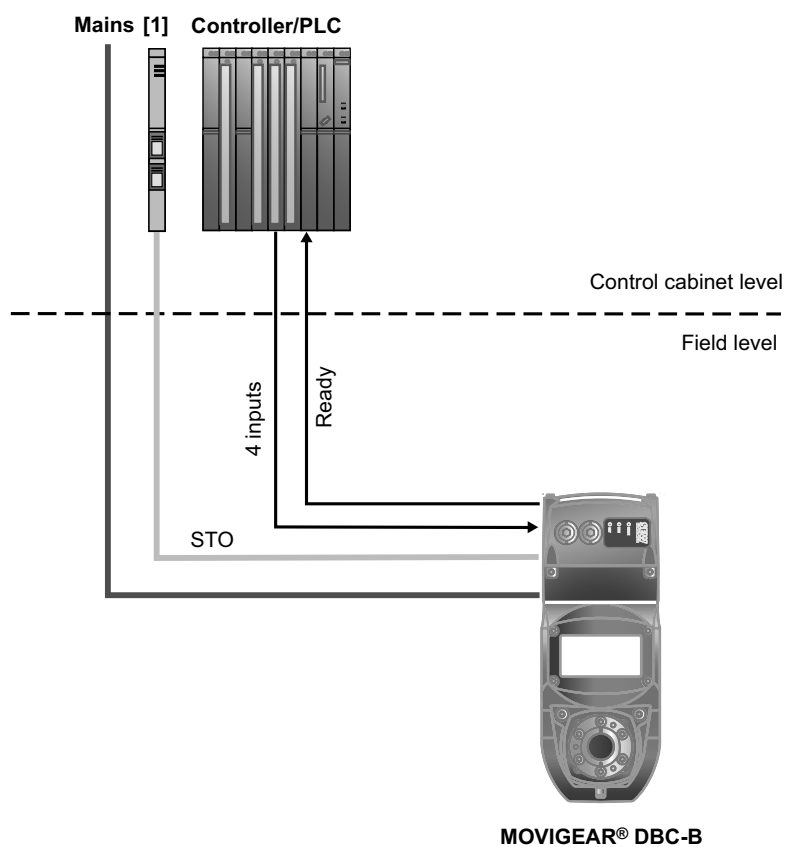


System Description

MOVIGEAR® DBC-B – Direct Binary Communication

2.4.4 Installation principle

The following figure shows the principle of MOVIGEAR® DBC-B:



MOVIGEAR® DBC-B

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[1] Safety switching device/safety controller



2.5 **MOVIGEAR® DAC-B – Direct AS-Interface Communication**

MOVIGEAR® DAC-B for simple fieldbus connection via standard AS-Interface. Parameterizable fixed speeds and ramps, integrated STO safety function and connection options for external sensors ensure fast and extremely efficient implementation of material handling systems.

2.5.1 **Characteristics**

- Parameterizable fixed speeds and ramps
- Control via standard AS-Interface specification
- Connection of external sensors on the actuator
- Voltage supply for connected sensors
- Local mode via binary inputs
- Interface for diagnostics and parameterization

2.5.2 **Fields of application**

- Simple fieldbus connection
- For applications that require soft start-up behavior
- Signal feedback of connected sensors
- For applications that require a lot of space
- Applications with/without STO safety function

2.5.3 **Application examples**

- Accumulating roller conveyors
- Roller and wheel conveyors
- Pallet conveyors
- Rotary tables



System Description

MOVIGEAR® DAC-B – Direct AS-Interface Communication

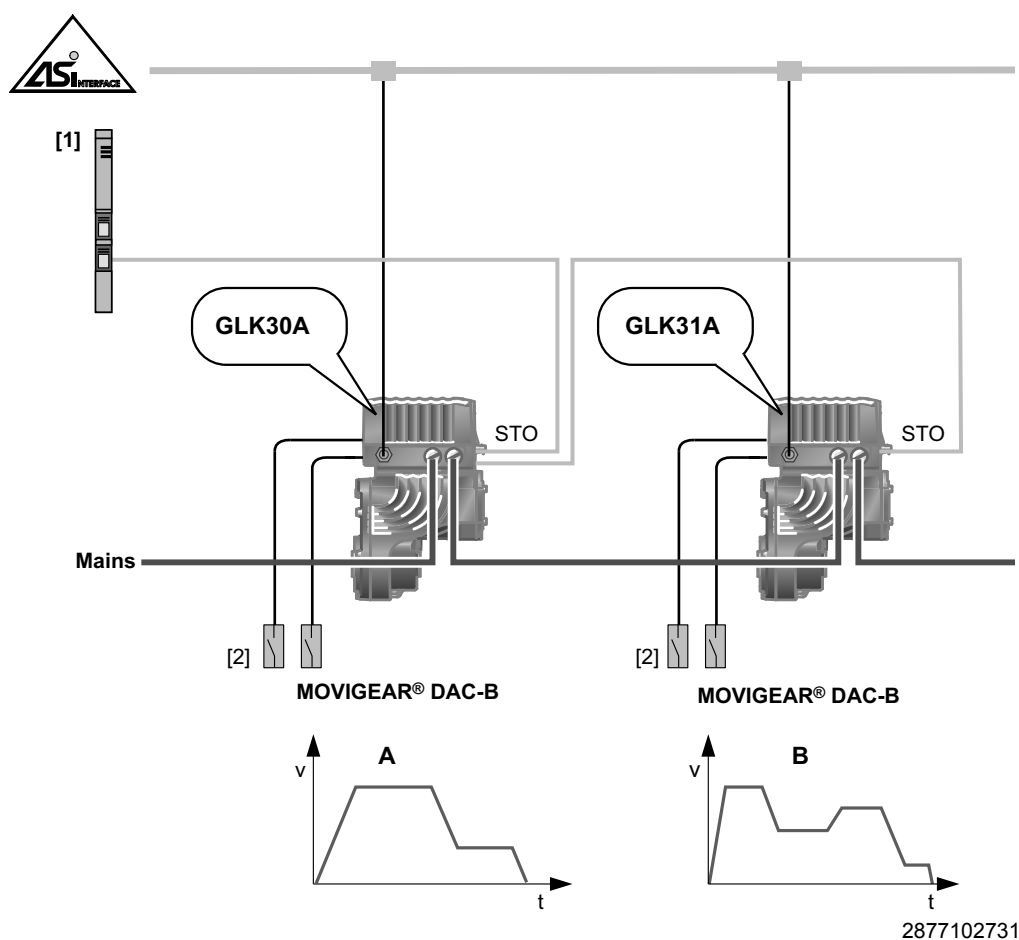
2.5.4 AS-interface option

The AS-Interface option is located on the connection board in the connection box.

MOVIGEAR® DAC-B is available with the following AS-Interface variants:

- GLK30A binary slave
- GLK31A double slave for drive with several speed setpoints and ramps

The following figure shows the topology and the travel diagrams of the MOVIGEAR® DAC-B drive unit with the AS-Interface slaves GLK30A [A] and GLK31A [B]:



- [A] MOVIGEAR® DAC-B with binary slave GLK30A
 [B] MOVIGEAR® DAC-B with double slave GLK31A
 Drive with several speed setpoints and ramps
 [1] Safety switching device/safety controller
 [2] Sensors



2.5.5 GLK30A binary slave

Connected to AS-Interface, the GLK30A slave works like a module with 4 inputs and 4 outputs.

The cyclic output bits control the MOVIGEAR® DAC-B inverter.

The input bits transmit the status of the drive and 2 additional sensor signals to the AS-Interface master.

The acyclic parameter bits are used to select speed scaling factors.

2.5.6 GLK31A double slave

The GLK31A option works as a double slave on AS-Interface according to AS-Interface specification 3.0.

The serial AS-Interface data transmission (analog profile) allows for writing and reading MOVIGEAR® DAC-B parameters and display values.

The MOVIGEAR® DAC-B inverter is controlled via the cyclic output bits. The coding of the data bits is specified in different function modules. The MOVIGEAR® DAC-B inverter interprets these bits as different control and status codes. You can switch between the function modules using the acyclic parameter bits.

The input bits transmit the status of the drive and 2 additional sensor signals to the AS-Interface master.



2.6 MOVIGEAR® DSC-B – Direct SBus Communication

MOVIGEAR® DSC-B allows for the functional integration of the mechatronic drive system into applications close to the machine. High performance and short response times distinguish this variant and enable reliable implementation of challenging drive tasks.

2.6.1 Characteristics

- Line wiring
- Single control
- Integrated communication interface
- Fast communication for short cycle times
- Hybrid cable for minimum installation effort
- System bus controller for control cabinet or fieldbus installation with integrated PLC
- High drive dynamics and performance
- Optional motion control inputs (via plug connector) for local mode or sensor inputs

2.6.2 Fields of application

- As a drive for applications with high breakaway and starting torques.
- As a drive for conveyor systems that must be operated dynamically at varying speeds
- Forming intelligent function groups
- Universal use due to wide control range of 1: 2000

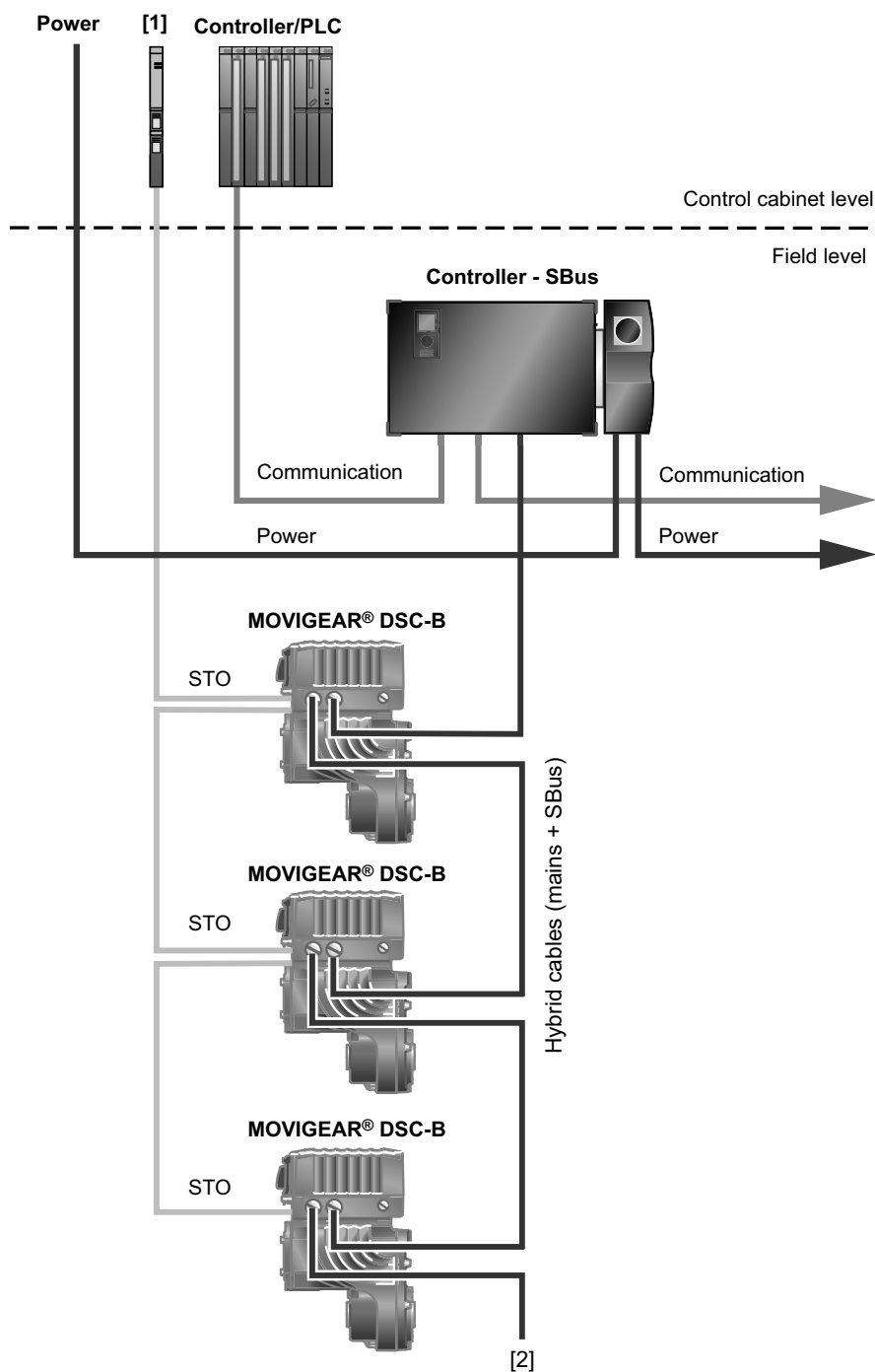
2.6.3 Application examples

- Pallet conveyors
- Machine-integrated conveyor belts
- Feeding conveyors
- Synchronized feeder conveyors
- Reversing drives



2.6.4 Installation topology

The following figure shows the principle of MOVIGEAR® DSC-B:



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- [1] Safety switching device/safety controller
- [2] Permitted cable length between controller and last MOVIGEAR® when using the recommended hybrid cable: 1 Mbaud: 25 m 500 Kbaud: 50 m



2.7 MOVIGEAR® SNI-B – Single Line Network Installation

With MOVIGEAR®, completely new system concepts can be implemented since energy and data are transferred via one standard cable. This principle is called Single Line Installation. Simplified installation leads to significantly reduced installation and system costs.

2.7.1 Characteristics

- Single control
- Reduction in the number of components
- Bus cables do not have to be routed in the field
- No risk of hidden faults in the bus cabling
- Reduced startup times
- Shorter project runtimes/reduction of project costs
- Optional motion control inputs (via plug connector) for local mode or sensor inputs

2.7.2 Fields of application

- As a drive for applications with high breakaway and starting torques.
- Conveyor systems with variable speeds
- As drive for applications that require soft and/or defined start-up behavior
- As group drive for easier implementation of synchronous operation

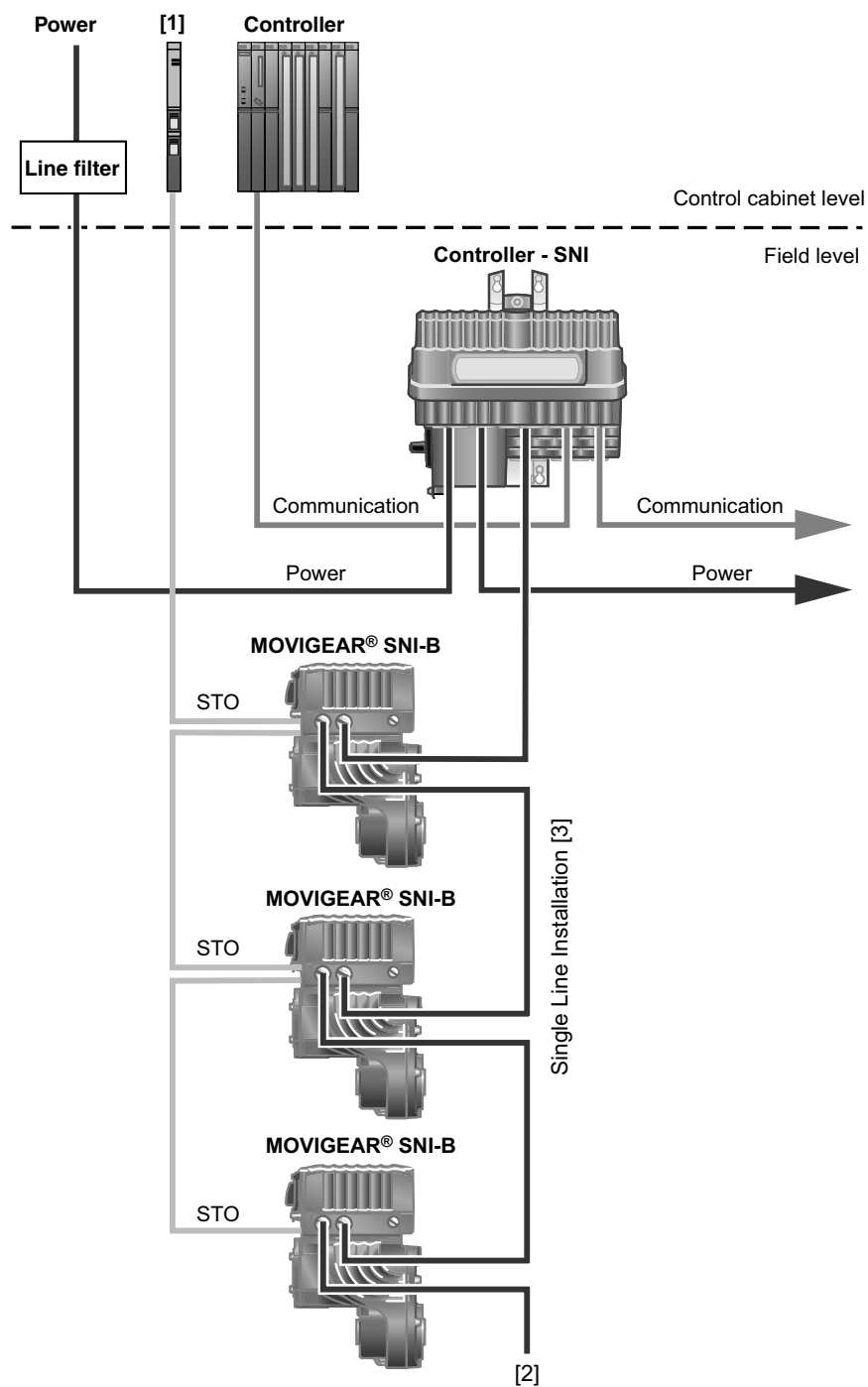
2.7.3 Application examples

- Belt conveyors
- Pallet conveyors
- Roller and wheel conveyors
- Screw conveyors
- Container and packaging unit transports
- Chain and drag-chain conveyors



2.7.4 Installation topology

The following figures shows the principle of the MOVIGEAR® Single Line Network Installation:



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- [1] Safety switching device
- [2] Max. 10 x MOVIGEAR® in total
- [3] Permitted cable length between controller and last MOVIGEAR® max. 100 m

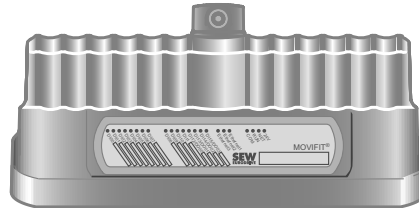


2.8 Controller

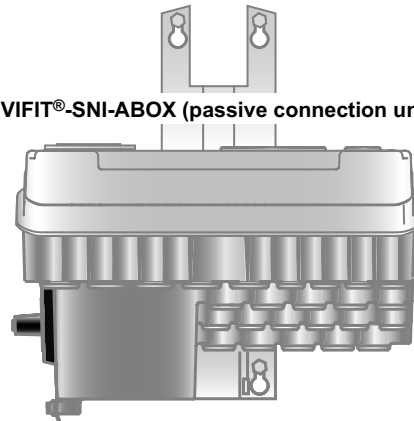
2.8.1 Controller for MOVIGEAR® SNI-B

MOVIFIT® SNI has been designed for decentralized installation in the field. MOVIFIT® SNI allows to control up to 10 MOVIGEAR® drive units. The controller passes control information to MOVIFIT® SNI via Ethernet signals. MOVIFIT® SNI is the interface between the controller (PLC) and the connected MOVIGEAR® drive units.

MOVIFIT®-SNI-EBOX (active electronics unit)



MOVIFIT®-SNI-ABOX (passive connection unit)



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Characteristics

- Up to 10 MOVIGEAR® drive units can be connected
- Voltage range 3 x 380 - 500 V
- Integrated energy distribution
- Integrated communication interface
- Maintenance switch (not for the Hygienic^{plus} design)
- 12 digital inputs + 4 digital inputs/outputs

Housing concept

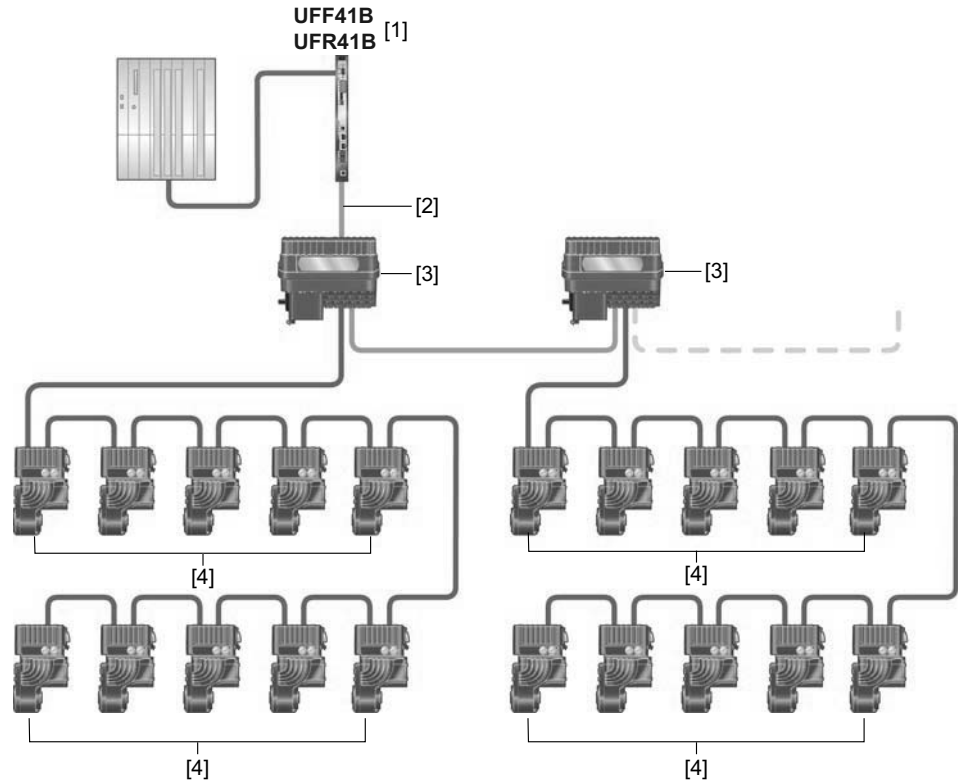
The MOVIFIT® SNI housing has the following characteristics:

- Aluminum die cast housing
- High rigidity
- IP65 version for industrial requirements
- Optional: Hygienic^{plus} version for the food industry
- Separation of connection unit (ABOX) and electronics (EBOX):
 - No damage to the electronics during installation and maintenance
 - Fast replacement of electronics without wiring: Only one screw is required to connect the EBOX to the ABOX



2.8.2 Fieldbus gateways for MOVIGEAR® SNI-B

For connecting a drive system with MOVIGEAR® SNI-B [4] to the fieldbus system PROFIBUS, DeviceNet, PROFINET or EtherNet/IP, you can operate MOVIFIT® SNI [3] together with the UFF41B/UFR41B fieldbus gateway [1]. Configuration and parameter setting is carried out using a plug-in in MOVITOOLS® MotionStudio.



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- [1] UFF41B/UFR41B fieldbus gateway with SD card OMG42B
- [2] Ethernet switch between UFF41B/UFR41B fieldbus gateway and MOVIFIT® SNI
- [3] MOVIFIT® SNI
- [4] MOVIGEAR® SNI-B



2.8.3 Controller and fieldbus gateways for MOVIGEAR® DSC-B

The following products of SEW-EURODRIVE are available to connect a drive system with MOVIGEAR® DSC-B to a fieldbus or Ethernet system:



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*Fieldbus gateways
(control cabinet
installation)*

The following table shows available variants:

	PROFIBUS	Interbus	DeviceNet	CANopen
Bus systems	DFP21B/UOH DFS11B/UOH	UFI11A	DFD11B/UOH	UFO11A
	PROFINET	EtherNet/IP	Modbus TCP	EtherCAT slave
Industrial Ethernet	DFE32B/UOH DFS21B/UOH	DFE33B/UOH	DFE33B/UOH	DFE24B/UOH

*Controller (control
cabinet
installation)*

The following table shows available variants:

Design	TYPE	Bus system / Industrial Ethernet
CCU / MOVI-PLC®	DHR21B DHR41B	PROFINET Ethernet/IP Modbus TCP
CCU / MOVI-PLC®	DHF21B DHF41B	PROFIBUS DeviceNet
MOVI-PLC®	DHE21B DHE41B	UDP



3 Technical Data and Dimension Drawings

3.1 Product description and overview of types

3.1.1 General information

<i>Power and torque ratings</i>	The power and torque ratings listed in this catalog refer to mounting position M1 and similar mounting positions in which the input stage is not completely submerged in oil. In addition, the values are based on standard versions with standard lubrication under normal ambient conditions.
<i>Speed ratings</i>	The specified output speeds are recommended values. You can calculate the output speed based on the speed of the motor and the gear unit ratio.
<i>Noise levels</i>	All MOVIGEAR® units are well within the maximum permissible noise levels set forth in ISO 8579-1 for gear units and EN 60034-9 for motors.
<i>Coating</i>	MOVIGEAR® units are coated with "blue and gray" (RAL 7031 7031 according to DIN 1843) machine paint as standard. Special paints are available on request.
<i>Surface and corrosion protection</i>	On request, all MOVIGEAR® units can also be supplied with special surface protection for applications in extremely humid or chemically aggressive environments.
<i>Weight data</i>	Note that all weights listed in this catalog are calculated without the lubricant fill. The weights vary according to design and size. The lubricant fill depends on the mounting position selected, which means that in this case no universally applicable information can be given. Please refer to "Lubricants" in the "Design and operating notes" section for recommended lubricant fill quantities depending on the mounting position. For the exact weight, refer to the order confirmation.
<i>Air admission and accessibility</i>	When installing the driven machine, make sure there is enough space in axial and radial direction for a sufficient supply of cooling air and unobstructed heat dissipation.

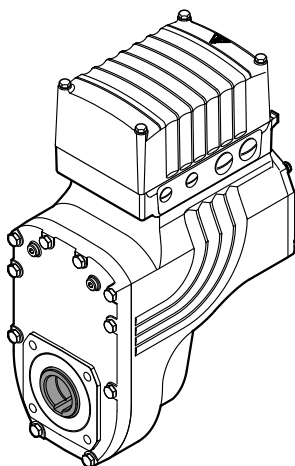


3.1.2 Shaft variants

MOVIGEAR® is available with the following shaft variants:

MOVIGEAR® with hollow shaft and keyway (MGFA..)

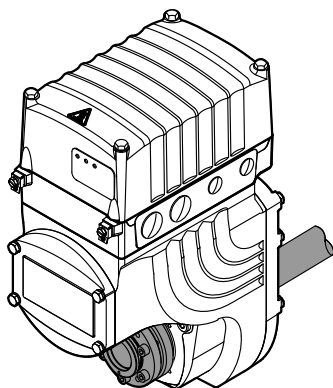
The following figure shows a MOVIGEAR® unit with hollow shaft and keyway:



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MOVIGEAR® with TorqLOC® (MGFT..)

The following figure shows a MOVIGEAR® unit with TorqLOC® hollow shaft mounting system:



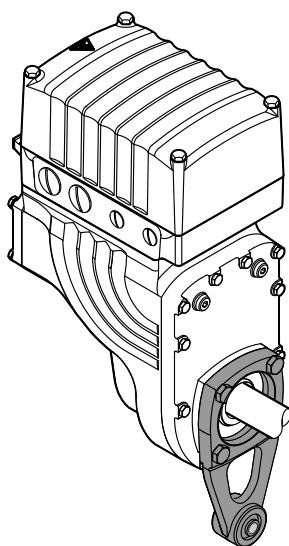
2690822539

kVA	n
f	
i	
P	Hz

3.1.3 Housing mounting

*Torque arm
(MGF.T)*

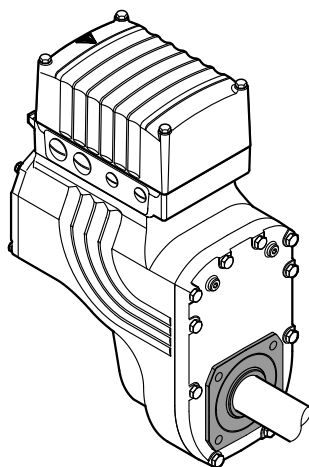
The following figure shows the torque arm for MGF.T:



2690826379

*Housing with
threads (MGF.S)*

The following figure shows the housing type with threads for mounting a torque arm. This type does not include a centering shoulder, which means it is not suitable for direct installation to the machine:

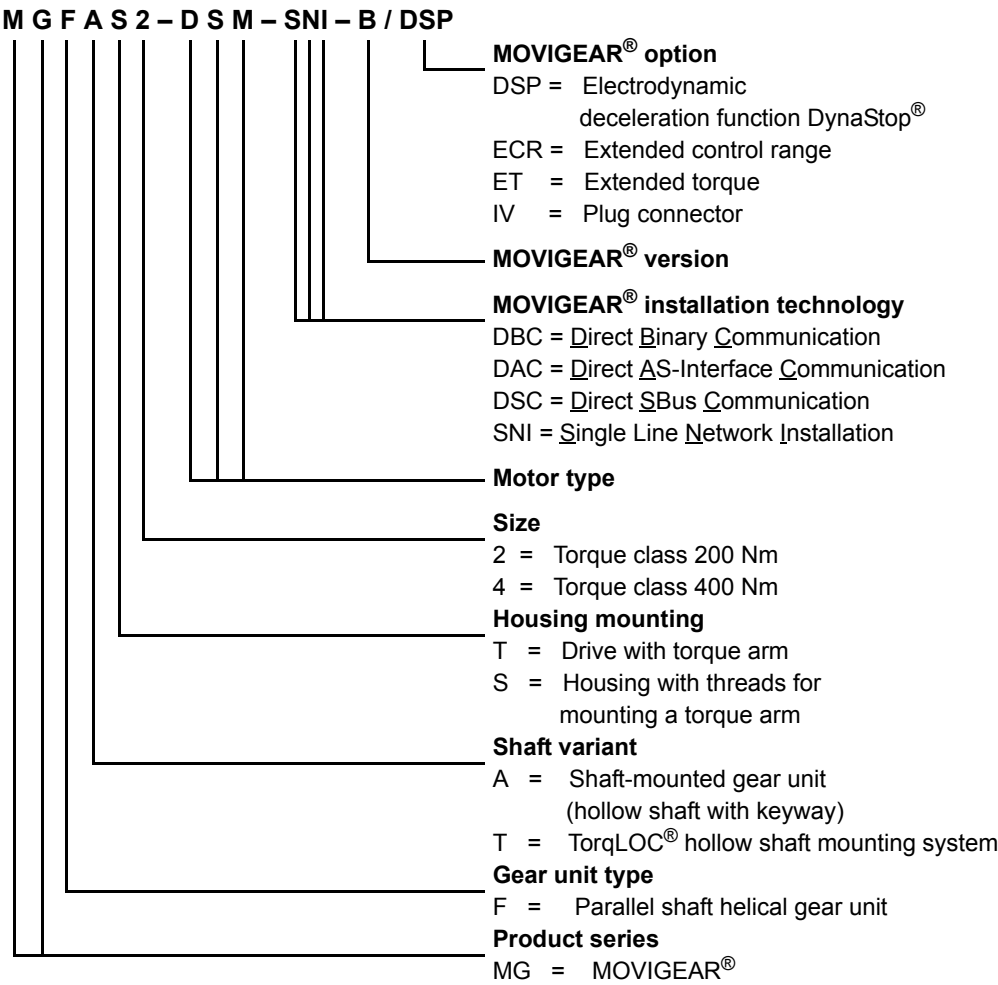


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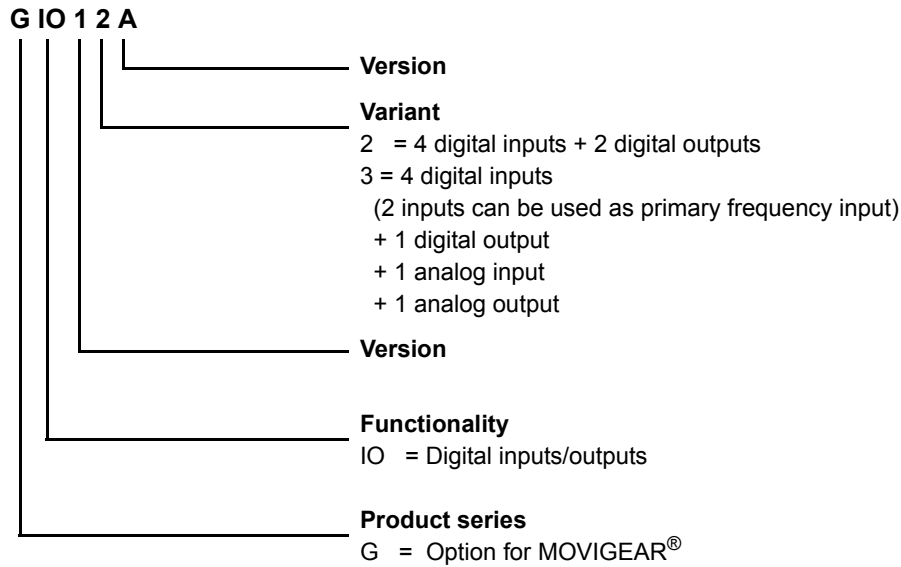
3.1.4 Overview of types

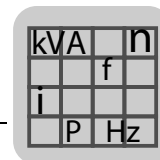
MOVIGEAR® The following figure shows the structure of the MOVIGEAR® type designation:



Type designation of application options

The following table shows the unit designation for the available application options:





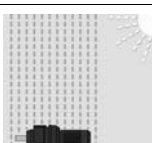
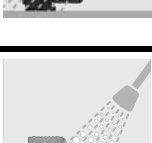
3.1.5 Surface protection

General SEW-EURODRIVE offers the following optional protective measure for operating MOVIGEAR® drive units under special environmental conditions.

- OS surface protection
- High protection surface treatment HP200 (only in conjunction with the optional package for applications in wet areas)

In addition, special optional protective measures for the output shafts are also available.

Surface protection Instead of the standard surface protection, MOVIGEAR® is available with surface protection OS1 to OS3 as an option. The special procedure Z can also be performed in addition. The special procedure Z means that large surface recesses are sprayed with a rubber filling prior to painting.

Surface protection	Ambient conditions	Sample applications
Standard 	Suitable for machines and systems in buildings and rooms indoors with neutral atmospheres. Similar to corrosivity category ¹⁾ : • C1 (negligible)	• Machines and systems in the automobile industry • Conveyor systems in logistics areas • Conveyor systems at airports
OS1 	Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection. Similar to corrosivity category ¹⁾ : • C2 (low)	• Systems in saw mills • Hall gates • Agitators and mixers
OS2 	Suited for environments with high humidity or mean atmospheric contamination, such as applications outdoors subject to direct weathering. Similar to corrosivity category ¹⁾ : • C3 (moderate)	• Funiculars and chair-lifts • Applications in gravel plants
OS3 	Suited for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. Similar to corrosivity category ¹⁾ : • C4 (high)	• Sewage treatment works • Port cranes • Mining applications
High Protection surface treatment HP200²⁾ 	For hygienic areas in the food and beverage industry with regular acidic and caustic wet cleaning. Antistick properties support the cleaning process even in inaccessible areas.	• Hygienic and aseptic conveyors in the beverage industry • Systems in cheese dairies and butcher shops • "Splash zones" in the food industry

1) To DIN EN ISO 12 944-2

2) Only in conjunction with the optional package for applications in wet areas



Special protection measures

Output shafts can be treated with special optional protective measures for operation subject to severe environmental pollution or in particularly demanding applications.

Measure	Protection principle	Suitable for
FKM oil seal (Viton)	High quality material	Drives subject to chemical contamination
Coating on output shaft end	Surface coating of the contact surface of the oil seal	Severe environmental impact and in conjunction with FKM oil seal (Viton)
Stainless steel output shaft	Surface protection with high-quality material	Particularly demanding applications in terms of surface protection

NOCO[®] fluid

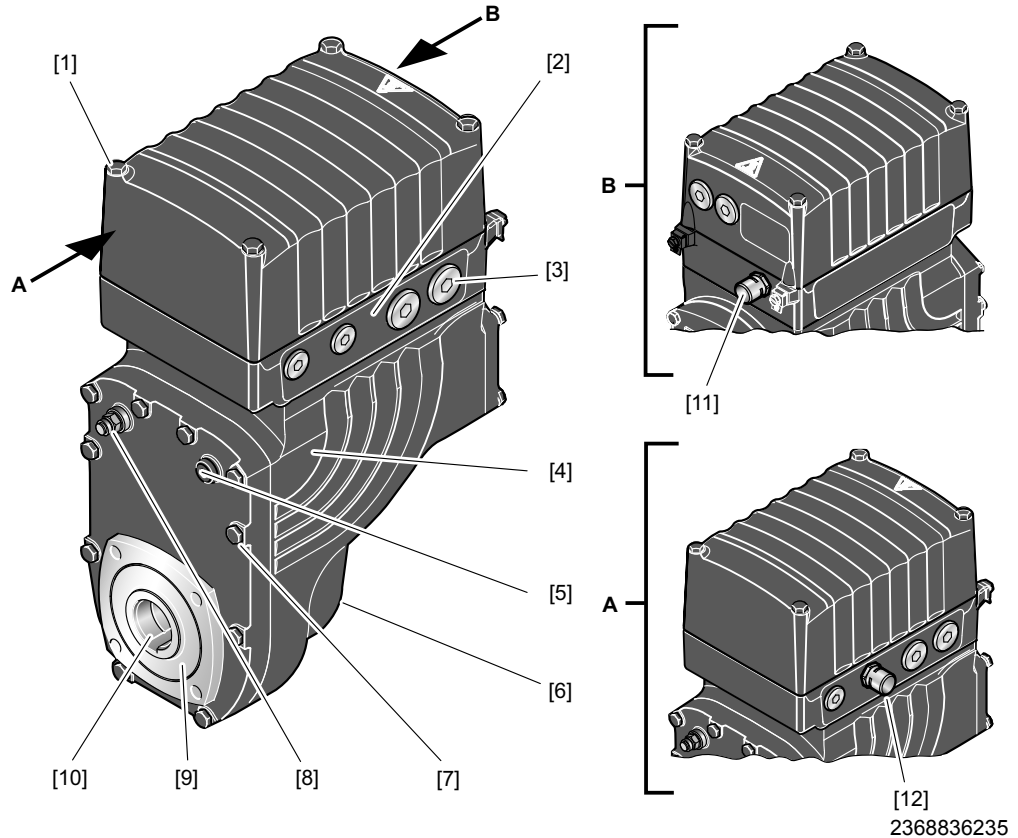
SEW-EURODRIVE supplies NOCO[®] fluid corrosion protection and lubricant as standard for every MOVIGEAR[®] with hollow shaft. Use NOCO[®] fluid when installing hollow shaft gear units. Using this fluid can help prevent contact corrosion and makes it easier to disassemble the drive at a later time. NOCO[®] fluid is also suitable for protecting machined metal surfaces that do not have corrosion protection, such as parts of shaft ends or flanges. You can also order larger quantities of NOCO[®] fluid from SEW-EURODRIVE.

NOCO[®] fluid is a food grade substance according to NSF-H1. You can tell that NOCO[®] fluid is a food grade oil by the NSF-H1 identification label on its packaging.

3.1.6 MOVIGEAR® with optional package for wet areas

Properties

The following figure shows the additional features of MOVIGEAR® drive units with the optional package for applications in wet areas:



Key

- All illustrations regarding MOVIGEAR® drive units with optional package for wet areas are displayed with a shading (= HP200 surface protection) in this publication
- [1] Mounting screws for electronics cover made of stainless steel
 - [2] Connection ring only possible with cable outlet "at the bottom" or "on the side":
 - In connection with mounting position M1 and M2: 2 + 3, 2 + X, X + 3, 2 + X + 3
 - In connection with mounting position M4: 2 + X
 - In connection with mounting position M5: X + 3
 - In connection with mounting position M6: 2 + 3
 - [3] Screw plugs made of stainless steel installed at the factory
 - [4] HP200 surface protection, see chapter "HP200 surface treatment"
 - [5] Oil screw plug made of stainless steel (hexagon)
 - [6] Additional cover opposite the output side
 - [7] Mounting screws for gear unit housing made of stainless steel
 - [8] Installed and activated breather valve corresponding to the mounting position, see chapter "Mounting position sheet".
 - [9] FKM oil seal (Viton)
 - [10] Output shaft made of stainless steel (can be deselected)
 - [11] Pre-installed pressure compensation fitting (M16) with mounting positions M5, M6
 - [12] Pre-installed pressure compensation fitting (M16) with mounting position M1, M2, M4, M4
- Optional plug connectors are available in connection with the package for wet areas.



Mounting positions

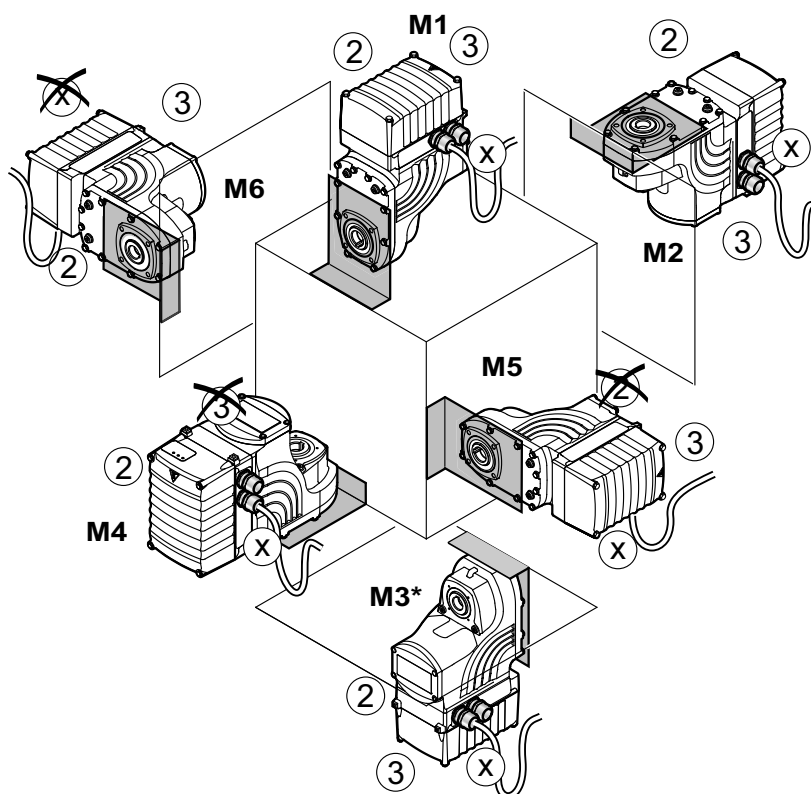
MOVIGEAR® drive units with optional package for wet areas are delivered with pressure compensation and breather valve installed according to the mounting position.

This is why MOVIGEAR® with optional package for wet areas must only be used in the mounting position specified in the order:

- Mounting position
 - M1
 - M2
 - M3 (only after consultation with SEW-EURODRIVE)
 - M4
 - M5
 - M6
- Cable entries
 - Position 3 (not possible in conjunction with M4)
 - Position 2 (not possible in conjunction with M5)
 - Position X (not possible in conjunction with M6)

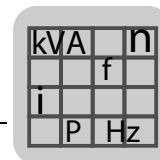
Mounting positions

The following figure shows the position of MOVIGEAR® in mounting positions M1 to M6.



* = Mounting position M3 only after consultation with SEW-EURODRIVE

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3.1.7 Sealing material properties

The following table lists a selection of properties of sealing material used for MOVIGEAR®. Take this information into account when planning your system.

Property	EPDM stability
Alkali resistance	very good
Resistance to aging	very good
Ammonia (no water)	very good
Ethanol	very good
Gasoline resistance	low
Vapor	up to 130 °C
Hot water	very good
Lye	very good
Carbonic acid	very good
Methanol	very good
Sodium chloride	very good
Oil (vegetable, ethereal)	good to medium
Oil and grease resistance	low
Ozone resistance	very good
Phosphoric acid (50%)	very good
Nitric acid (40%)	good
Hydrochloric acid (38%)	very good
Acid resistance	very good
Sulfuric acid (30%)	very good
Silicone oils and greases	very good
Drinking water	very good
Suds (laundry detergent)	very good
Sugar (watery)	very good
Permitted temperature range	-25 ... +150 °C



3.1.8 HP200 surface



INFORMATION

The information in this chapter is based on the current technical knowledge and experience. No legally binding guarantee of certain properties or of the suitability for a specific application purpose can be derived from the given information.

Characteristics

Thermoplastic fluorinated polymer coating with nearly non-porous surface, excellent antistick properties and chemical resistance. Approved for contact with food.

Properties

The HP200 surface has the following properties:

HP200 surface	
Anti-stick properties	very good
Abrasion resistance	good, not suited for abrasion or high pressure
Chemical resistance	very good
Solvent resistance	not soluble
Corrosion resistance	DIN 50021, > 1000 h depending on layer structure
Flammability	not flammable
Temperature resistance	–40 to +200° C, thermoplastic behavior
Layer thickness	approx. 25 µm
Color	silver gray
Food grade approval	approved according to German Federal law and US FDA (no. 21 CFR 175.300)

Cleaning

Do not mix cleaning and disinfecting agents under any circumstances!

Never mix acids and chloralkalis, as poisonous chlorine gas will result.

Strictly observe the safety instructions of the cleaning agent manufacturer.



Certificate of Ecolab Deutschland GmbH



Ecolab Deutschland GmbH
P.O. Box 13 04 06
D-40554 Düsseldorf

certifies that

a material resistance test

was performed for

SEW-EURODRIVE GmbH & Co. KG
Ernst-Blickle-Straße 42
D-76646 Bruchsal

with the following cleaning agents and disinfectants:

P3-topax 19, P3-topax 56, P3-topax 58, P3-topax 686, P3-topactive 200,
P3-topactive 500, P3-topactive DES, P3-topax 990 and P3-oxysan ZS,
and **demineralized water.**

The protective properties of the **High Protection surface treatment HP 200** tested against the above-mentioned Ecolab products used in the test can be considered to be positive according to the cleaning procedures mentioned overleaf.

Düsseldorf, 14 August 2009

Ecolab Deutschland GmbH

i.V.

Thomas Wershofen
Manager Corporate Service RD&E
Center of Excellence EMEA
Food & Beverage Division

i. A.

Karin Uhlenbrock
Service Engineer RD&E
Center of Excellence EMEA
Food & Beverage Division

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ECOLAB®

SEW EURODRIVE

This certificate for the HP200 surface treatment is based on

- documented test procedures on material resistance
- defined product specifications
- a standardized cleaning procedure

Test procedure

Dipping test:

- Immersion into the test medium with contact surface to ambient air

Test period:

- 7 days

Evaluation:

- Evaluation takes place approx. 7 days after regeneration
- Evaluation of changes of the protective properties according to DIN EN ISO 4628-1
- Evaluation of decorative changes (color, brightness, blistering)
 - (+) no changes
 - (o) possible minor changes
 - (-) possible changes under long-term influence

The HP200 surface treatment was tested in the following media:

Alkaline and chlorinated alkaline foam cleaners			
P3-topax 12	5%	40°C	o
P3-topax 686	5%	40°C	o

TFC cleaning agents			
P3-topactive 200	4%	40°C	o
P3-topactive 500	4%	40°C	o

Acid foam cleaning agents			
P3-topax 56	5%	40°C	o
P3-topax 58	5%	40°C	+

Disinfectants			
P3-topax 990	5%	23°C	+
P3-topactive DES	3%	23°C	+
P3-oxysan ZS	1%	23°C	+

DI water	-	40°C	+
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Product specifications:

P3-topax 19

Alkaline foam cleaning agent

P3-topax 56

Acid foam cleaning agent based on phosphoric acid

P3-topax 58

Acid foam cleaning agent based on organic acids

P3-topax 686

Alkaline foam cleaning agent with active chlorine

P3-topactive 200

Alkaline cleaning agent for operational cleaning as TFC application

P3-topactive 500

Acid cleaning agent for operational cleaning as TFC application

P3-topax 990

Alkaline foam disinfectant based on alkylamine acetate

P3-topactive DES

Foam and TFC capable disinfectant based on H₂O₂ and peroxy acid

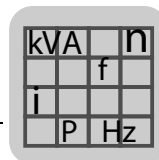
P3-oxysan ZS

Disinfectant based on peroxy compounds

DI water

Demineralized water

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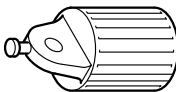
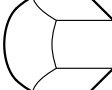
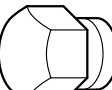
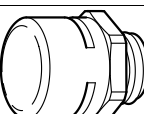
3.1.9 Screw connections

The following tables show the screw connections available from SEW-EURODRIVE:

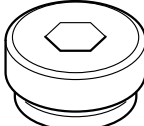
*Cable glands/
screw plugs*

Type of screw connection	Figure	Content	Size	Part number
Screw plugs (made of stainless steel)		10 pc	M16 x 1.5	1 820 223 3
		10 pc	M25 x 1.5	1 820 226 8
EMC cable gland (brass, nickel plated)		10 pc	M16 x 1.5	1 820 478 3
		10 pc	M25 x 1.5	1 820 480 5
EMC cable gland (made of stainless steel)		10 pc	M16 x 1.5	1 821 636 6
		10 pc	M25 x 1.5	1 821 638 2

*Screw connections
plug connectors/
pressure
compensation*

Type of screw connection	Figure	Content	Size	Part number
M23 plug (made of plastic)		10 pc	M23 x 1.5	1 823 733 9
M12 plug (made of stainless steel)		10 pc	M12 x 1.0	1 820 279 9
M12 plug (made of stainless steel)		10 pc	M12 x 1.0	1 820 227 6
Pressure compensation fitting		1 pc	M16 x 1.5	1 820 409 0

*Screw connection
diagnostic
interface /
potentiometer*

Type of screw fitting	Figure	Content	Size	Part number
Screw plug for f1 potentiometer and diagnostic interface (made of stainless steel)		10 pc	M24 x 1.5	1 823 803 3



3.1.10 Extended storage

Drive



INFORMATION

For storage periods longer than 9 months, SEW-EURODRIVE recommends the "Extended storage" design. MOVIGEAR® drive units in this design are designated with a corresponding label.

In this case, a VCI corrosion inhibitor (volatile corrosion inhibitor) is added to the lubricant in these MOVIGEAR® drive units. Please note that this VCI corrosion inhibitor is only effective in a temperature range of -25 °C to +50 °C. In addition, the shaft ends are also treated with an anti-corrosion agent. MOVIGEAR® drive units in "extended storage" design are equipped with OS2 surface protection without further notice. Instead of OS2, you can order OS3. For further information refer to chapter "Surface protection".



NOTICE

MOVIGEAR® drive units must remain tightly sealed until taken into operation to prevent the VCI corrosion protection agent from evaporating.

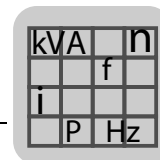
MOVIGEAR® drive units will be supplied with an oil fill according to the mounting position (M1 ... M6) and are ready for operation.

Storage conditions Observe the storage conditions specified in the following table for extended storage:

Climate zone	Packaging ¹⁾	Storage location ²⁾	Storage duration
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	Under roof, protected against rain and snow, no shock loads.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	Under roof, protected against rain and shocks.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks. Protected against insect damage.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.

1) Packaging must be carried out by an experienced company using the packaging materials that have been explicitly specified for the particular application.

2) SEW-EURODRIVE recommends to store the drive according to the mounting position.



Electronics

If the unit is stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

*Procedure when
maintenance has
been neglected*

Electrolytic capacitors are used in the inverters. They are subject to aging effects when de-energized. This effect can damage the capacitors if the unit is connected using the rated voltage after a longer period of storage. If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. After you have completed the regeneration process, the unit can be used immediately or stored again for an extended period with maintenance.

The following stages are recommended:

AC 400/500 V units:

- Stage 1: AC 0 V to AC 350 V within a few seconds
- Stage 2: AC 350 V for 15 minutes
- Stage 3: AC 420 V for 15 minutes
- Stage 4: AC 500 V for 1 hour



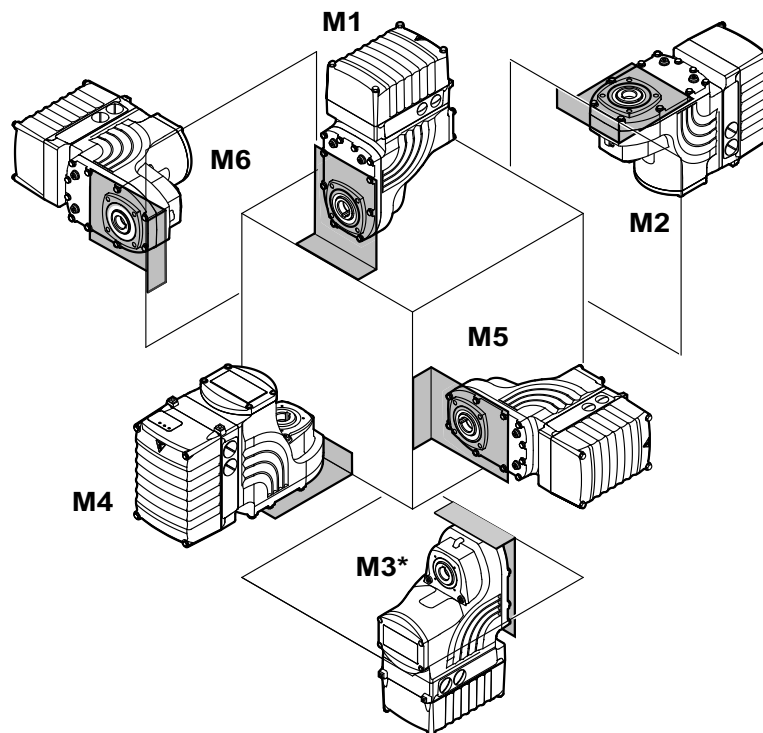
3.2 Important order information and mounting positions

3.2.1 Important order information

Mounting position designation The following mounting positions are possible for MOVIGEAR®:

- Specified mounting position: M1 or M2 or M3* or M4 or M5 or M6
- Universal operation in mounting positions M1, M2, M3*, M5, M6

Mounting positions M1 to M6 The following figure shows the position of MOVIGEAR® in mounting positions M1 to M6.



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* = Mounting position M3 only after consultation with SEW-EURODRIVE

kVA	n
f	
i	
P	Hz

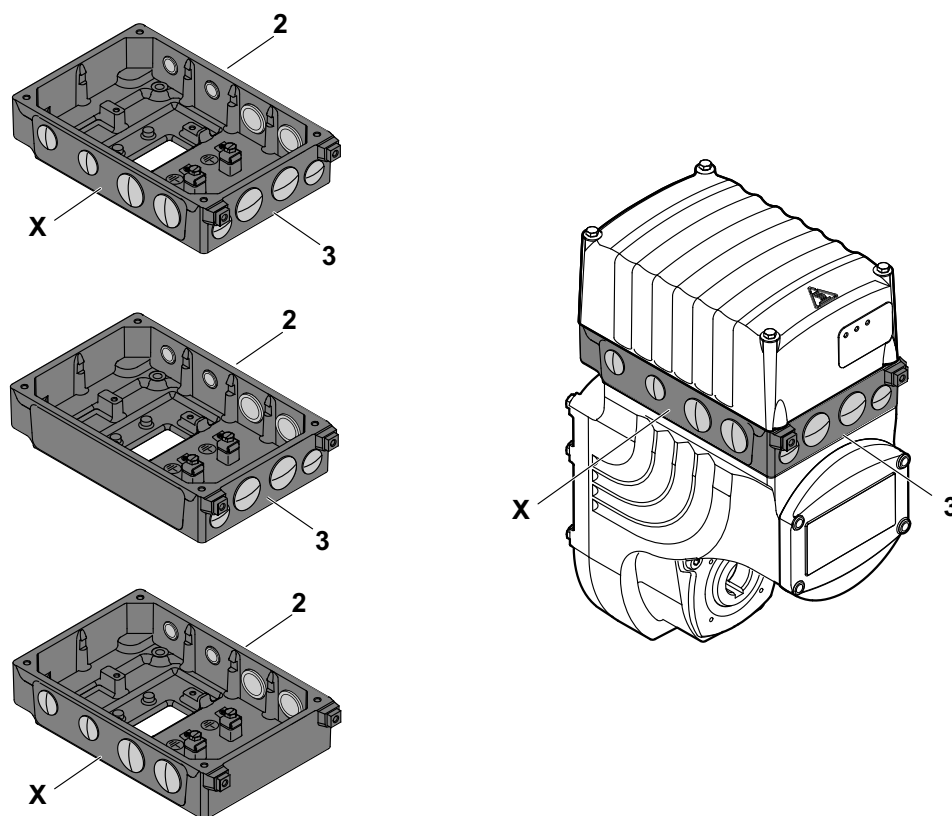
Position of the cable entry

The following cable entries are possible for MOVIGEAR®:

- Position X + 2
 - X: 2 x M25 x 1.5 + 1 x M16 x 1.5 + 1 x M16 x 1.5 ¹⁾
 - 2: 2 x M25 x 1.5 + 1 x M16 x 1.5 + 1 x M16 x 1.5 ¹⁾
- Position X + 2 + 3
 - X: 2 x M25 x 1.5 + 1 x M16 x 1.5 + 1 x M16 x 1.5 ¹⁾
 - 2: 2 x M25 x 1.5 + 1 x M16 x 1.5 + 1 x M16 x 1.5 ¹⁾
 - 3: 2 x M25 x 1.5 + 2 x M16 x 1.5
- Position X + 3
 - X: 2 x M25 x 1.5 + 1 x M16 x 1.5 + 1 x M16 x 1.5 ¹⁾
 - 3: 2 x M25 x 1.5 + 2 x M16 x 1.5
- Position 2 + 3
 - 2: 2 x M25 x 1.5 + 1 x M16 x 1.5 + 1 x M16 x 1.5 ¹⁾
 - 3: 2 x M25 x 1.5 + 2 x M16 x 1.5

Overview

The following figure shows the possible cable entries:



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1) 1 x M16 x 1.5 reserved for pressure compensation fitting in connection with the package for wet areas



Electronics design

The following electronics designs are available for MOVIGEAR®:

- **Electronics cover variant**

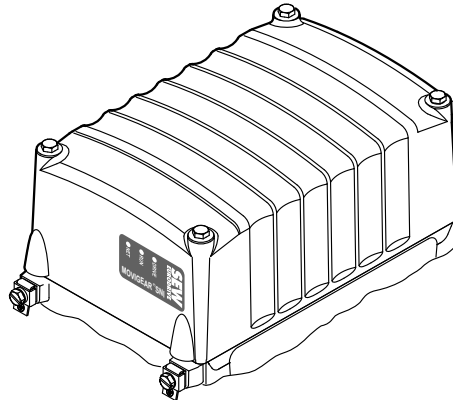
The following types of electronics covers are available for all MOVIGEAR® DSC-B and MOVIGEAR® SNI-B sizes (MGF.2, MGF.4 and MGF.4/ET):

- Electronics cover without application slot
- Electronics cover with application slot and application cover (for integrating application options)

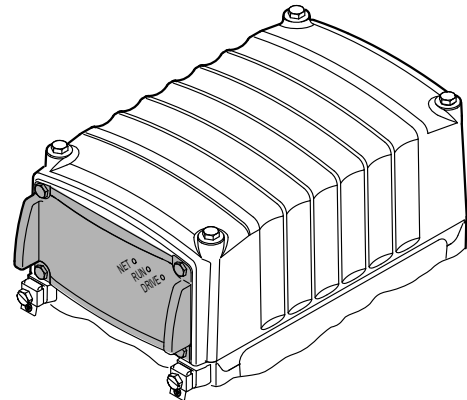
The electronics cover of MOVIGEAR® DBC-B and MOVIGEAR® DAC-B is designed without application slot.

The following figure shows the possible designs:

MOVIGEAR® electronics cover without application slot



MOVIGEAR® electronics cover with application slot and cover



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For an overview of available application options, refer to the section "Overview of types".

DynaStop® – The electrodynamic deceleration function (/DSP option)

- The function allows for creating a speed-dependent torque when the motor is de-energized or "controller inhibit" is activated.
- This prevents the application from excessive acceleration due to external forces (e.g. sagging on inclining tracks)
- See chapter "Project Planning" for more information.

- **Extended control range (/ECR option)**

- This design allows for operating MOVIGEAR® drive units with an extended control range (speed range from 1 rpm to 2000 rpm).
- See chapter "Project Planning" for more information.

Increased torque (/ET option)

- Optional expansion of rated motor torque in continuous duty.
- Note that the contour dimension of the MOVIGEAR® electronics cover is different when using this option (see chapter "Dimension Drawings").
- See chapter "Project Planning" for more information.



*Options for
parameterization
and diagnostics*

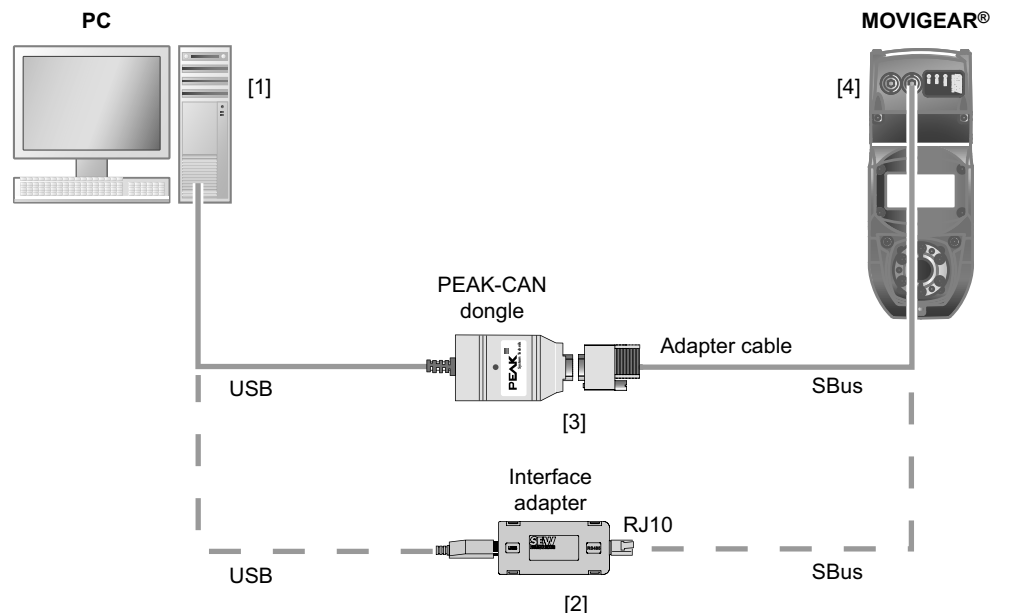
MOVIGEAR® DBC-B and DAC-B drive units are equipped with an interface for parameterization and diagnostics. The following chapter shows the options for connection with the PC/laptop.

	INFORMATION
	When using MOVIGEAR® DSC-B and SNI-B, the PC and MOVIGEAR® is connected using the controller used. Read the information in the relevant documentation.

PC connection

The diagnostic interface can be connected to a commercially available PC/laptop using one of the following options:

- PEAK CAN dongle with adapter cable
 - Part number of PEAK CAN dongle: 1821 0597
 - Part number of adapter cable: 1812 3864
- Interface adapter (in preparation)



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- [1] PC
[2] Interface adapter (in preparation)
[3] USB-CAN interface with adapter cable
[4] Diagnostic interface

*Package for wet
applications*

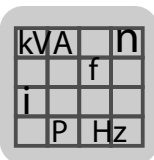
This optional drive package is available for applications in wet areas (see chapter "MOVIGEAR® with optional package for applications in wet areas").

Plug connectors

MOVIGEAR® B is supplied without plug connector unless specified otherwise in the order. Exception: MOVIGEAR® DAC-B is supplied with the following plug connectors as standard:

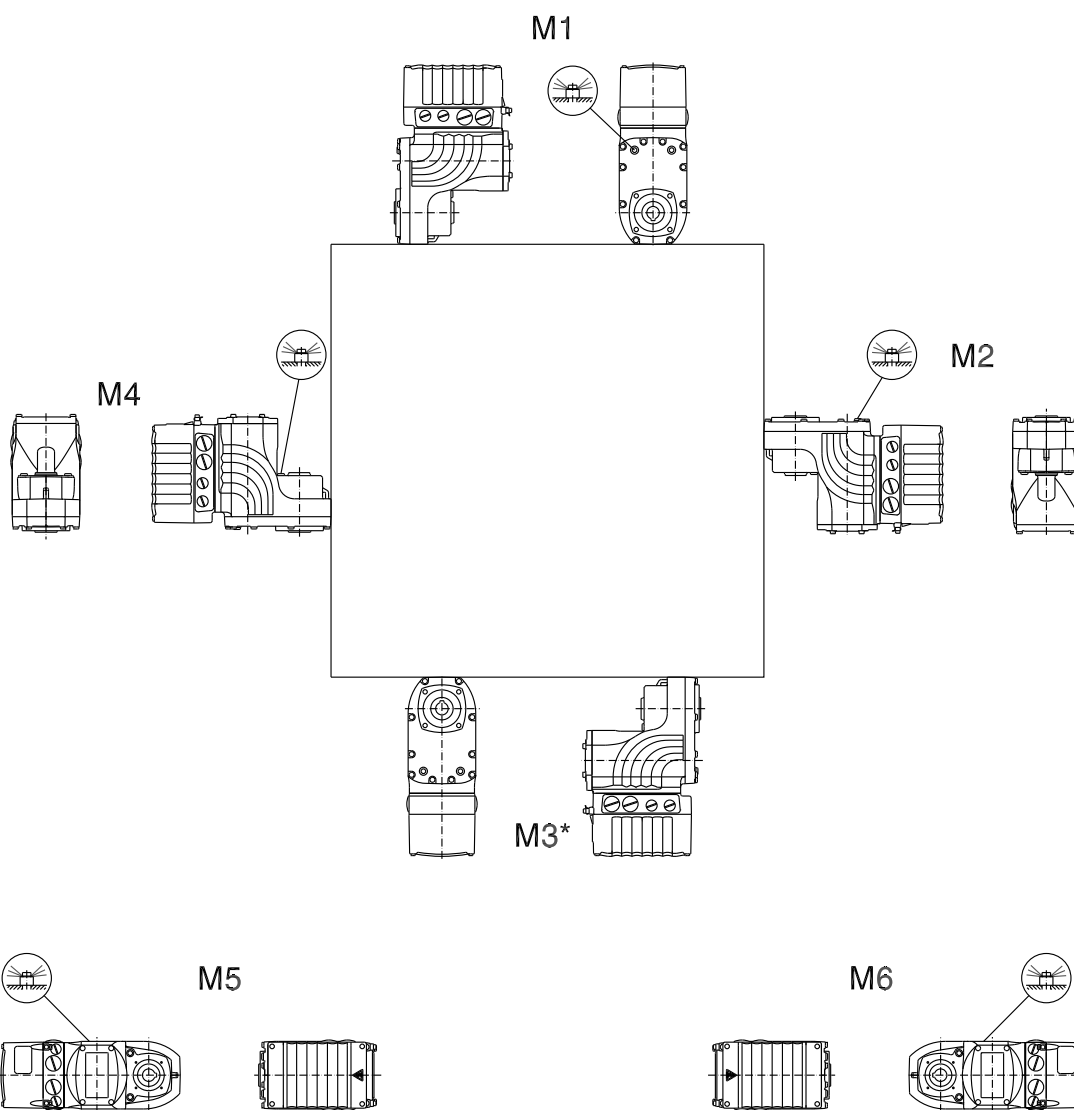
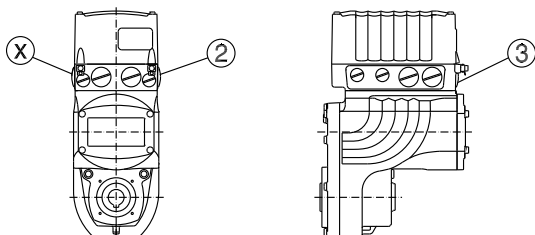
- X4271: AS-Interface communication interface
- X5011: AS-Interface sensors

For more information, refer to chapter "Optional plug connectors".



3.2.2 Mounting positions

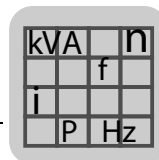
03 022 00 09



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* = Mounting position M3 only after consultation with SEW-EURODRIVE

 = Breather valve



3.3 Design and operating notes

3.3.1 Lubricants

*Lubricant fill
quantities*

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear ratio.

MGF..2		MGF..4	
Gear ratio i	Fill quantities in liters for mounting positions M1, M2, M3*, M4, M5, M6	Gear ratio i	Fill quantities in liters for mounting positions M1, M2, M3*, M4, M5, M6
55.25	0.46 l	48.00	1.06 l
51.51		42.86	
45.03		36.6	
42.19		34.29	
37.24		28.89	
33.02		25.72	
28.07		21.82	
22.86	0.49 l	19.70	
19.81		17.33	
18.52		16.36	
16.00		13.93	
13.60		12.66	
12.14		10.97	
10.37		8.96	1.1 l
9.71	0.53 l	7.88	
8.24		7.44	
7.00		6.34	
6.25		5.76	
5.34		4.99	
5.00			

* M3 mounting position only after consultation with SEW-EURODRIVE

 = preferred gear ratio



Technical Data and Dimension Drawings

Design and operating notes

Key to the lubricant tables

Abbreviations, meaning of shading and notes:

- CLP HC = Synthetic hydrocarbons
 E = Ester oil (water hazard classification 1)
 HCE = Synthetic hydrocarbons + ester oil (USDA - H1 certification)
 HLP = Hydraulic oil
 = Synthetic lubricant (= synthetic-based roller bearing grease)
 1) Observe the critical starting behavior at low temperatures.
 2) Ambient temperature
 Lubricant for the food industry (food grade oil)
 Biodegradable oil (lubricant for agriculture, forestry, and water management)

Roller bearing greases

The roller bearings are filled with the following greases at the factory:

	Ambient temperature	Manufacturer	Type
Gear unit rolling bearings	-40°C ... +80°C	Fuchs	Renolit CX-TOM15 ¹⁾
Special greases for gear unit anti-friction bearings			
	-30°C ... +40°C	Aral	Eural Grease EP 2
	-20°C ... +40°C	Aral	Aralub BAB EP2

1) Rolling bearing grease based on semi-synthetic base oil.



3.3.2 Design notes for gear units with hollow shaft and key



NOTICE

Always use the supplied NOCO[®] fluid for assembly. The fluid prevents contact corrosion and facilitates subsequent disassembly.

The keyway dimension X is specified by the customers, but X must be > DK.

Assembly

SEW-EURODRIVE recommends 2 variants for installing the hollow shaft and key on the input shaft of the driven machine (= customer shaft):

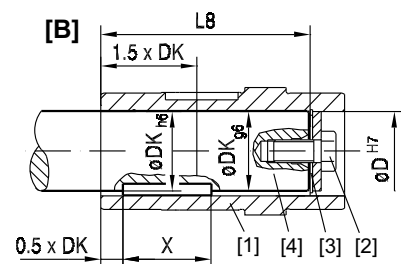
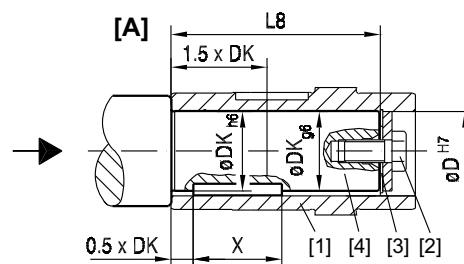
1. Use the provided fastening parts for installation.
2. Use the optional installation/removal kit for installation.

1. Provided fastening parts

The following fastening parts are supplied as standard:

- Retaining screw with washer [2]
- Circlip [3]

Customer shaft



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- [1] Hollow shaft
- [2] Retaining screw with washer
- [3] Retaining ring
- [4] Customer shaft

- The installation length of the customer shaft with contact shoulder [A] must be L8 - 1 mm.
- The installation length of the customer shaft without contact shoulder [B] must equal L8.

Dimensions and tightening torques

The retaining screw [2] must be tightened to the tightening torque MS given in the following table.

Gear unit type	D ^{H7} [mm]	DK [mm]	L8 [mm]	MS [Nm]
MGFA.2	25	25	101	20
MGFA.2	30	30	101	20
MGFA.4	35	35	124	20
MGFA.4	40	40	106	40

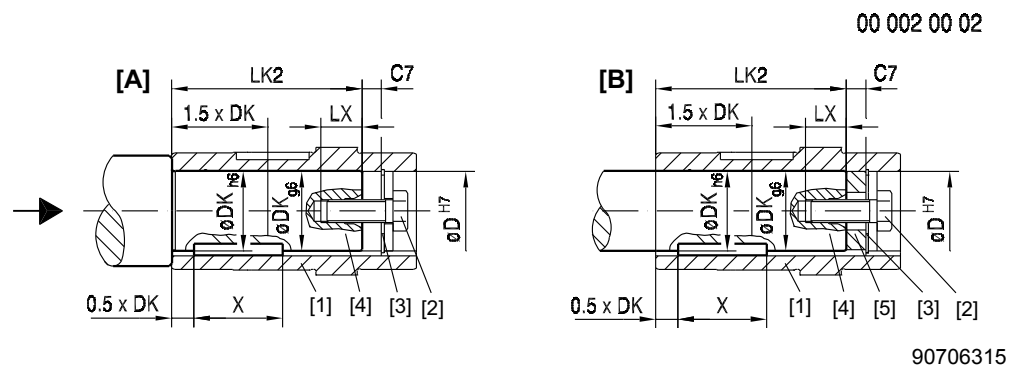
2. Installation/ removal kit

You can also use the optional installation/removal kit for installation. You can order the kit for the specific size by quoting the part numbers in the table below. The delivery includes:

- Spacer tube for installation without contact shoulder [5]
- Retaining screw for installation [2]
- Forcing washer for removal [7]
- Locked nut for removal [8]

The short retaining screw delivered as standard is not required.

Customer shaft



- [1] Hollow shaft
- [2] Retaining screw with washer
- [3] Retaining ring
- [4] Customer shaft
- [5] Spacer tube

- The installation length of the customer shaft must be LK2. Do not use the spacer if the customer shaft **has a contact shoulder [A]**.
- The installation length of the customer shaft must be LK2. Use the spacer if the customer shaft **has a contact shoulder [B]**.

Dimensions, tightening torques, and part numbers

The retaining screw [2] must be tightened to the tightening torque MS given in the following table.

Type	D ^{H7} [mm]	DK [mm]	LK2 [mm]	LX ⁺² [mm]	C7 [mm]	MS [Nm]	Part number of the installation/ removal kit
MGFA.2	25	25	85	22	16	20	064 368 46
MGFA.2	30	30	85	22	16	20	064 368 54
MGFA.4	35	35	106	28	18	20	064 368 62
MGFA.4	40	40	88	36	18	40	064 368 70

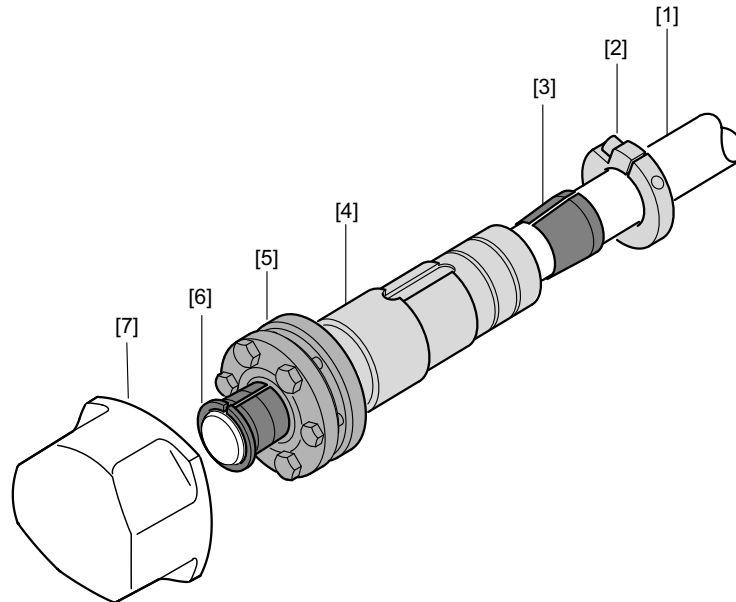


3.3.3 TorqLOC® hollow shaft mounting system for gear units with hollow shaft

Description of TorqLOC®

The TorqLOC® hollow shaft mounting system is used for creating a non-positive connection between the customer shaft and the drive. As a result, the TorqLOC® hollow shaft mounting system is an alternative to the hollow shaft with shrink disk, the hollow shaft with key and the splined hollow shaft that have been used so far.

The TorqLOC® hollow shaft mounting system consists of the following components:



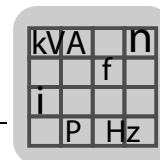
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- [1] Customer shaft
- [2] Locking collar
- [3] Conical bushing
- [4] Hollow shaft in gear unit
- [5] Shrink disk
- [6] Conical bushing
- [7] Protective canopy

Advantages of TorqLOC®

The TorqLOC® hollow shaft mounting system offers the following advantages:

- Cost savings because the customer shaft can be made from drawn material up to quality h11.
- Cost saving since different customer shaft diameters can be covered by one hollow shaft diameter and different bushings (→ reduction in the number of variants).
- Simple installation as there is no need to accommodate any shaft connections.
- Simple disassembly even after many hours of operation since the formation of contact corrosion has been reduced and the conical connections can easily be released.



3.4 Dimension drawings

3.4.1 Dimension sheet information

Scope of delivery



= Standard parts supplied by SEW-EURODRIVE.



= Standard parts not supplied by SEW-EURODRIVE.

Tolerances

Shaft ends

Diameter tolerance:

Ø	≤ 50 mm	→ ISO k6
Ø	> 50 mm	→ ISO m6

Center bores according to DIN 332, shape DR:

Ø	= 7...10 mm	→ M3
Ø	> 10...13 mm	→ M4
Ø	> 13...16 mm	→ M5
Ø	> 16...21 mm	→ M6
Ø	> 21...24 mm	→ M8
Ø	> 24...30 mm	→ M10
Ø	> 30...38 mm	→ M12
Ø	> 38...50 mm	→ M16

Keys: according to DIN 6885 (domed type).

Hollow shafts

Diameter tolerance:

Ø	→ ISO H7 measured with plug gauge
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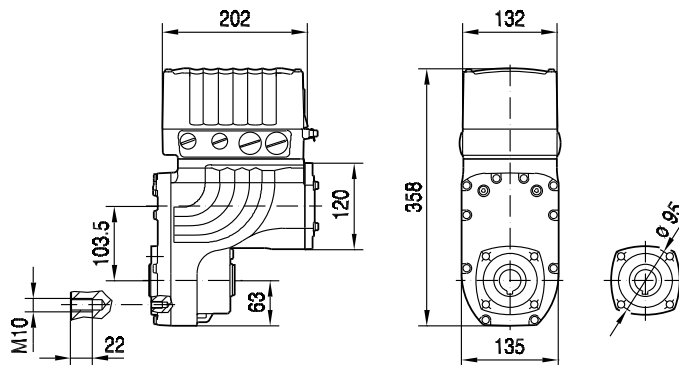
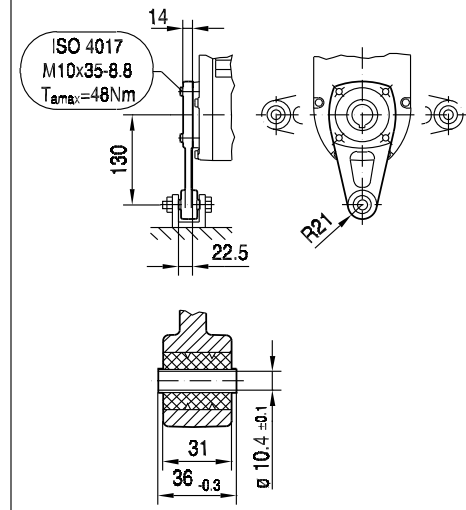
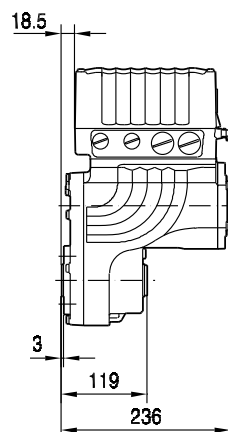
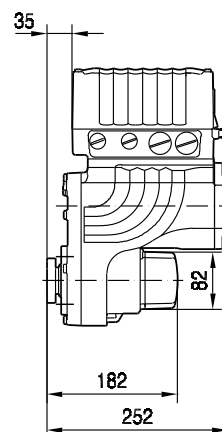
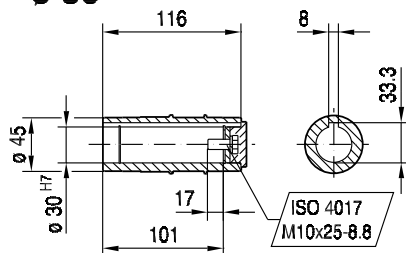
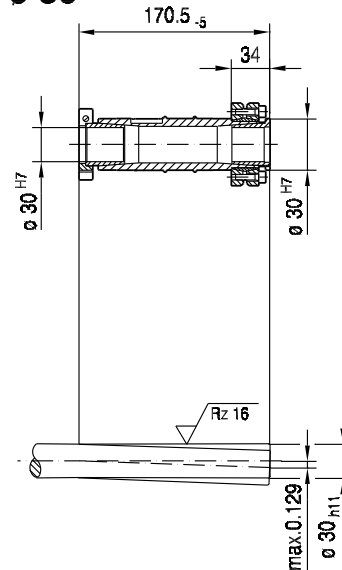
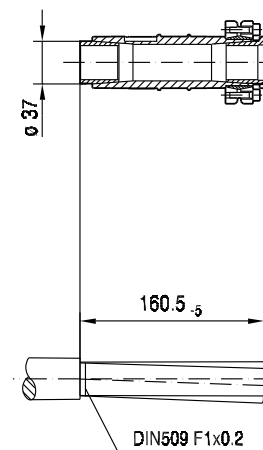
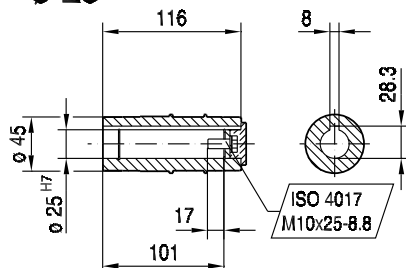
Breather valves and cable glands

The dimension drawings always show the screw plugs. The contour dimensions may vary slightly due to preinstalled breather valves, plug connectors or pressure compensation fittings (in conjunction with the MOVIGEAR® package for wet areas, for example).



3.4.2 MGF..2

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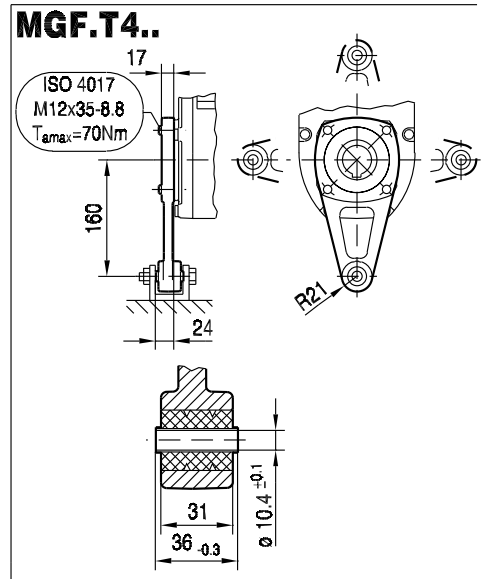
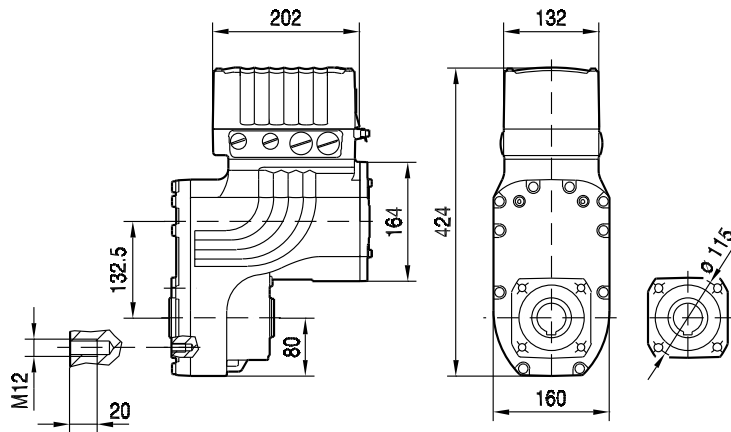
MGFAS2..-B**MGF.T2..****MGFAS2..-B****MGFTS2..-B** **$\phi 30$ H7** **$\phi 30$ H7** **$\phi 25$ H7**

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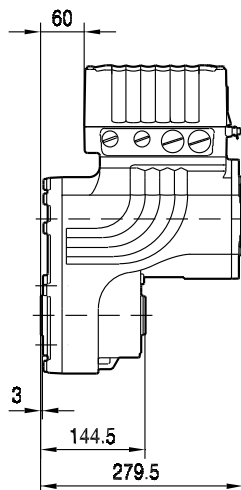
3.4.3 MGF..4

03 024 00 09

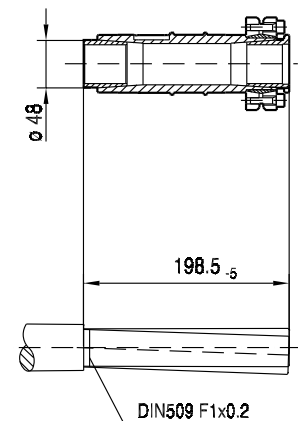
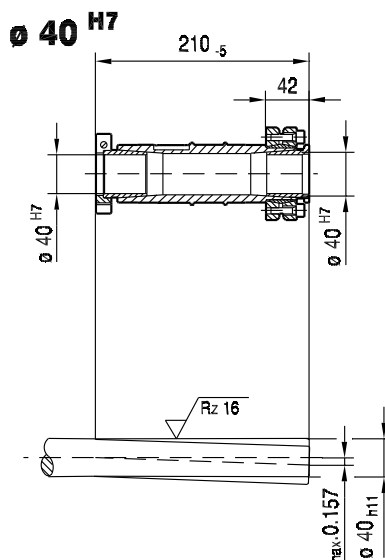
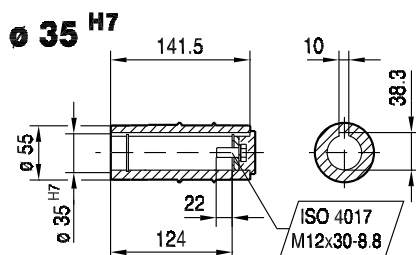
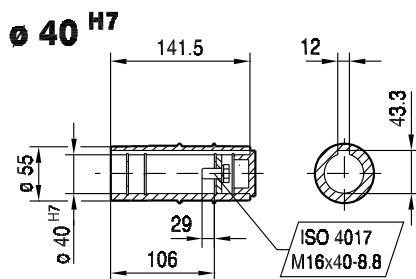
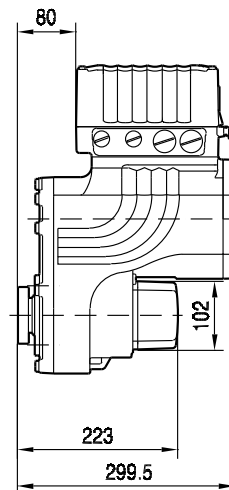
MGFAS4..-B



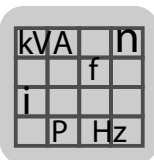
MGFAS4..-B



MGFTS4..-B



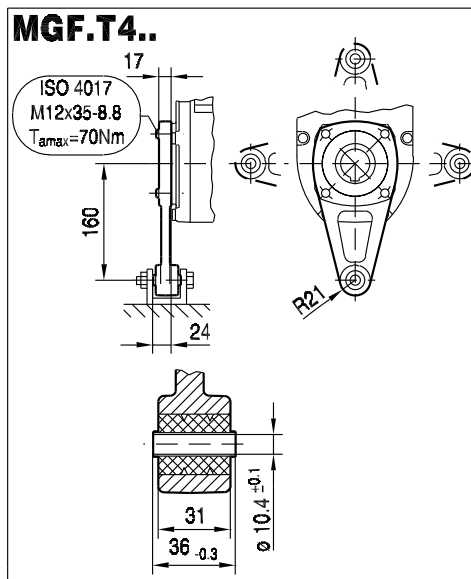
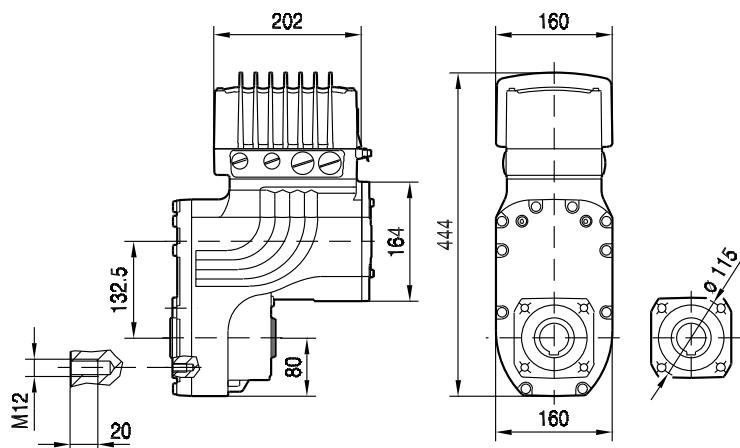
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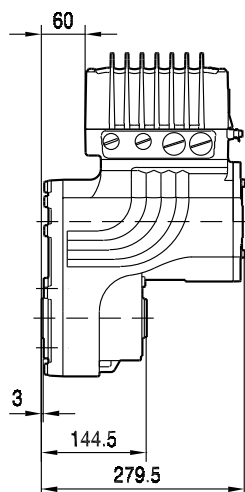
3.4.4 MGF..4../ET with increased torque

03 021 00 09

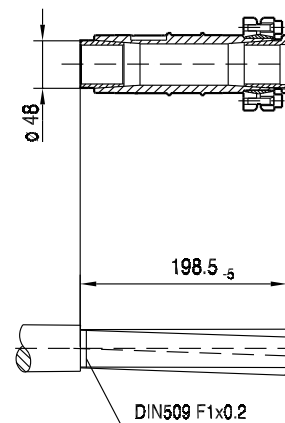
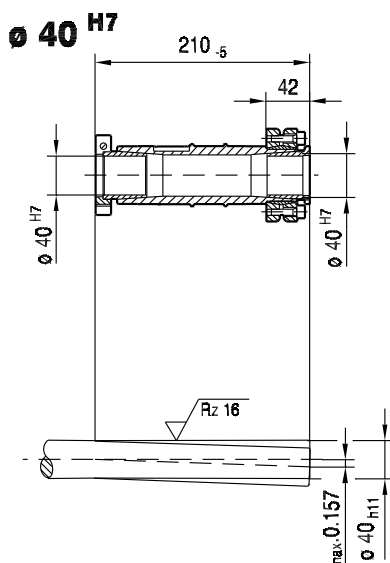
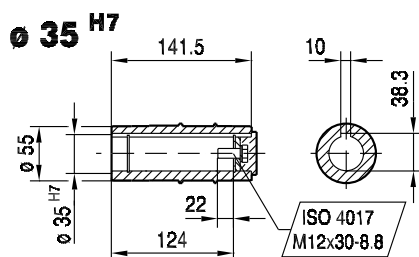
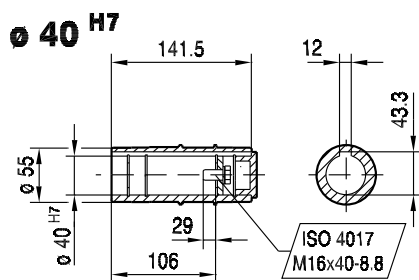
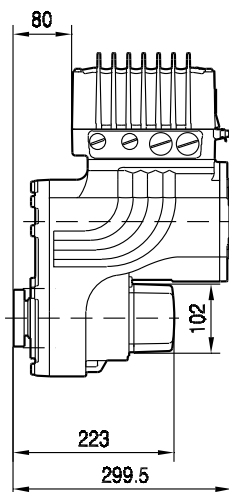
MGFAS4../B/ET



MGFAS4../B/ET



MGFTS4../B/ET

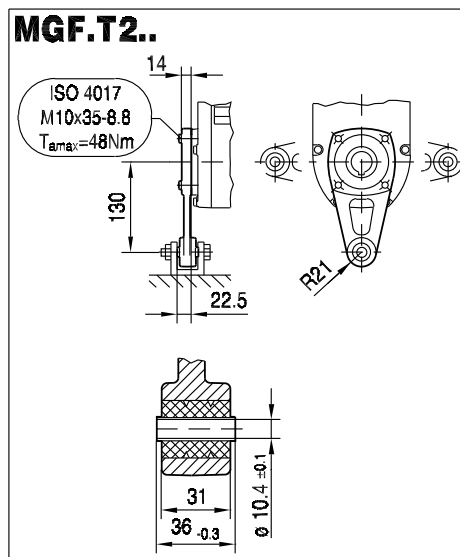
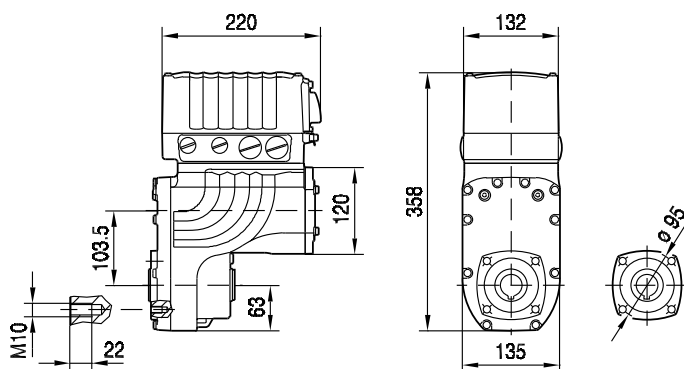


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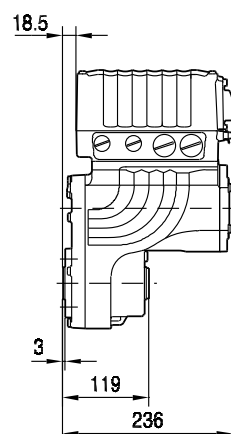
3.4.5 MGF..2 with application option

03 016 00 09

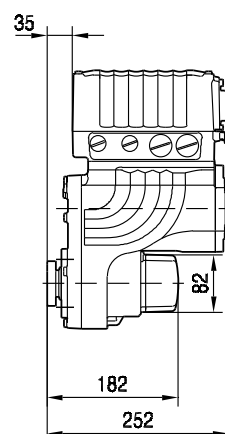
MGFAS2..-B



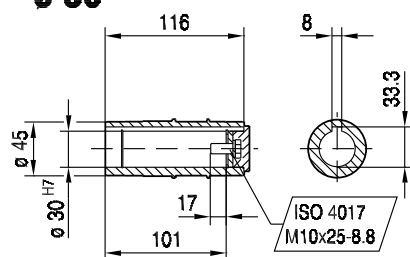
MGFAS2..-B



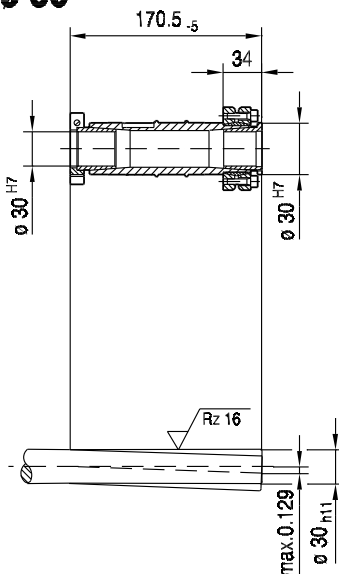
MGFTS2..-B



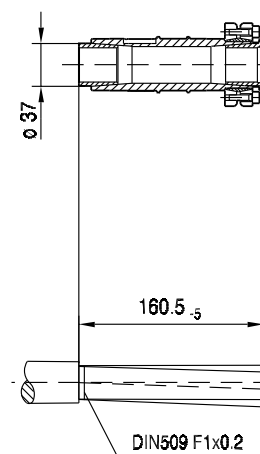
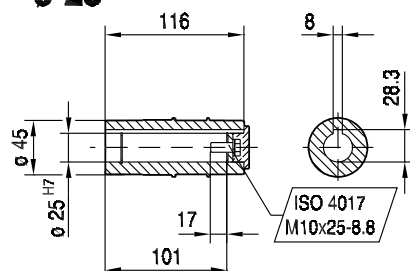
$\phi 30$ H7



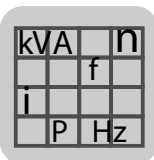
$\phi 30$ H7



$\phi 25$ H7



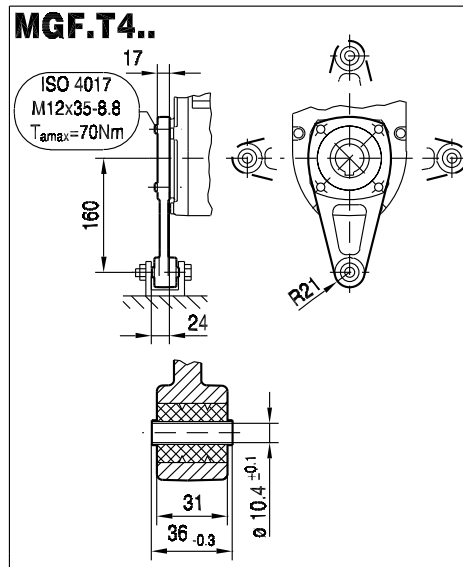
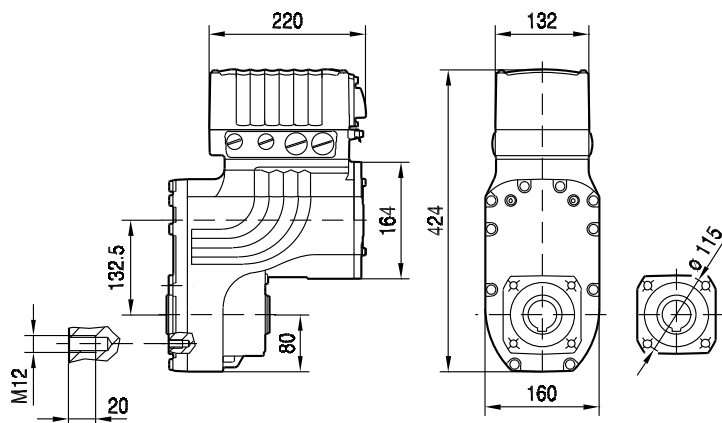
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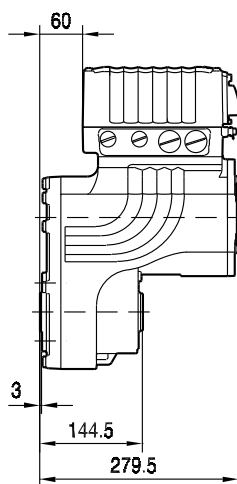
3.4.6 MGF..4 with application option

03 025 00 09

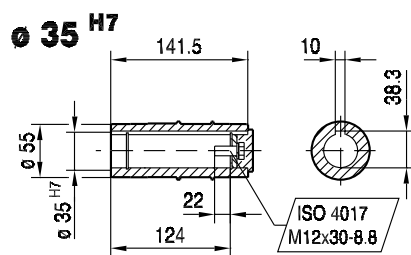
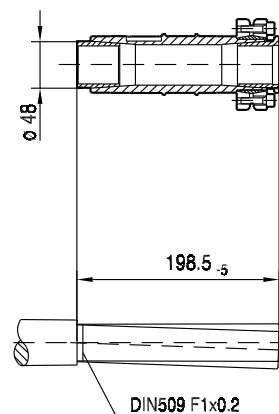
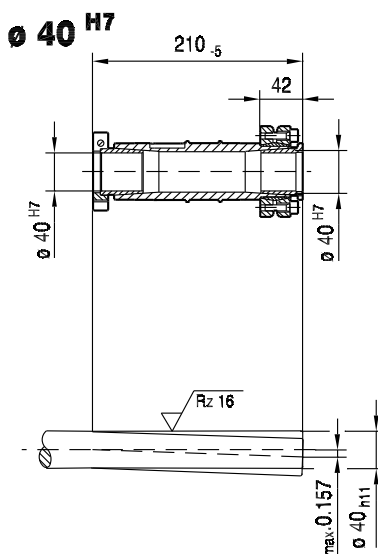
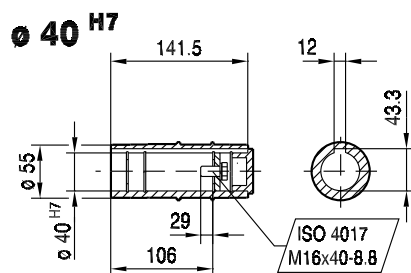
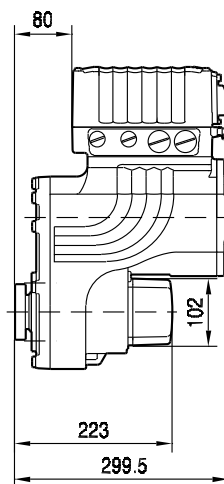
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MGFAS4...-B



MGFTS4...-B

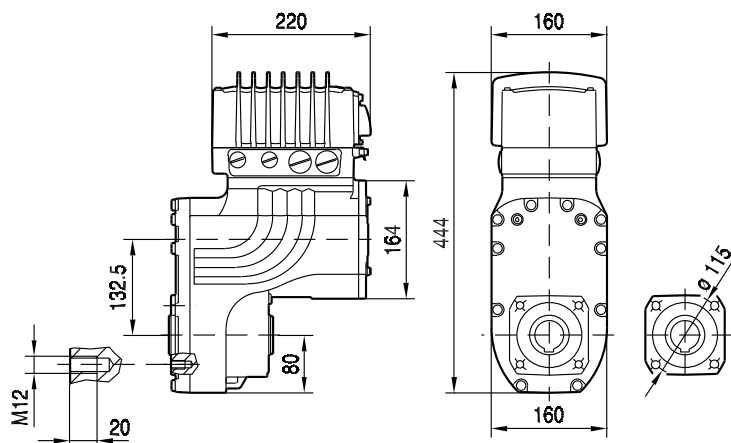


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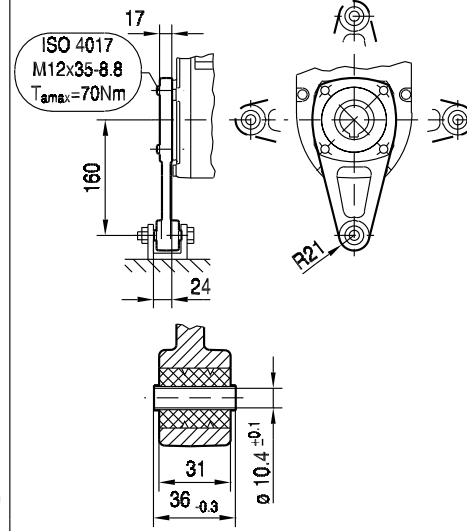
3.4.7 MGF..4../ET with increased torque and application option

03 017 00 09

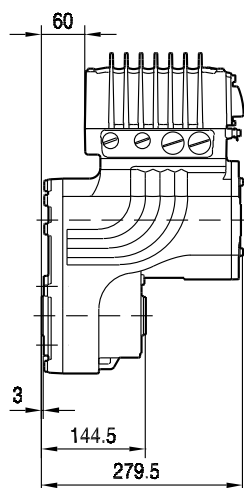
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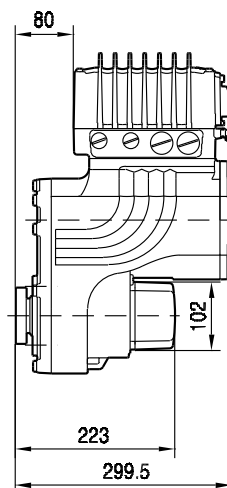
MGF.T4..



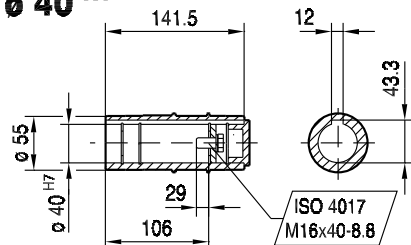
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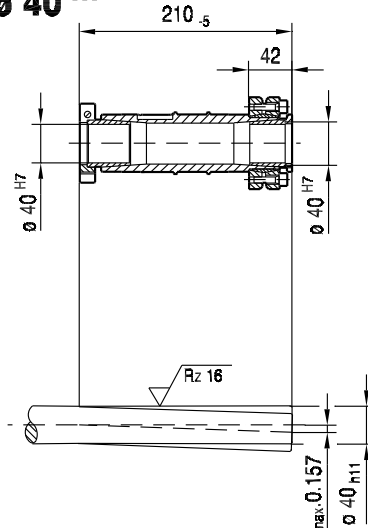
MGFTS4../B/ET



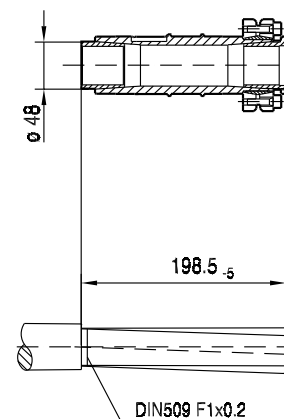
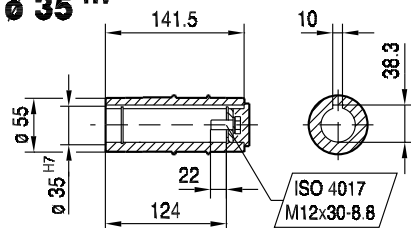
$\phi 40$ H7



$\phi 40$ H7



$\phi 35$ H7



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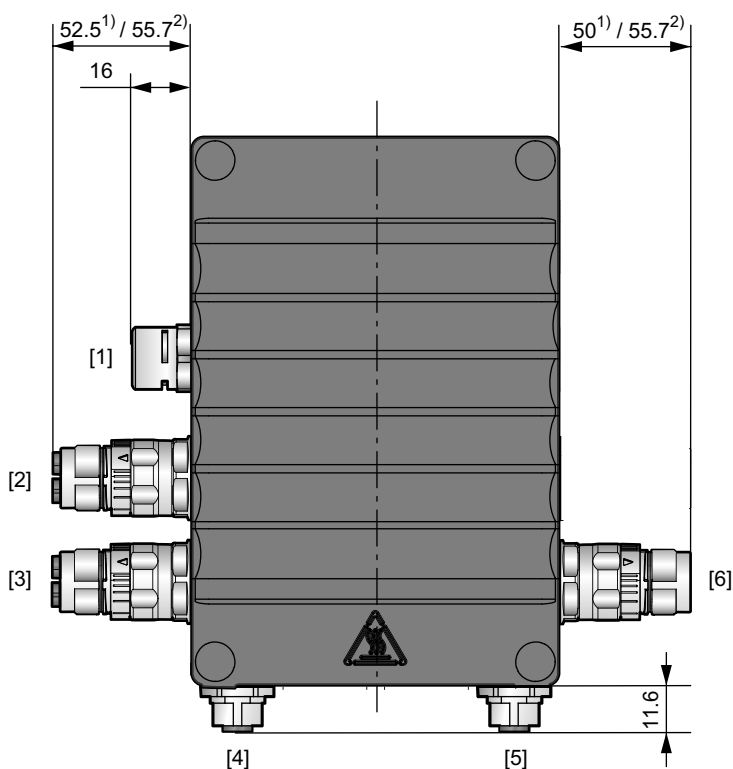


3.4.8 Dimension of MOVIGEAR® DBC-B plug connectors



INFORMATION

- The following figure shows an example of the additional dimensions of the optional plug connectors for a possible plug connector configuration.
- For more information, refer to chapter "Optional plug connectors for MOVIGEAR® DBC-B / plug connector positions"



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- 1) "Straight" plug connector variant
2) "Right-angle" plug connector variant

Key

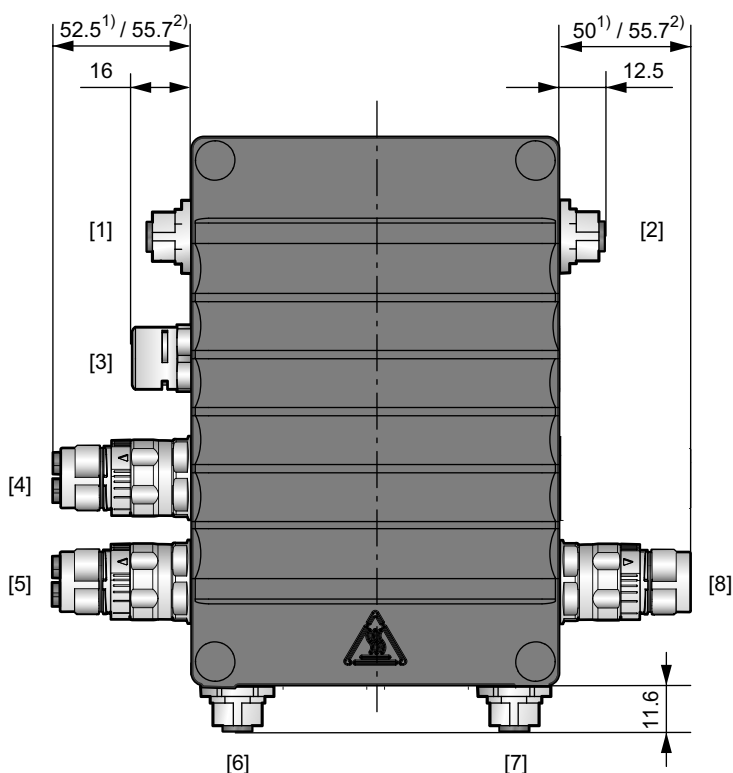
[1]	Pressure compensation fitting in conjunction with the optional package for applications in wet areas
[2]	X1203_2: AC 400 V connection
[3]	X1203_1: AC 400 V connection
[4]	X5502: STO – IN
[5]	X5503: STO – OUT
[6]	X5132: Digital inputs/outputs

3.4.9 Dimension drawing of MOVIGEAR® DAC-B plug connectors



INFORMATION

- The following figure shows an example of the additional dimensions of the optional plug connectors for a possible plug connector configuration.
- For more information, refer to chapter "Optional plug connectors for MOVIGEAR® DAC-B / plug connector positions"



2640947851

- 1) "Straight" plug connector variant
2) "Right-angle" plug connector variant

Key

[1]	X4271: AS-Interface communication interface
[2]	X5011: AS-Interface sensors
[3]	Pressure compensation fitting in conjunction with the optional package for applications in wet areas
[4]	X1203_2: AC 400 V connection
[5]	X1203_1: AC 400 V connection
[6]	X5502: STO – IN
[7]	X5503: STO – OUT
[8]	X5132: Digital inputs/outputs

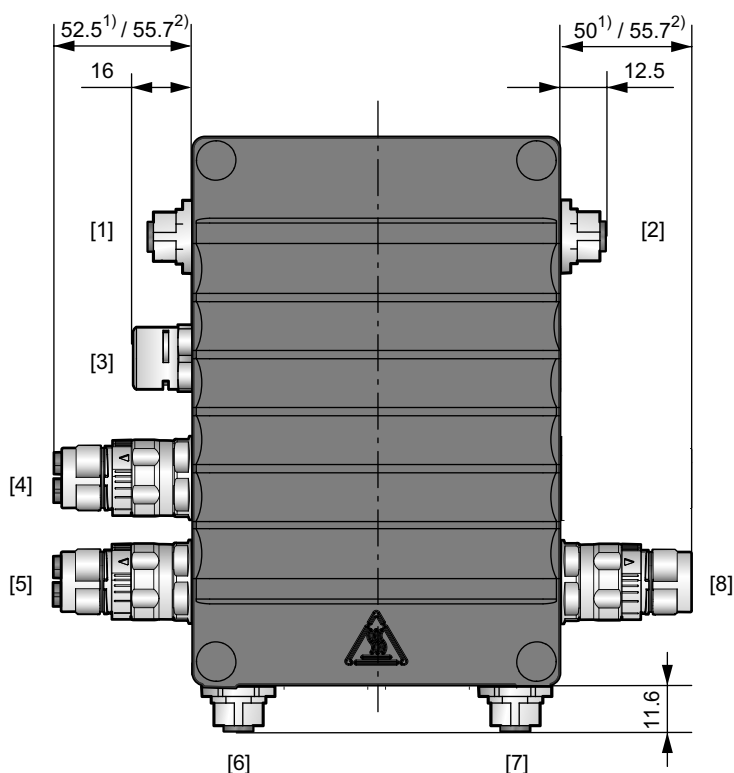


3.4.10 Dimension drawing of MOVIGEAR® DSC-B plug connectors



INFORMATION

- The following figure shows an example of the additional dimensions of the optional plug connectors for a possible plug connector configuration.
- For more information, refer to chapter "Optional plug connectors for MOVIGEAR® DSC-B / plug connector positions"



2640947851

- 1) "Straight" plug connector variant
2) "Right-angle" plug connector variant

Key

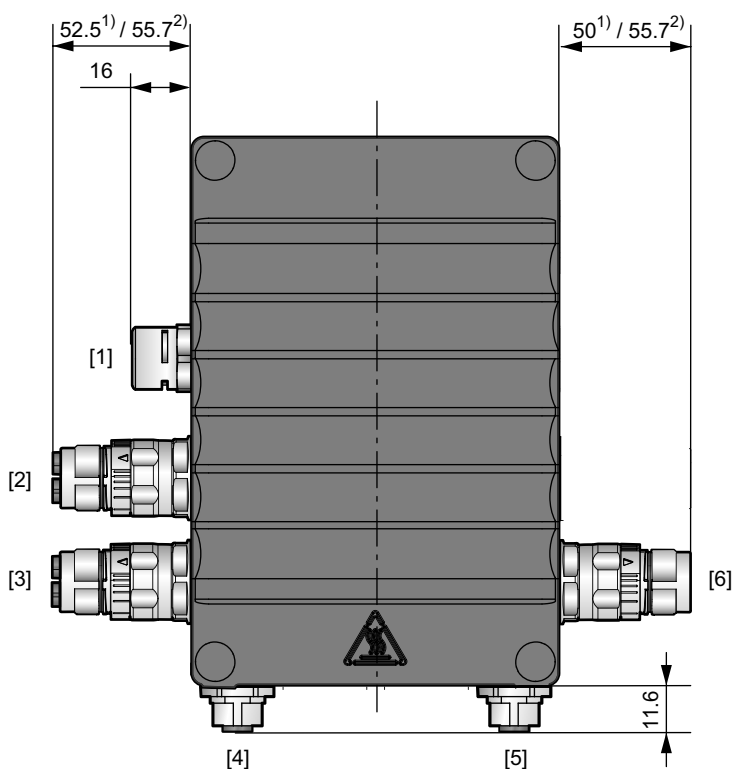
[1]	X4104: CAN bus – system bus – input
[2]	X4103: CAN bus – system bus – output
[3]	Pressure compensation fitting in conjunction with the optional package for applications in wet areas
[4]	X1203_2: AC 400 V connection / X1231: AC 400 V output and CAN bus
[5]	X1203_1: AC 400 V connection / X2324: AC 400 V input and CAN bus
[6]	X5502: STO – IN
[7]	X5503: STO – OUT
[8]	X5131: Digital inputs/outputs

3.4.11 Dimension drawing for MOVIGEAR® SNI-B plug connectors



INFORMATION

- The following figure shows an example of the additional dimensions of the optional plug connectors for a possible plug connector configuration.
- For more information, refer to chapter "Optional plug connectors for MOVIGEAR® SNI-B / plug connector positions"



2672093067

- 1) "Straight" plug connector variant
2) "Right-angle" plug connector variant

Key

[1]	Pressure compensation fitting in conjunction with the optional package for applications in wet areas
[2]	X1203_2: AC 400 V connection with SNI
[3]	X1203_1: AC 400 V connection with SNI
[4]	X5502: STO – IN
[5]	X5503: STO – OUT
[6]	X5131: Digital inputs/outputs



3.5 Technical data of MOVIGEAR® DBC-B

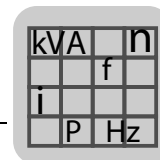
3.5.1 General technical data

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Torque class	M	200 Nm	400 Nm	
Supply voltages Permitted range	V_{line}	3 x AC 380 V - 5 % to AC 500 V + 10 %		
Line frequency	f_{line}	50 Hz ... 60 Hz		
Input current	I_N	1.52 A ($n_{Motor} = 2000$ rpm)	2.72 A ($n_{Motor} = 2000$ rpm)	3.2 A ($n_{Motor} = 2000$ rpm)
	$I_{maxStart}$	2.45 A	3.15 A	3.7 A
PWM frequency		4/8 kHz		
Interference immunity		EN 61800-3; 2nd environment (industrial environment)		
Interference emission		EN 61800-3 category C3 (class A group 2 of EN 55011)		
Climate class		EN 60721-3-3, class 3K3		
Storage temperature	ϑ_L	- 25 °C to + 70 °C (EN 60721-3-3)		
Proof of mechanical strength		according to EN 61800-5-1		
Degree of protection	IP	Standard: IP 65 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Possible restrictions regarding application options) With optional package for applications in wet areas: IP 66 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Application options not permitted for this drive package)		
Duty cycle		S1, continuous (EN 60149-1-1 and 1-3)		
Type of cooling		Self-cooling to DIN 41751 and EN 61800-5-1		
Signaling functions		Display elements on housing to indicate the unit state		
Installation altitude	h	Up to $h \leq 1000$ m without restrictions. The following restrictions apply to heights ≥ 1000 : - From 1000 m to max. 4000 m: I_N reduction by 1% per 100 m - From 2000 m to max. 4000 m: U_N reduction by AC 6 V per 100 m Over 2000 m only overvoltage class 2; external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.		
Required preventive measures		Ground the unit		

3.5.2 Ambient temperature

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Ambient temperature	ϑ_A	- 25 °C to + 60 °C ¹⁾		
I_N reduction Ambient temperature		3 % I_N per K at 40 °C to 60 °C		

1) Observe the permitted temperature range of the oil to be used (see chapter "Lubricant table").

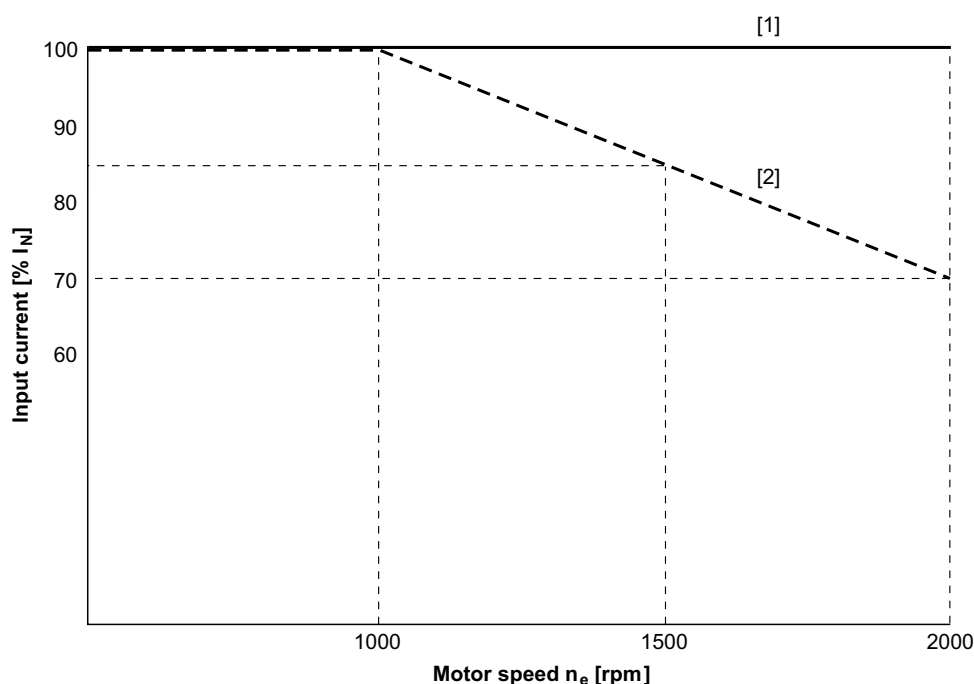


3.5.3 Binary inputs/signal relay

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Input type	DI01 to DI04	Isolated via optocoupler; PLC compatible to EN 61131-2 (digital inputs type 1) $R_i \approx 3.0 \text{ k}\Omega$, $I_E \approx 10 \text{ mA}$, sampling interval $\leq 5 \text{ ms}$		
Number of inputs		4		
Signal level		+15 to +30 V = "1" = Contact closed -3 to +5 V = "0" = Contact open		
Signal relay	K1a	Response time $\leq 15 \text{ ms}$ DC 24 V / 50 mA / DC 12 to IEC 60947-5-1 (only SELV or PELV circuits)		
Contact information	K1b			
Signaling function		NO contact for ready signal Contact closed: – with voltage present (24 V system) – if no fault was detected – after completion of self-testing phase (when unit is turned on)		

3.5.4 Derating factors for MGF..4 and MGF..4/ET

For MOVIGEAR® MGF..4 and MGF..4/ET, you have to additionally observe the I_N reduction shown in the following figure:



2859291275

- [1] Ambient temperature $\leq 35 \text{ }^\circ\text{C}$
[2] Ambient temperature = $40 \text{ }^\circ\text{C}$



INFORMATION

Derating is based on typical operating conditions with a supply voltage of 24 V (signal level of binary inputs, input voltage of STO input).



3.6 Technical data of MOVIGEAR® DAC-B

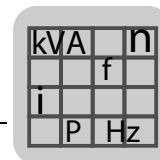
3.6.1 General technical data

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Torque class	M	200 Nm	400 Nm	
Supply voltages Permitted range	V_{line}	3 x AC 380 V - 5 % to AC 500 V + 10 %		
Line frequency	f_{line}	50 Hz ... 60 Hz		
Input current	I_N	1.52 A ($n_{Motor} = 2000$ rpm)	2.72 A ($n_{Motor} = 2000$ rpm)	3.2 A ($n_{Motor} = 2000$ rpm)
	$I_{maxStart}$	2.45 A	3.15 A	3.7 A
PWM frequency		4/8 kHz		
Interference immunity		EN 61800-3; 2nd environment (industrial environment)		
Interference emission		EN 61800-3 category C3 (class A group 2 of EN 55011)		
Climate class		EN 60721-3-3, class 3K3		
Storage temperature	ϑ_L	- 25 °C to + 70 °C (EN 60721-3-3)		
Proof of mechanical strength		according to EN 61800-5-1		
Degree of protection	IP	Standard: IP 65 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Possible restrictions regarding application options) With optional package for applications in wet areas: IP 66 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Application options not permitted for this drive package)		
Duty cycle		S1, continuous (EN 60149-1-1 and 1-3)		
Type of cooling		Self-cooling to DIN 41751 and EN 61800-5-1		
Signaling functions		Display elements on housing to indicate the unit state		
Installation altitude	h	Up to $h \leq 1000$ m without restrictions. The following restrictions apply to heights ≥ 1000 : - From 1000 m to max. 4000 m: I_N reduction by 1% per 100 m - From 2000 m to max. 4000 m: U_N reduction by AC 6 V per 100 m Over 2000 m only overvoltage class 2; external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.		
Required preventive measures		Ground the unit		

3.6.2 Ambient temperature

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Ambient temperature	ϑ_A	- 25 °C to + 60 °C ¹⁾		
I_N reduction Ambient temperature		3 % I_N per K at 40 °C to 60 °C		

1) Observe the permitted temperature range of the oil to be used (see chapter "Lubricant table").

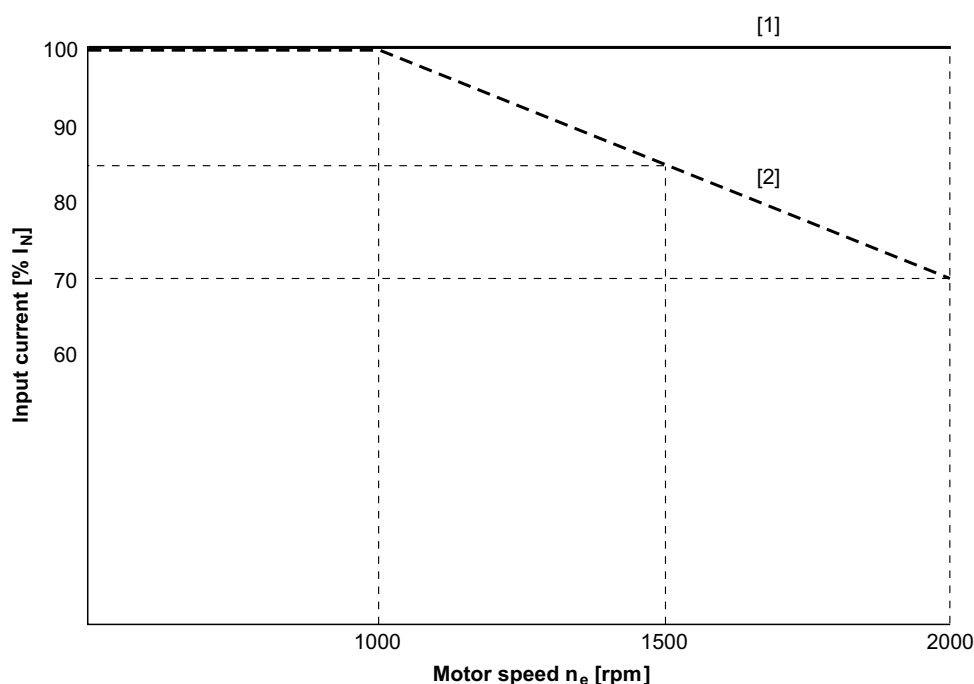


3.6.3 Binary inputs/signal relay

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Input type	DI01 to DI04	Isolated via optocoupler; PLC compatible to EN 61131-2 (digital inputs type 1) $R_i \approx 3.0 \text{ k}\Omega$, $I_E \approx 10 \text{ mA}$, sampling interval $\leq 5 \text{ ms}$		
Number of inputs		4		
Signal level		+15 to +30 V = "1" = Contact closed -3 to +5 V = "0" = Contact open		
Signal relay Contact information	K1a	Response time $\leq 15 \text{ ms}$		
	K1b	DC 24 V / 50 mA / DC 12 to IEC 60947-5-1 (only SELV or PELV circuits)		
Signaling function		NO contact for ready signal Contact closed: – with voltage present (24 V system) – if no fault was detected – after completion of self-testing phase (when unit is turned on)		

3.6.4 Derating factors for MGF..4 and MGF..4/ET

For MOVIGEAR® MGF..4 and MGF..4/ET, you have to additionally observe the I_N reduction shown in the following figure:



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- [1] Ambient temperature $\leq 35 \text{ }^\circ\text{C}$
 [2] Ambient temperature = $40 \text{ }^\circ\text{C}$



INFORMATION

Derating is based on typical operating conditions with a supply voltage of 24 V (AS-Interface electronics supply, signal level of binary inputs, input voltage of STO input).



3.6.5 Technical data AS-Interface

AS-Interface		
AS-Interface electronics supply	TI. AS +	29.5 V – 31.6 V
	TI. AS -	(AS-Interface power supply to EN 50295)
	I _E only AS-Interface:	≤ 50 mA ¹⁾
Control input	TI. AS +	Connection of the AS-interface data line
	TI. AS -	Connection of the AS-interface data line
Sensor connection	TI. DI2	External sensor input
	TI. DI3	External sensor input
	TI. V024	24 V for sensor supply
	TI. V0┘	Reference potential for sensor supply
	Sensor inputs	PLC-compatible to EN 61131-2, R _i about 3.0 kΩ I _E about 10 mA
Signal level	+15 V to +30 V	"1"
	-3 V to +5 V	"0"
Maximum sensor cable length	15 m	

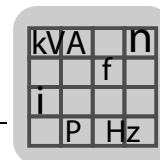
1) The current increases by the demand of the connected sensors (max 100 mA)

AS-Interface
GLK30A binary
slave

AS-Interface GLK30A	
Protocol variant	AS-interface binary slave with a S-7.F profile "four-bit I/O mode slave"
AS-Interface profile	S-7.F
I/O configuration	7 _{hex}
ID code	F _{hex}
ext. ID code 2	E _{hex}
ext. ID code 1	F _{hex}
Address	1 to 31 (factory setting: 0), can be changed as often as required

AS-Interface
GLK31A double
slave

AS-Interface GLK31A	Slave A	Slave B
Protocol variant	AS-Interface double slave in extended address mode AS-Interface specification V3.0, rev.02 in conjunction with M4 master profile	
AS-Interface profile	S-7.A.7.7	S-7.A.5.F
I/O configuration	7 _{hex}	7 _{hex}
ID code	A _{hex}	A _{hex}
ext. ID code2	7 _{hex}	5 _{hex}
ext. ID code1	7 _{hex}	F _{hex}
Function	4DI/4DO cyclical 4PDI/3PDO	serial acyclic
Address	1 to 31 (factory setting: 0), can be changed as often as required	



3.7 Technical data of MOVIGEAR® DSC-B

3.7.1 General technical data

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Torque class	M	200 Nm	400 Nm	
Supply voltages Permitted range	V_{line}	3 x AC 380 V - 5 % to AC 500 V + 10 %		
Line frequency	f_{line}	50 Hz ... 60 Hz		
Input current	I_N	1.52 A ($n_{Motor} = 2000$ rpm)	2.72 A ($n_{Motor} = 2000$ rpm)	3.2 A ($n_{Motor} = 2000$ rpm)
	$I_{maxStart}$	2.45 A	3.15 A	3.7 A
PWM frequency		4/8 kHz		
Interference immunity		EN 61800-3; 2nd environment (industrial environment)		
Interference emission		EN 61800-3 category C3 (class A group 2 of EN 55011)		
Climate class		EN 60721-3-3, class 3K3		
Storage temperature	ϑ_L	- 25 °C to + 70 °C (EN 60721-3-3)		
Proof of mechanical strength		according to EN 61800-5-1		
Degree of protection	IP	Standard: IP 65 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Possible restrictions regarding application options) With optional package for applications in wet areas: IP 66 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Application options not permitted for this drive package)		
Duty cycle		S1, continuous (EN 60149-1-1 and 1-3)		
Type of cooling		Self-cooling to DIN 41751 and EN 61800-5-1		
Signaling functions		Display elements on housing to indicate the unit state		
Installation altitude	h	Up to $h \leq 1000$ m without restrictions. The following restrictions apply to heights ≥ 1000: - From 1000 m to max. 4000 m: – I_N reduction by 1% per 100 m - From 2000 m to max. 4000 m: – U_N reduction by AC 6 V per 100 m Over 2000 m only overvoltage class 2; external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.		
Required preventive measures		Ground the unit		

3.7.2 Ambient temperature

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Ambient temperature	ϑ_A	- 25 °C to + 60 °C ¹⁾		
I_N reduction Ambient temperature		3 % I_N per K at 40 °C to 60 °C		

1) Observe the permitted temperature range of the oil to be used (see chapter "Lubricant table").



3.7.3 Motion control inputs

MOVIGEAR® type	MGF..2	MGF..4	MGF..4/ET
Input type	DI01 to DI04 ¹⁾	PLC-compatible according to EN 61131-2 (digital inputs type 1) $R_i \approx 3.0 \text{ k}\Omega$, $I_E \approx 10 \text{ mA}$, sampling interval 2 ms	
Number of inputs		4	
Signal level		+15 V to +30 V "1" = Contact closed -3 V to +5 V "0" = Contact open	

1) only in conjunction with optional plug connector

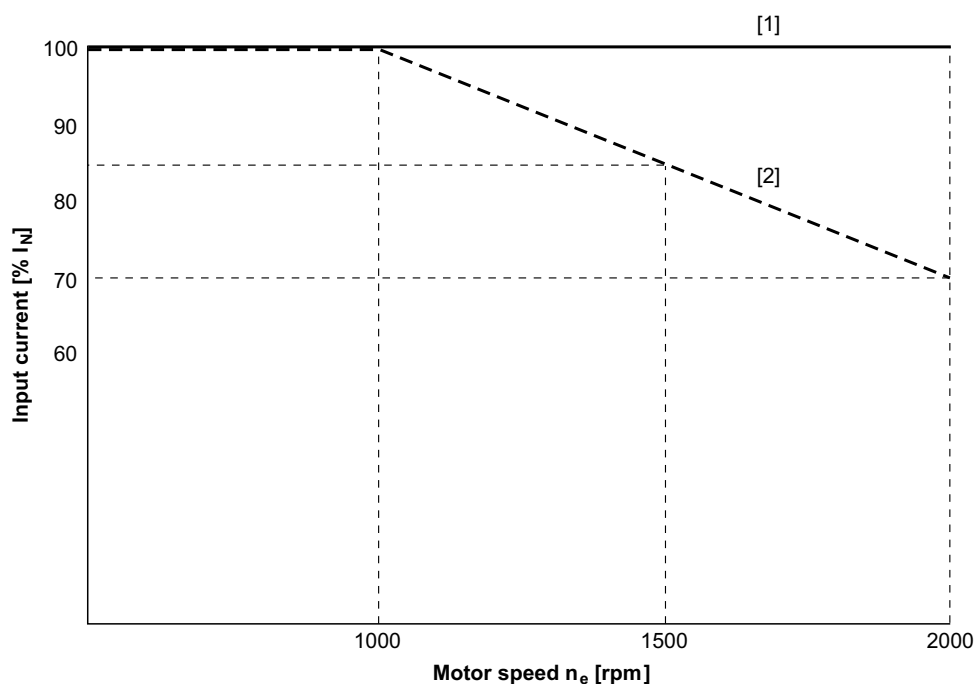
3.7.4 Derating factors for MGF..4 and MGF..4/ET



INFORMATION

This chapter does not apply to unit types without application option. You need not observe the following derating when operating units without application option.

For MOVIGEAR® MGF..4 and MGF..4/ET, you have to additionally observe the I_N reduction shown in the following figure:



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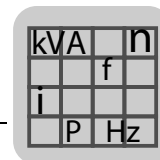
[1] Ambient temperature $\leq 35 \text{ }^\circ\text{C}$

[2] Ambient temperature = $40 \text{ }^\circ\text{C}$



INFORMATION

Derating is based on typical operating conditions with a supply voltage of 24 V (sensor supply, input voltage of STO input).



3.7.5 Technical data of the SBus interface

Standard	CAN specification 2.0 parts A and B
Baud rate	Can be set using DIP switch: 1000, 500 kBaud
ID range	3...775
Address	Can be set using DIP switch
Number of process data words	fixed setting: 3 PD
Cable length	depending on the baud rate, max. 50 m
Number of stations	max. 110 CAN stations (thereof max. 32 MOVIGEAR® DSC stations)
Interface	according to operating instructions
Type	CAN1
Profile	MOVILINK®
Electrical isolation	Yes
Connection technology	Terminal
Bus termination	according to operating instructions
Control/setpoint source Index 8461.0 / 8462.0	SBus 1
Timeout monitoring	Yes, via parameter index 8602.0 to 8615.0
Process data	Configuration using parameter index 8304.0 to 8309.0
Master/slave	No
Manual mode (MOVITOOLS® MotionStudio)	Yes
IPOS bus type	5



3.8 Technical data of MOVIGEAR® SNI-B

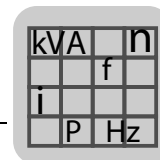
3.8.1 General technical data

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Torque class	M	200 Nm	400 Nm	
Supply voltages Permitted range	V_{line}	3 x AC 380 V - 5 % to AC 500 V + 10 %		
Line frequency	f_{line}	50 Hz ... 60 Hz		
Input current	I_N	1.52 A ($n_{Motor} = 2000$ rpm)	2.72 A ($n_{Motor} = 2000$ rpm)	3.2 A ($n_{Motor} = 2000$ rpm)
	$I_{maxStart}$	2.45 A	3.15 A	3.7 A
PWM frequency		4/8 kHz		
Interference immunity		EN 61800-3; 2nd environment (industrial environment)		
Interference emission		EN 61800-3 category C3 (class A group 2 of EN 55011)		
Climate class		EN 60721-3-3, class 3K3		
Storage temperature	ϑ_L	- 25 °C to + 70 °C (EN 60721-3-3)		
Proof of mechanical strength		according to EN 61800-5-1		
Degree of protection	IP	Standard: IP 65 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Possible restrictions regarding application options) With optional package for applications in wet areas: IP 66 to EN 60529 (MOVIGEAR® housing closed and all cable glands sealed off. Application options not permitted for this drive package)		
Duty cycle		S1, continuous (EN 60149-1-1 and 1-3)		
Type of cooling		Self-cooling to DIN 41751 and EN 61800-5-1		
Signaling functions		Display elements on housing to indicate the unit state		
Installation altitude	h	Up to $h \leq 1000$ m without restrictions. The following restrictions apply to heights ≥ 1000 : - From 1000 m to max. 4000 m: I_N reduction by 1% per 100 m - From 2000 m to max. 4000 m: U_N reduction by AC 6 V per 100 m Over 2000 m only overvoltage class 2; external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.		
Required preventive measures		Ground the unit		

3.8.2 Ambient temperature

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Ambient temperature	ϑ_A	0 °C to + 60 °C ¹⁾		
I_N reduction Ambient temperature		3 % I_N per K at 40 °C to 60 °C		

1) Observe the permitted temperature range of the oil to be used (see chapter "Lubricant table").



3.8.3 Motion control inputs

MOVIGEAR® type		MGF..2	MGF..4	MGF..4/ET
Input type	DI01 to DI04 ¹⁾	PLC-compatible according to EN 61131-2 (digital inputs type 1) $R_i \approx 3.0 \text{ k}\Omega$, $I_E \approx 10 \text{ mA}$, sampling interval 2 ms		
Number of inputs		4		
Signal level		+15 V to +30 V "1" = Contact closed -3 V to +5 V "0" = Contact open		

1) only in conjunction with optional plug connector

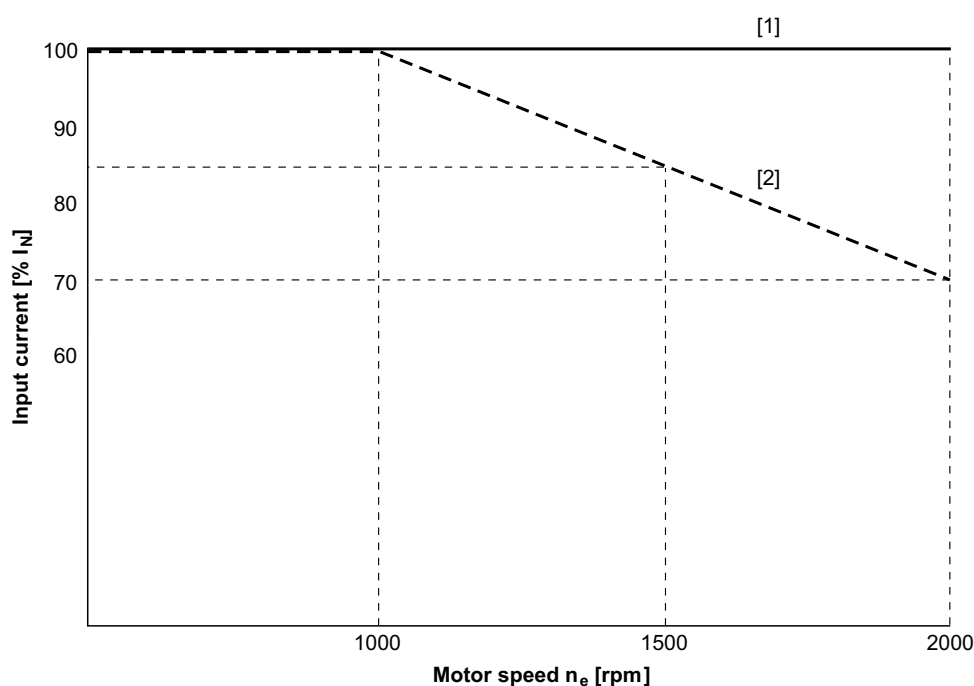
3.8.4 Derating factors for MGF..4 and MGF..4/ET



INFORMATION

This chapter does not apply to unit types without application option. You need not observe the following derating when operating units without application option.

For MOVIGEAR® MGF..4 and MGF..4/ET, you have to additionally observe the I_N reduction shown in the following figure:



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[1] Ambient temperature $\leq 35 \text{ °C}$

[2] Ambient temperature = 40 °C



INFORMATION

Derating is based on typical operating conditions with a supply voltage of 24 V (sensor supply, input voltage of STO input).



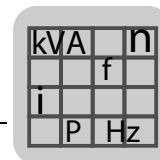
3.9 Technical data of application options

3.9.1 GIO12A application option

GIO12A application option	
Degree of protection	IP65
Number of inputs	4
Number of outputs	2
Connection technology	M12 plug connector (A-coded, female)
Input type	PLC-compatible according to EN 61131-2 (digital inputs type 3) R_i about 8 k Ω , sampling cycle 4 ms Signal level +11 V to +30 V "1" = Contact closed -3 V to +5 V "0" = Contact open
Output type	PLC-compatible to EN 61131-2, interference-voltage proof and short-circuit proof
Sensor/actuator supply	DC 24 V to EN 61131-2, Interference voltage proof and short-circuit proof
Permitted total current	250 mA (total of all connected sensors/actuators, maximum individual load: 250 mA)
Part number	1 821 897 0

3.9.2 GIO13A application option

GIO13A application option			
Binary inputs / binary outputs			
Number of binary inputs	4 (2 inputs can be used as primary frequency input)		
Primary frequency input	The primary frequency input function occupies a maximum of 2 digital inputs. The function is used to evaluate frequency input signals that are provided, for example, by a distance encoder (A/B tracks or only A track) or an external controller. The frequency value is then converted into a digital value for further processing. Input frequency range: 0 to 120 KHz Signal voltage: HTL signal level		
Input type	PLC-compatible according to EN 61131-2 (digital inputs type 3) R_i about 8 k Ω , sampling cycle 4 ms Signal level +11 V to +30 V "1" = Contact closed -3 V to +5 V "0" = Contact open		
Number of binary outputs	1		
Output type	Relay with change-over contact U_{max} = DC 30 V I_{min} = DC 100 mA I_{max} = DC 800 mA		
Analog inputs / analog outputs			
Number of analog inputs	1		
Analog input type	Differential input <table border="1"> <tr> <td>Voltage input U_{in} = DC 0 to +10V Resolution 10 bit Internal resistance R_i >10 kΩ</td><td>Current input I_{in} = DC 4 to 20 mA Resolution 10 bit Internal resistance R_i = 250 Ω</td></tr> </table>	Voltage input U_{in} = DC 0 to +10V Resolution 10 bit Internal resistance R_i >10 k Ω	Current input I_{in} = DC 4 to 20 mA Resolution 10 bit Internal resistance R_i = 250 Ω
Voltage input U_{in} = DC 0 to +10V Resolution 10 bit Internal resistance R_i >10 k Ω	Current input I_{in} = DC 4 to 20 mA Resolution 10 bit Internal resistance R_i = 250 Ω		
Number of analog outputs	1		
Analog output type	Output characteristics: 4 to 20 mA Max. output voltage: 25 V Short-circuit proof Resolution 10 bit		



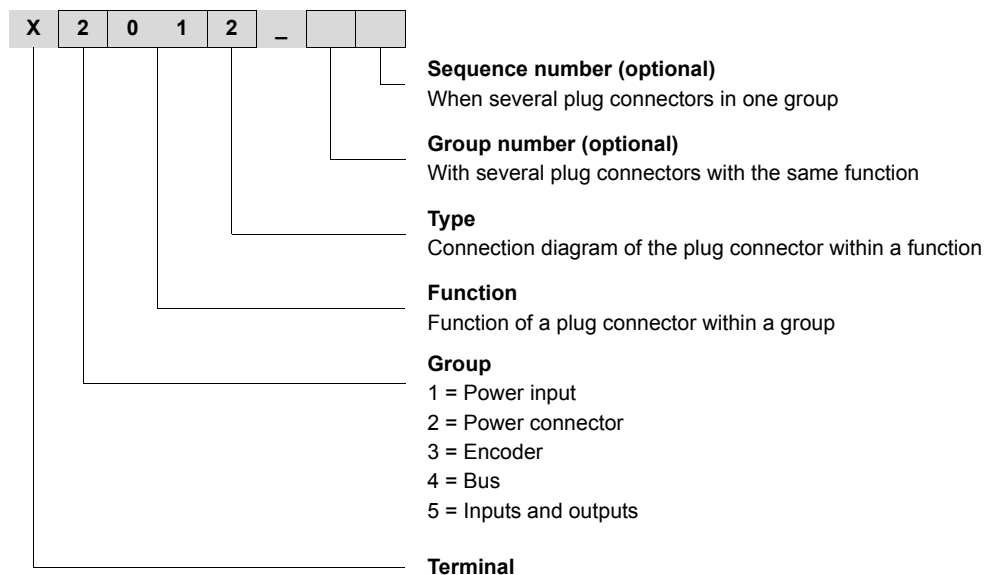
GIO13A application option	
General technical data	
Degree of protection	IP65 (only when installed)
Connection technology	M12 plug connector (A-coded, female)
Sensor/actuator supply	DC 24 V to EN 61131-2, Interference voltage proof and short-circuit proof
Permitted total current	140 mA (total of all connected sensors/actuators, maximum individual load: 140 mA)
Part number	1822 711 2



3.10 Optional plug connectors

3.10.1 Designation key

The designation of the plug connectors is specified according to the following key:



3.10.2 Connection cables

Connection cables are not included in the scope of delivery.

You can order prefabricated cables from SEW-EURODRIVE. These cables are described in the following chapters. Specify the part number and length of the required cable in your order.

The number and design of the required connection cables depend on the design of the units and the components to be connected. This is why not all cables that are listed are actually required.

The following figures show the different cable designs:

Cable	Length	Installation type
	Set length	Suitable for cable carrier installation
	Variable length	Not suitable for cable carrier installation



INFORMATION

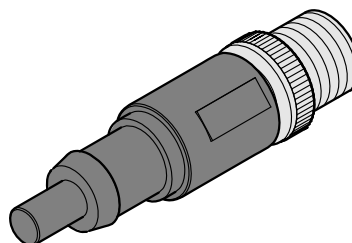
You find detailed information on the cable types in the chapter "Technical Data and Dimension Sheets/Connection Cables".

kVA	n
f	
i	
P	Hz

3.10.3 Jumper plug STO

The STO jumper plug can be connected to the STO plug connector of MOVIGEAR®. The STO jumper plug deactivates the safety functions of the MOVIGEAR®.

The following figure shows the STO jumper plug, part number 1 174 709 9:



18014399658394891



! DANGER

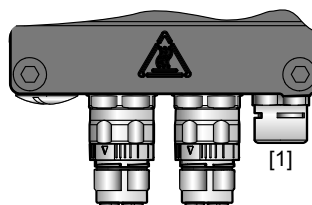
Safe disconnection of the MOVIGEAR® is not possible when the STO jumper plug is used.

Severe or fatal injuries.

- Use the STO jumper plug only if MOVIGEAR® is not required to perform any safety functions.

3.10.4 Restrictions in connection with the optional package for wet areas

In connection with the optional package for wet areas and mounting positions M5 and M6, the position for the STO plug connectors is occupied by the pressure compensation fitting [1]. In this case, plug connectors for STO are not possible:



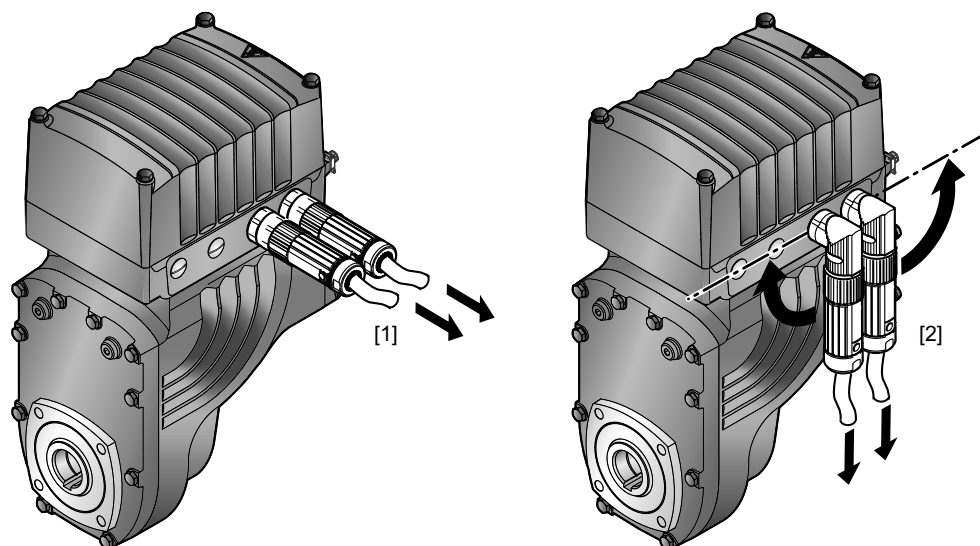
2446105355



3.10.5 Plug connector variants

The M23 plug connectors are available in the following variants:

- [1] "Straight" plug connector variant
- [2] "Right-angle" plug connector variant



2849146635

Once the mating connector has been plugged in, the "right-angle" connector can be adjusted without using additional tools.



NOTICE

Possible damage of the right-angle connector in case of rotation without mating connector.

- Irreparable damage to the thread, damage to the sealing surface.

Do not use pliers to adjust the right-angle connector before connecting it.



NOTICE

The "right-angle" variant is designed to be adjusted only for assembly and installation of the drive unit.

- Damage to the plug connector.

Do not turn the plug connector regularly once it has been installed. Do not align the right-angle connector frequently.

3.11 Optional plug connectors for MOVIGEAR® DBC-B

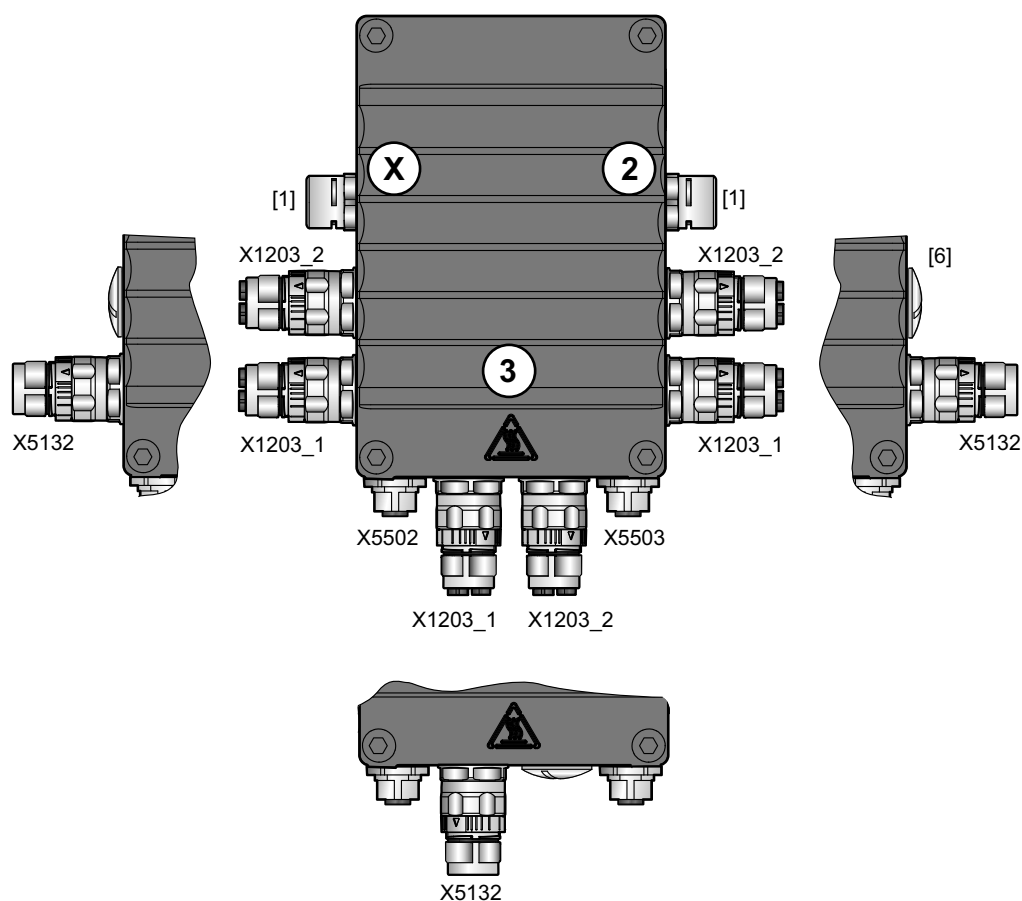
3.11.1 Plug connector positions

The following figure shows the possible plug connector positions. A difference is made between plug connectors with selectable position and plug connectors with fixed position:

Plug connector	Color	Position	Location
X5132: Digital inputs/outputs	–	As required	X, 2 or 3, not together with X1203_1, X1203_2
X5502: STO – IN	Orange	Fixed	3 (left)
X5503: STO – OUT	Orange	Fixed	3 (right)
X1203_1: AC 400 V connection ¹⁾	Black	As required	X, 2 or 3, not together with X5132
X1203_2: AC 400 V connection	Black	As required	X, 2 or 3, not together with X5132
[1] Pressure compensation ²⁾	–	Fixed	Depends on mounting position

1) Plug connector X1203_1 is also available separately (i.e. without plug connector X1203_2).

2) Only in conjunction with the optional package for applications in wet areas.



2446120843



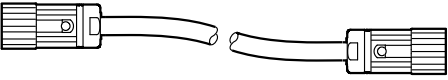
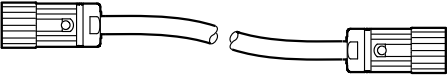
3.11.2 X1203_1 and X1203_2: AC 400 V connection

The following table provides information about this connection:

Function
AC 400 V connection for supplying the unit/for looping through
Connection type
M23, SEW insert, SpeedTec-capable, company: Intercontec, female, coding ring: black, protected against contact
Wiring diagram
2497125387

Assignment		
No.	Name	Function
A	L1	Power supply connection phase L1
B	L2	Power supply connection phase L2
C	L3	Power supply connection phase L3
D	n.c.	Not connected
PE	PE	PE connection
1	n.c.	Not connected
2	n.c.	Not connected
3	n.c.	Not connected
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	n.c.	Not connected
8	n.c.	Not connected
9	n.c.	Not connected
10	n.c.	Not connected
SHLD	n.c.	Not connected

Connection cables The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type	Cable cross section
Part number 1 812 746 0  M23, coding ring: Black M23, coding ring: Black	Variable 	2.5 mm ²
Part number 1 812 747 9  M23, coding ring: Black Open	Variable 	2.5 mm ²
Part number 1 812 748 7  M23, coding ring: Black M23, coding ring: Black	Variable 	4 mm ²
Part number 1 812 749 5  M23, coding ring: Black Open	Variable 	4 mm ²

**Connection of
cables with open
end**

The following table shows the conductor assignment of the cable with the following part number:

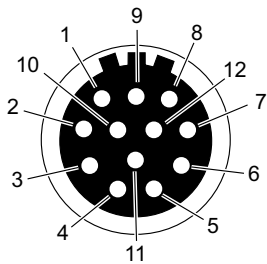
1 331 276 6 and 1 331 277 4

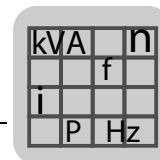
Signal name	Core color / designation
L1	Black / 1
L2	Black / 2
L3	Black / 3
PE	Green/yellow



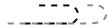
3.11.3 X5132: Digital inputs/outputs

The following table provides information about this connection:

Function		
Digital inputs/outputs for MOVIGEAR®		
Connection type		
M23, P insert 12-pole, SpeedTec-capable, Intercontec, female, 0°-coded		
Wiring diagram		
		
2264820107		
Assignment		
No.	Name	Function
1	DI01	Binary input DI01
2	DI02	Binary input DI02
3	DI03	Binary input DI03
4	DI04	Binary input DI04
5	n.c.	Not connected
6	K1a	Signal relay K1a
7	K1b	Signal relay K1b
8	+24V_O	DC 24 V output
9	0V24_O	0V24 reference potential
10	n.c.	Not connected
11	n.c.	Not connected
12	FE	Equipotential bonding/functional ground



Connection cables The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 174 145 7  M23, 12-pole, 0°-coded Open	Variable 

**Connection of
cables with open
end**

The following table shows the conductor assignment of the cable with the following part number:

1 174 145 7

Signal name	Color coding
DI01	Pink
DI02	Gray
DI03	Red
DI04	Blue
Reserved	Yellow
K1a	Green
K1b	Violet
+24V_O	Black
0V24_O	Brown
Reserved	White
Reserved	Gray/pink
FE	Red/blue

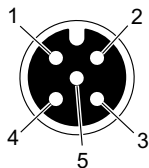


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DBC-B

3.11.4 X5502: STO – IN

The following table provides information about this connection:

Function		
Input for safe torque off (STO)		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
		
2264816267		
Assignment		
No.	Name	Function
1	+24V_O	DC 24 V output
2	STO –	Input STO –
3	0V24_O	0V24 reference potential
4	STO+	Input STO+
5	res.	Reserved

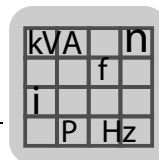


! DANGER

No safe disconnection of MOVIGEAR®.

Severe or fatal injuries.

- Do not use the 24 V output (pins 1 and 3) for safety-related applications with MOVIGEAR®.
- The STO input may only be jumpered with 24 V if MOVIGEAR® does not perform any safety function.



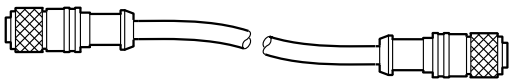
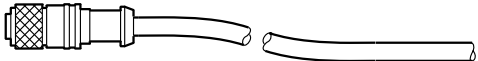
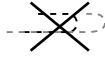
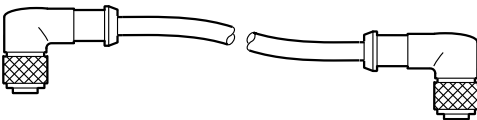
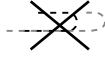
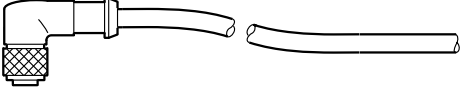
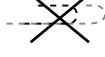
Connection cables



INFORMATION

Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 497 6  M12, 5-pole, A-coded Open	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 739 8  M12, 5-pole, A-coded Open	Variable 

Connection of cables with open end

The following table shows the conductor assignment of the cable with the following part number:

1 812 497 6 and 1 812 739 8

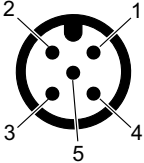
Signal name	Core color / designation
STO –	Black / 1
STO+	Black / 2



Technical Data and Dimension Drawings Optional plug connectors for MOVIGEAR® DBC-B

3.11.5 X5503: STO – OUT

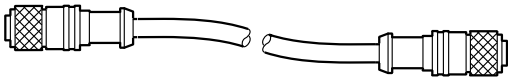
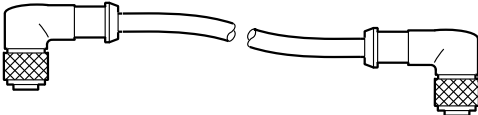
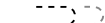
The following table provides information about this connection:

Function		
Connection for safe torque off (STO) for looping through		
Connection type		
M12, 5-pole, male, A-coded		
Wiring diagram		
		
2264818187		
Assignment		
No.	Name	Function
1	res.	Reserved
2	STO –	Output STO – (to loop through)
3	res.	Reserved
4	STO+	Output STO + (to loop through)
5	res.	Reserved

Connection cables

	INFORMATION
	Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 

3.12 Optional plug connectors for MOVIGEAR® DAC-B

3.12.1 Plug connector positions

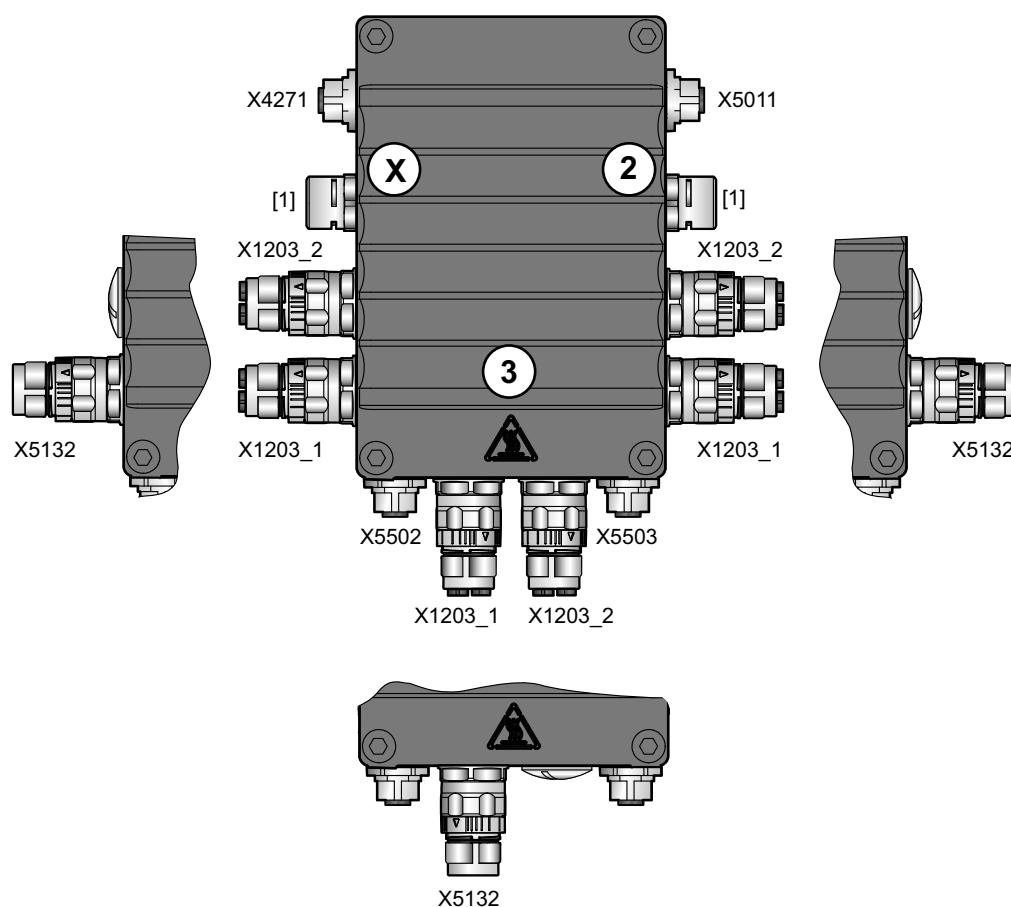
The following figure shows the possible plug connector positions. A difference is made between plug connectors with selectable position and plug connectors with fixed position:

Plug connector	Color	Position	Location
X5132: Digital inputs/outputs	–	As required	X, 2 or 3, not together with X1203_1, X1203_2
X5502: STO – IN	Orange	Fixed	3 (left)
X5503: STO – OUT	Orange	Fixed	3 (right)
X4271: AS-Interface communication interface ¹⁾	Yellow	Fixed	X
X5011: AS-Interface sensors ¹⁾	Black	Fixed	2
X1203_1: AC 400 V connection ²⁾	Black	As required	X, 2 or 3, not together with X5132
X1203_2: AC 400 V connection	Black	As required	X, 2 or 3, not together with X5132
[1] Pressure compensation ³⁾	–	Fixed	Depends on mounting position

1) Standard scope of delivery

2) Plug connector X1203_1 is also available separately (i.e. without plug connector X1203_2).

3) Only in conjunction with the optional package for applications in wet areas.



2446060811

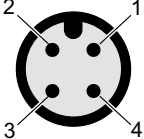


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DAC-B

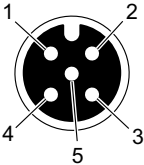
3.12.2 X4271: AS-Interface communication interface

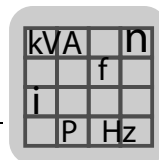
The following table provides information about this connection:

Function		
Connection of AS-Interface data cable		
Connection type		
M12, 4-pole, male, A-coded		
Wiring diagram		
		
2384154763		
Assignment		
No.	Name	Function
1	AS+	AS-Interface data cable (+)
2	res.	Reserved
3	AS-	AS-Interface data cable (-)
4	res.	Reserved

3.12.3 X5011: AS-Interface sensor connection

The following table provides information about this connection:

Function		
Connection of AS-Interface sensors		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
		
2264816267		
Assignment		
No.	Name	Function
1	+24V_SEN	DC 24 V voltage supply for sensors
2	DI3	DI3 sensor input
3	0V24_SEN	0V24 reference potential for sensors
4	DI2	DI2 sensor input
5	res.	Reserved



3.12.4 X1203_1 and X1203_2: AC 400 V connection

The following table provides information about this connection:

Function
AC 400 V connection for supplying the unit/for looping through
Connection type
M23, SEW insert, SpeedTec-capable, company: Intercontec, female, coding ring: black, protected against contact
Wiring diagram
2497125387

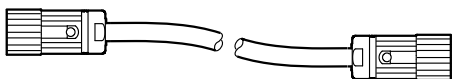
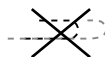
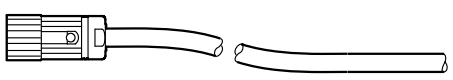
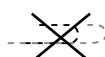
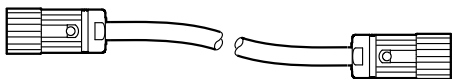
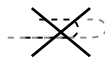
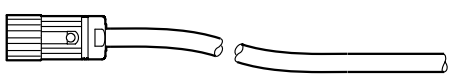
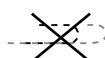
Assignment		
No.	Name	Function
A	L1	Power supply connection phase L1
B	L2	Power supply connection phase L2
C	L3	Power supply connection phase L3
D	n.c.	Not connected
PE	PE	PE connection
1	n.c.	Not connected
2	n.c.	Not connected
3	n.c.	Not connected
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	n.c.	Not connected
8	n.c.	Not connected
9	n.c.	Not connected
10	n.c.	Not connected
SHLD	n.c.	Not connected



Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DAC-B

Connection cables The following table provides an overview of the cables available for this connection:

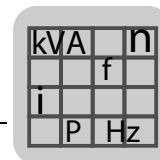
Connection cable	Length/ Installation type	Cable cross section
Part number 1 812 746 0  M23, coding ring: Black M23, coding ring: Black	Variable 	2.5 mm ²
Part number 1 812 747 9  M23, coding ring: Black Open	Variable 	2.5 mm ²
Part number 1 812 748 7  M23, coding ring: Black M23, coding ring: Black	Variable 	4 mm ²
Part number 1 812 749 5  M23, coding ring: Black Open	Variable 	4 mm ²

**Connection of
cables with open
end**

The following table shows the conductor assignment of the cable with the following part number:

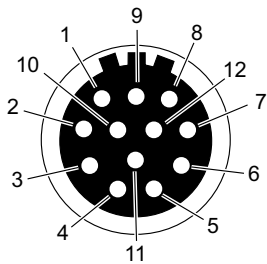
1 331 276 6 and 1 331 277 4

Signal name	Core color / designation
L1	Black / 1
L2	Black / 2
L3	Black / 3
PE	Green/yellow



3.12.5 X5132: Digital inputs/outputs

The following table provides information about this connection:

Function		
Digital inputs/outputs for MOVIGEAR®		
Connection type		
M23, P insert 12-pole, SpeedTec-capable, Intercontec, female, 0°-coded		
Wiring diagram		
		
2264820107		
Assignment		
No.	Name	Function
1	DI01	Binary input DI01 (CW/stop)
2	DI02	Binary input DI02 (CCW/stop)
3	DI03	Binary input DI03 (setpoint f1/f2)
4	DI04	Binary input DI04 (changeover automatic/local mode)
5	n.c.	Not connected
6	K1a	Signal relay K1a
7	K1b	Signal relay K1b
8	+24V_O	DC 24 V output
9	0V24_O	0V24 reference potential
10	n.c.	Not connected
11	n.c.	Not connected
12	FE	Equipotential bonding/functional ground

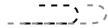


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DAC-B

Connection cables

The following table provides an overview of the cables available for this connection:

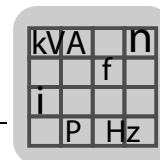
Connection cable	Length/ Installation type
Part number 1 174 145 7  M23, 12-pole, 0°-coded Open	Variable 

Connection of cables with open end

The following table shows the conductor assignment of the cable with the following part number:

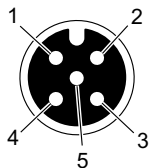
1 174 145 7

Signal name	Color coding
DI01	Pink
DI02	Gray
DI03	Red
DI04	Blue
Reserved	Yellow
K1a	Green
K1b	Violet
+24V_O	Black
0V24_O	Brown
Reserved	White
Reserved	Gray/pink
FE	Red/blue



3.12.6 X5502: STO – IN

The following table provides information about this connection:

Function		
Input for safe torque off (STO)		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
		
2264816267		
Assignment		
No.	Name	Function
1	+24V_O	DC 24 V output
2	STO –	Input STO –
3	0V24_O	0V24 reference potential
4	STO+	Input STO+
5	res.	Reserved



! DANGER

No safe disconnection of MOVIGEAR®.

Severe or fatal injuries.

- Do not use the 24 V output (pins 1 and 3) for safety-related applications with MOVIGEAR®.
- The STO input may only be jumpered with 24 V if MOVIGEAR® does not perform any safety function.



Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DAC-B

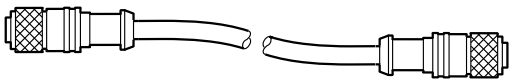
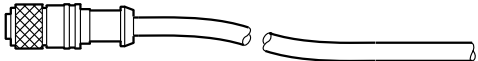
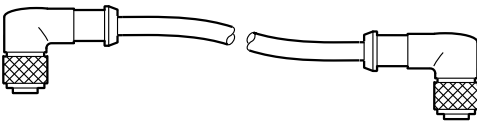
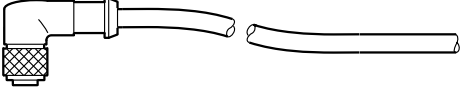
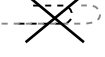
Connection cables



INFORMATION

Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

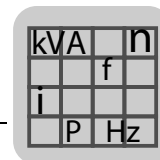
Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 497 6  M12, 5-pole, A-coded Open	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 739 8  M12, 5-pole, A-coded Open	Variable 

Connection of cables with open end

The following table shows the conductor assignment of the cable with the following part number:

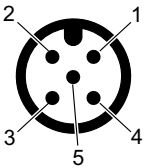
1 812 497 6 and 1 812 739 8

Signal name	Core color / designation
STO –	Black / 1
STO+	Black / 2



3.12.7 X5503: STO – OUT

The following table provides information about this connection:

Function		
Connection for safe torque off (STO) for looping through		
Connection type		
M12, 5-pole, male, A-coded		
Wiring diagram		
		
2264818187		
Assignment		
No.	Name	Function
1	res.	Reserved
2	STO –	Output STO – (to loop through)
3	res.	Reserved
4	STO+	Output STO + (to loop through)
5	res.	Reserved

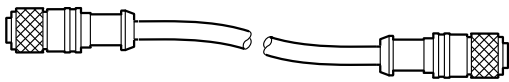
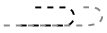
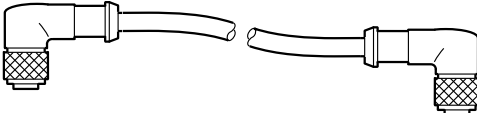
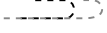
Connection cables



INFORMATION

Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 



3.13 Optional plug connectors for MOVIGEAR® DSC-B

3.13.1 Plug connector positions

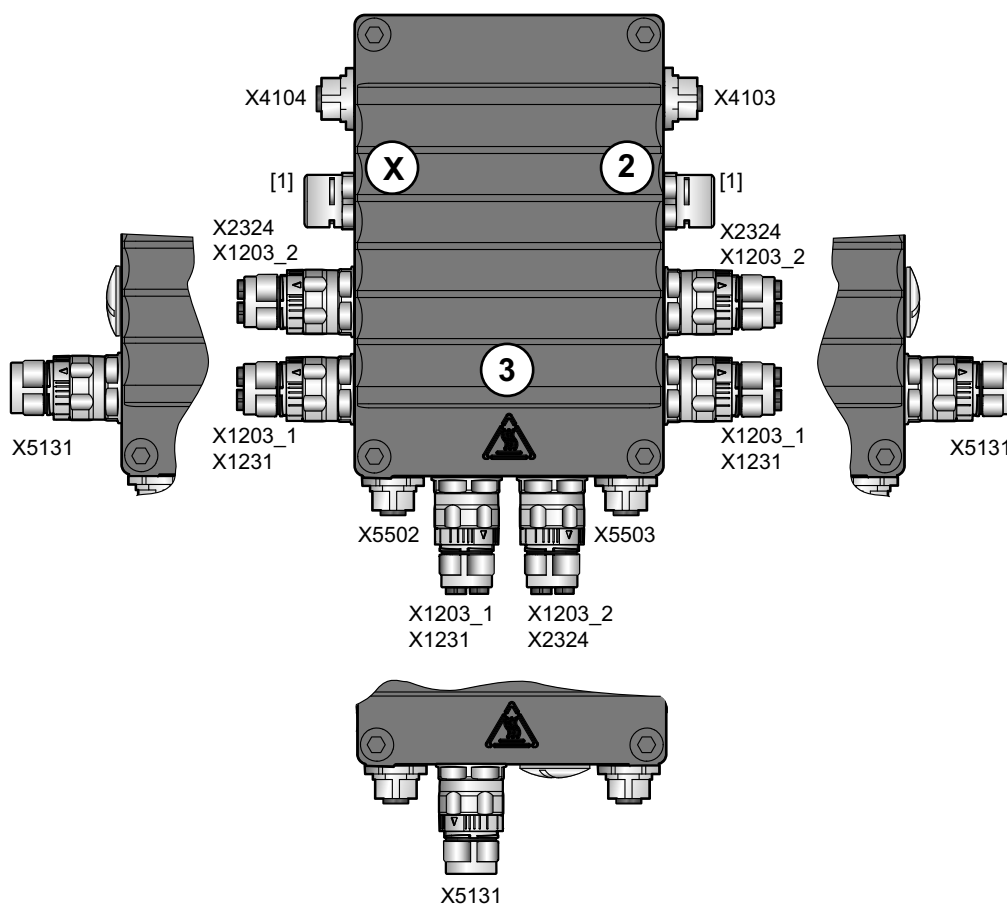
The following figure shows the possible plug connector positions. A difference is made between plug connectors with selectable position and plug connectors with fixed position:

Plug connector	Color	Position	Location
X5131: Digital inputs/outputs	–	As required	X, 2 or 3, not together with X1231, X2324, X1203_1, X1203_2
X5502: STO – IN	Orange	Fixed	3 (left)
X5503: STO – OUT	Orange	Fixed	3 (right)
X4104: CAN bus – system bus – input	Violet	Fixed	X
X4103: CAN bus – system bus – output	Violet	Fixed	2
X1231: AC 400 V input and CAN bus ¹⁾	Violet	As required	X, 2 or 3, not together with X5131
X2324: AC 400 V output and CAN bus	Violet		
X1203_1: AC 400 V connection ²⁾	Black	As required	X, 2 or 3, not together with X5131
X1203_2: AC 400 V connection	Black		
[1] Pressure compensation ³⁾	–	Fixed	Depends on mounting position

1) The plug connector X1231 is also available separately (i.e. without plug connector X2324).

2) The plug connector X1203_1 is also available separately (i.e. without plug connector X1203_2:).

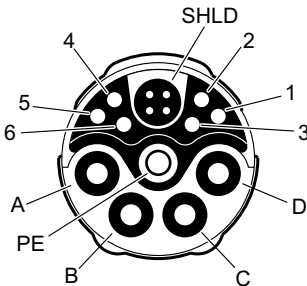
3) Only in conjunction with the optional package for applications in wet areas.



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3.13.2 X1203_1 and X1203_2: AC 400 V connection

The following table provides information about this connection:

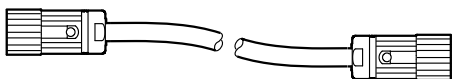
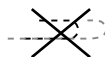
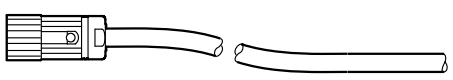
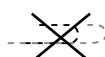
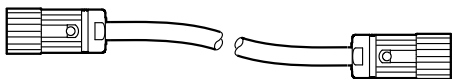
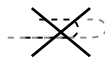
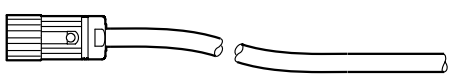
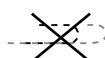
Function		
AC 400 V connection for supplying the unit/for looping through		
Connection type		
M23, SEW insert, SpeedTec-capable, company: Intercontec, female, coding ring: black, protected against contact		
Wiring diagram		
		
2497125387		
Assignment		
No.	Name	Function
A	L1	Power supply connection phase L1
B	L2	Power supply connection phase L2
C	L3	Power supply connection phase L3
D	n.c.	Not connected
PE	PE	PE connection
1	n.c.	Not connected
2	n.c.	Not connected
3	n.c.	Not connected
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	n.c.	Not connected
8	n.c.	Not connected
9	n.c.	Not connected
10	n.c.	Not connected
SHLD	n.c.	Not connected



Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DSC-B

Connection cables The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type	Cable cross section
Part number 1 812 746 0  M23, coding ring: Black M23, coding ring: Black	Variable 	2.5 mm ²
Part number 1 812 747 9  M23, coding ring: Black Open	Variable 	2.5 mm ²
Part number 1 812 748 7  M23, coding ring: Black M23, coding ring: Black	Variable 	4 mm ²
Part number 1 812 749 5  M23, coding ring: Black Open	Variable 	4 mm ²

**Connection of
cables with open
end**

The following table shows the conductor assignment of the cable with the following part number:

1 331 276 6 and 1 331 277 4

Signal name	Core color / designation
L1	Black / 1
L2	Black / 2
L3	Black / 3
PE	Green/yellow

3.13.3 X1231: AC 400 V input and CAN bus

The following table provides information about this connection:

Function
AC 400 V unit supply input, CAN bus (system bus)
Connection type
M23, SEW insert, SpeedTec-capable, company: Intercontec, female, coding ring: Violet, protected against contact
Wiring diagram

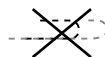
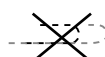
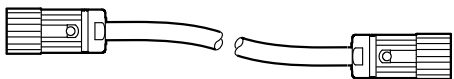
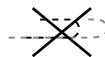
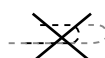
Assignment		
No.	Name	Function
A	L1	Power supply connection phase L1
B	L2	Power supply connection phase L2
C	L3	Power supply connection phase L3
D	n.c.	Not connected
PE	PE	PE connection
1	n.c.	Not connected
2	n.c.	Not connected
3	n.c.	Not connected
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	CAN_L	CAN data line (low)
8	CAN_GND	Reference potential CAN bus
9	CAN_H	CAN data line (high)
10	n.c.	Not connected
SHLD	CAN_SHLD	Shield/equipotential bonding CAN bus



Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DSC-B

Connection cables The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type	Cable cross section/cable type
Part number 1 812 742 8  M23, coding ring: Violet M23, coding ring: Violet	Variable 	2.5 mm ² LEONI Elocab Type: EHRK 016281 REV. 00
Part number 1 812 743 6  M23, coding ring: Violet Open	Variable 	2.5 mm ² LEONI Elocab Type: EHRK 016281 REV. 00
Part number 1 812 744 4  M23, coding ring: Violet M23, coding ring: Violet	Variable 	4 mm ² LEONI Elocab Type: EHRK 018473 REV.00
Part number 1 812 745 2  M23, coding ring: Violet Open	Variable 	4 mm ² LEONI Elocab Type: EHRK 018473 REV.00

**Connection of
cables with open
end**

The below table shows the conductor assignment of the cable with part numbers 1 328 477 0 and 1 331 363 0

Signal name	Core color / designation
L1	Black / 1
L2	Black / 2
L3	Black / 3
PE	Green/yellow
CAN_L	Blue
CAN_GND	Black
CAN_H	White

3.13.4 X2324: AC 400 V output and CAN bus

The following table provides information about this connection:

Function
AC 400 V output for looping, CAN bus (system bus)
Connection type
M23, SEW insert, SpeedTec-capable, company: Intercontec, female, coding ring: Violet, protected against contact
Wiring diagram

Assignment		
No.	Name	Function
A	L1	Power supply connection phase L1
B	L2	Power supply connection phase L2
C	L3	Power supply connection phase L3
D	n.c.	Not connected
PE	PE	PE connection
1	n.c.	Not connected
2	n.c.	Not connected
3	n.c.	Not connected
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	CAN_L	CAN data line (low)
8	CAN_GND	Reference potential CAN bus
9	CAN_H	CAN data line (high)
10	n.c.	Not connected
SHLD	CAN_SHLD	Shield/equipotential bonding CAN bus



INFORMATION

When the bus terminating resistor is activated (also see chapter "Startup"), the CAN bus is separated. The input and output end of the plug connectors must not be confused.

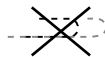
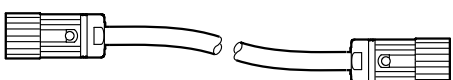


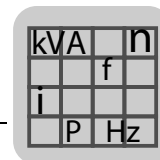
Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DSC-B

Connection cables

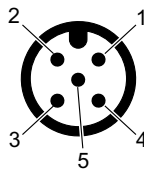
The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type	Cable cross section/cable type
Part number 1 812 742 8  M23, coding ring: Violet M23, coding ring: Violet	Variable 	2.5 mm ² LEONI Elocab Type: EHRK 016281 REV. 00
Part number 1 812 745 2  M23, coding ring: Violet M23, coding ring: Violet	Variable 	4 mm ² LEONI Elocab Type: EHRK 018473 REV.00



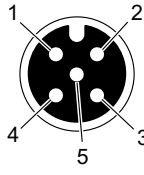
3.13.5 X4104: CAN bus – system bus – input

The following table provides information about this connection:

Function		
CAN system bus (system bus) - input (electrically isolated)		
Connection type		
M12, 5-pole, male, A-coded		
Wiring diagram		
		
2264818187		
Assignment		
No.	Name	Function
1	Drain	Shield/equipotential bonding CAN bus
2	res.	Reserved
3	CAN_GND	Reference potential CAN bus
4	CAN_H	CAN data line (high)
5	CAN_L	CAN data line (low)

3.13.6 X4103: CAN bus – system bus – output

The following table provides information about this connection:

Function		
CAN system bus (system bus) - output (electrically isolated)		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
		
2264816267		
Assignment		
No.	Name	Function
1	Drain	Shield/equipotential bonding CAN bus
2	res.	Reserved
3	GND	Reference potential CAN bus
4	CAN_H	CAN data line (high)
5	CAN_L	CAN data line (low)

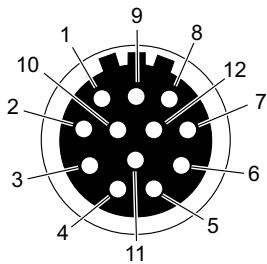


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DSC-B

3.13.7 X5131: Digital inputs/outputs

The following table provides information about this connection:

Function
Digital inputs/outputs for MOVIGEAR® MotionControl
Connection type
M23, P insert 12-pole, SpeedTec-capable, Intercontec, female, 0°-coded
Wiring diagram

2264820107

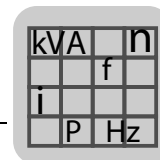
Assignment			
No.	Name	Function Motion control inputs DIP switch S2/3 = OFF	Function Local mode DIP switch S2/3 = ON
1	DI01	Sensor input DI01	CW/stop
2	DI02	Sensor input DI02	CCW/stop
3	DI03	Sensor input DI03	Setpoint f1/f2
4	DI04	Sensor input DI04	Changeover automatic/local mode
5	n.c.	Not connected	Not connected
6	n.c.	Not connected	Not connected
7	n.c.	Not connected	Not connected
8	+24V_O	Reserved	DC 24 V output
9	0V24V_O	Reserved	0V24 reference potential
10	0V24V_SEN	0V24 reference potential for sensors ¹⁾ Must be supplied via terminals	Reserved
11	+24V_SEN	DC 24 V sensor supply ¹⁾ Must be supplied via terminals	Reserved
12	FE	Equipotential bonding/functional ground	Equipotential bonding/functional ground

1) See operating instructions, chapter "Connecting MOVIGEAR®"

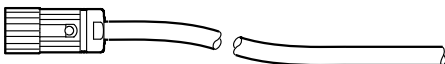
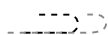


INFORMATION

Use actuator/sensor distributors with 4 slots for the sensor inputs. Use the DC 24 V output only for local operation.



Connection cables The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 174 145 7  M23, 12-pole, 0°-coded Open	Variable 

**Connection of
cables with open
end**

The following table shows the conductor assignment of the cable with the following part number:

1 174 145 7

Signal name	Color coding
DI01	Pink
DI02	Gray
DI03	Red
DI04	Blue
Reserved	Yellow
Reserved	Green
Reserved	Violet
+24V_O	Black
0V24_O	Brown
0V24_SEN	White
+24V_SEN	Gray/pink
FE	Red/blue

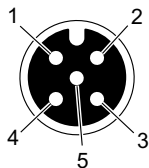


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DSC-B

3.13.8 X5502: STO – IN

The following table provides information about this connection:

Function		
Input for safe torque off (STO)		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
		
2264816267		
Assignment		
No.	Name	Function
1	+24V_O	DC 24 V output
2	STO –	Input STO –
3	0V24_O	0V24 reference potential
4	STO+	Input STO+
5	res.	Reserved

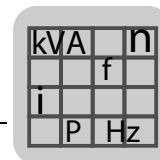


! DANGER

No safe disconnection of MOVIGEAR®.

Severe or fatal injuries.

- Do not use the 24 V output (pins 1 and 3) for safety-related applications with MOVIGEAR®.
- The STO input may only be jumpered with 24 V if MOVIGEAR® does not perform any safety function.



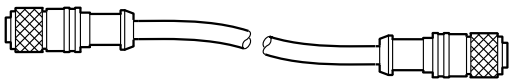
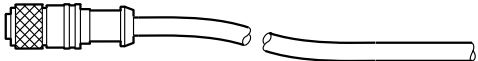
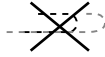
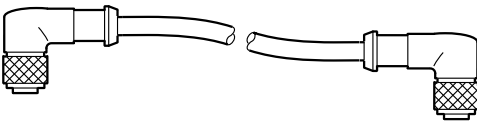
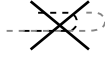
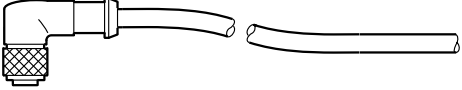
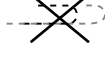
Connection cables



INFORMATION

Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 497 6  M12, 5-pole, A-coded Open	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 739 8  M12, 5-pole, A-coded Open	Variable 

Connection of cables with open end

The following table shows the conductor assignment of the cable with the following part number:

1 812 497 6 and 1 812 739 8

Signal name	Core color / designation
STO –	Black / 1
STO+	Black / 2

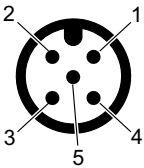


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® DSC-B

3.13.9 X5503: STO – OUT

The following table provides information about this connection:

Function		
Connection for safe torque off (STO) for looping through		
Connection type		
M12, 5-pole, male, A-coded		
Wiring diagram		
		
2264818187		
Assignment		
No.	Name	Function
1	res.	Reserved
2	STO –	Output STO – (to loop through)
3	res.	Reserved
4	STO+	Output STO + (to loop through)
5	res.	Reserved

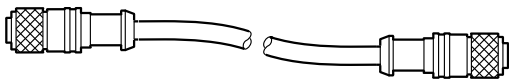
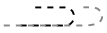
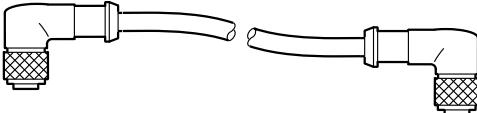
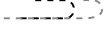
Connection cables



INFORMATION

Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 

3.14 Optional plug connectors for MOVIGEAR® SNI-B

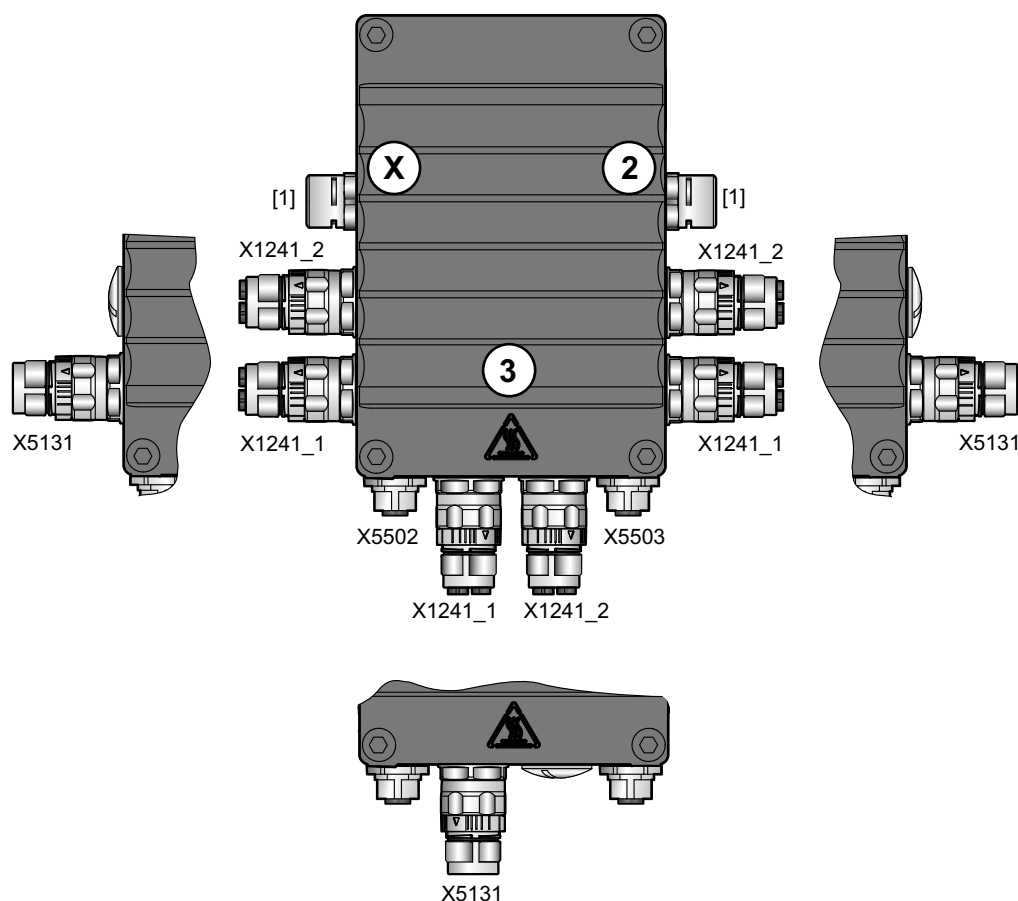
3.14.1 Plug connector positions

The following figure shows the possible plug connector positions. A difference is made between plug connectors with selectable position and plug connectors with fixed position:

Plug connector	Color	Position	Location
X5131: Digital inputs/outputs	–	As required	X, 2 or 3, not together with X1241_1, X1241_2
X5502: STO – IN	Orange	Fixed	3 (left)
X5503: STO – OUT	Orange	Fixed	3 (right)
X1241_1: AC 400 V connection with SNI ¹⁾	Red	As required	X, 2 or 3, not together with X5131
X1241_2: AC 400 V connection with SNI	Red	As required	X, 2 or 3, not together with X5131
[1] Pressure compensation ²⁾	–	Fixed	Depends on mounting position

1) Plug connector X1241_1 is also available separately (i.e. without plug connector X1241_2).

2) Only in conjunction with the optional package for applications in wet areas.



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Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® SNI-B

3.14.2 X1241_1 and X1241_2: AC 400 V connection with SNI

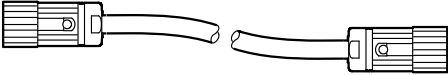
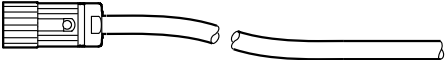
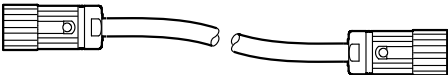
The following table provides information about this connection:

Function		
AC 400 V connection for supplying the unit/for looping through With Single Line Network Installation (SNI)		
Connection type		
M23, SEW insert, SpeedTec-capable, company: Intercontec, female, coding ring: Red, protected against contact		
Wiring diagram		
2497125387		
Assignment		
No.	Name	Function
A	L1_SNI	Actuator supply phase L1 with SNI communication
B	L2_SNI	Actuator supply phase L2 with SNI communication
C	L3_SNI	Actuator supply phase L3 with SNI communication
D	n.c.	Not connected
PE	PE	PE connection
1	n.c.	Not connected
2	n.c.	Not connected
3	n.c.	Not connected
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	n.c.	Not connected
8	n.c.	Not connected
9	n.c.	Not connected
10	n.c.	Not connected
SHLD	n.c.	Not connected



INFORMATION

Due to the communication method, you must observe the order of the line phases L1, L2, L3 between the SNI controller and MOVIGEAR® SNI 1 to 10.

Connection cable	Length/ Installation type	Cable cross section/cable type
Part number 1 812 750 9  M23, coding ring: Red M23, coding ring: Red	Variable 	2.5 mm ² HELUKABEL TOPFLEX® – EMV- UV-2YSLCYK-J
Part number 1 812 751 7  M23, coding ring: Red Open	Variable 	2.5 mm ² HELUKABEL TOPFLEX® – EMV- UV-2YSLCYK-J
Part number 1 812 752 5  M23, coding ring: Red M23, coding ring: Red	Variable 	4 mm ² HELUKABEL TOPFLEX® – EMV- UV-2YSLCYK-J
Part number 1 812 753 3  M23, coding ring: Red Open	Variable 	4 mm ² HELUKABEL TOPFLEX® – EMV- UV-2YSLCYK-J

The following table shows the conductor assignment of the cable with the following part number:

Signal name	Color coding
L1_SNI	Brown
L2_SNI	Black
L3_SNI	Gray
PE	Green/yellow

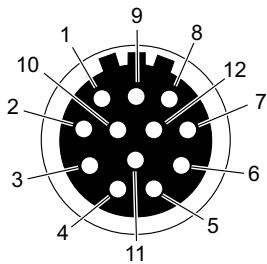


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® SNI-B

3.14.3 X5131: Digital inputs/outputs

The following table provides information about this connection:

Function
Digital inputs/outputs for MOVIGEAR® MotionControl
Connection type
M23, P insert 12-pole, SpeedTec-capable, Intercontec, female, 0°-coded
Wiring diagram

2264820107

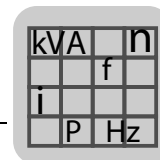
Assignment			
No.	Name	Function Motion control inputs DIP switch S2/3 = OFF	Function Local mode DIP switch S2/3 = ON
1	DI01	Sensor input DI01	CW/stop
2	DI02	Sensor input DI02	CCW/stop
3	DI03	Sensor input DI03	Setpoint f1/f2
4	DI04	Sensor input DI04	Changeover automatic/local mode
5	n.c.	Not connected	Not connected
6	n.c.	Not connected	Not connected
7	n.c.	Not connected	Not connected
8	+24V_O	Reserved	DC 24 V output
9	0V24V_O	Reserved	0V24 reference potential
10	0V24V_SEN	0V24 reference potential for sensors ¹⁾ Must be supplied via terminals	Reserved
11	+24V_SEN	DC 24 V sensor supply ¹⁾ Must be supplied via terminals	Reserved
12	FE	Equipotential bonding/functional ground	Equipotential bonding/functional ground

1) See operating instructions, chapter "Connecting MOVIGEAR®"

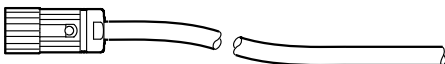
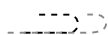


INFORMATION

Use actuator/sensor distributors with 4 slots for the sensor inputs. Use the DC 24 V output only for local operation.



Connection cables The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 174 145 7  M23, 12-pole, 0°-coded Open	Variable 

**Connection of
cables with open
end**

The following table shows the conductor assignment of the cable with the following part number:

1 174 145 7

Signal name	Color coding
DI01	Pink
DI02	Gray
DI03	Red
DI04	Blue
Reserved	Yellow
Reserved	Green
Reserved	Violet
+24V_O	Black
0V24_O	Brown
0V24_SEN	White
+24V_SEN	Gray/pink
FE	Red/blue



Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® SNI-B

3.14.4 X5502: STO – IN

The following table provides information about this connection:

Function		
Input for safe torque off (STO)		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
2264816267		
Assignment		
No.	Name	Function
1	+24V_O	DC 24 V output
2	STO –	Input STO –
3	0V24_O	0V24 reference potential
4	STO+	Input STO+
5	res.	Reserved

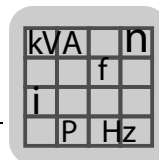


! DANGER

No safe disconnection of MOVIGEAR®.

Severe or fatal injuries.

- Do not use the 24 V output (pins 1 and 3) for safety-related applications with MOVIGEAR®.
- The STO input may only be jumpered with 24 V if MOVIGEAR® does not perform any safety function.



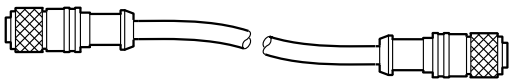
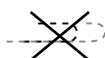
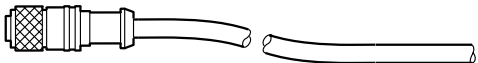
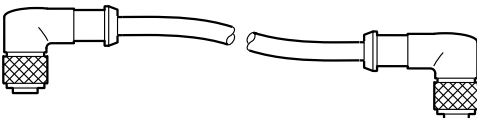
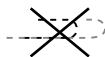
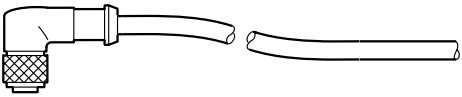
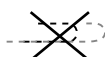
Connection cables



INFORMATION

Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 497 6  M12, 5-pole, A-coded Open	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 739 8  M12, 5-pole, A-coded Open	Variable 

Connection of cables with open end

The following table shows the conductor assignment of the cable with the following part number:

1 812 497 6 and 1 812 739 8

Signal name	Core color / designation
STO –	Black / 1
STO+	Black / 2

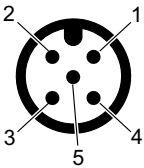


Technical Data and Dimension Drawings

Optional plug connectors for MOVIGEAR® SNI-B

3.14.5 X5503: STO – OUT

The following table provides information about this connection:

Function		
Connection for safe torque off (STO) for looping through		
Connection type		
M12, 5-pole, male, A-coded		
Wiring diagram		
		
2264818187		
Assignment		
No.	Name	Function
1	res.	Reserved
2	STO –	Output STO – (to loop through)
3	res.	Reserved
4	STO+	Output STO + (to loop through)
5	res.	Reserved

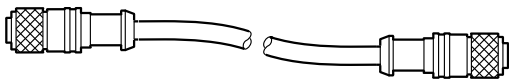
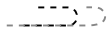
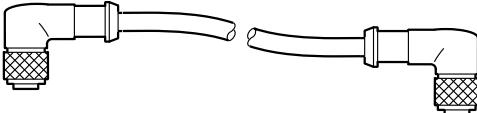
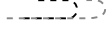
Connection cables



INFORMATION

Use shielded cables only for this connection.

The following table provides an overview of the cables available for this connection:

Connection cable	Length/ Installation type
Part number 1 812 496 8  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 
Part number 1 812 740 1  M12, 5-pole, A-coded M12, 5-pole, A-coded	Variable 

3.15 Connection cables

3.15.1 Required connection cables for single line installation

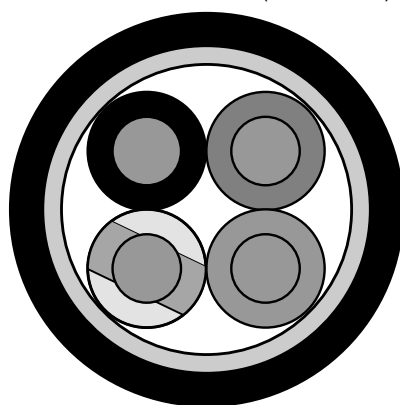
SEW-EURODRIVE specifies the following cable types for connecting MOVIGEAR® SNI and SNI controller:

- **HELUKABEL TOPFLEX® – EMV-UV-2YSLCYK-J**

HELUKABEL TOPFLEX® – EMV-2YSLCY-J

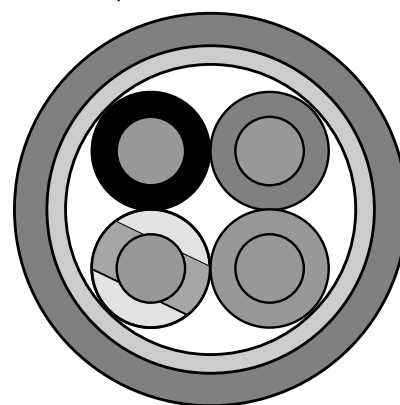
The following figure shows the cable structure:

HELUKABEL TOPFLEX® – EMV-UV-2YSLCYK-J
Black outer cable sheath (UV-resistant)



2393726347

HELUKABEL TOPFLEX® – EMV-2YSLCY-J
Transparent outer cable sheath



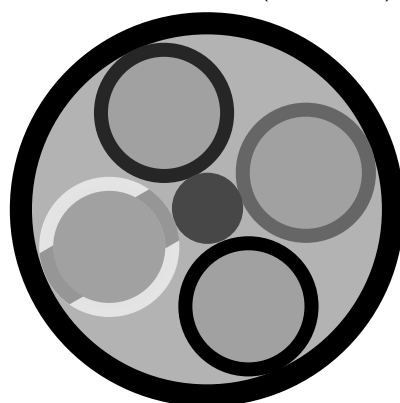
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- **LAPP ÖLFLEX® SERVO 2YSCCYK-JB**

LAPP ÖLFLEX® SERVO 2YSLCY-JB

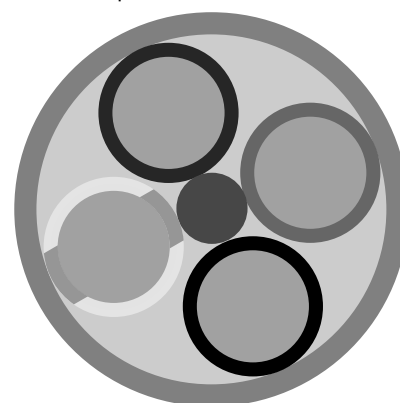
The following figures show the cable structure:

LAPP ÖLFLEX® SERVO 2YSCCYK-JB
Black outer cable sheath (UV-resistant)



2640952459

LAPP ÖLFLEX® SERVO 2YSLCY-JB
Transparent outer cable sheath



2640950539



INFORMATION

A high signal quality is achieved due to the low operating capacitance of the specified cables.

The shielding prevents interference emission resulting from the data transmission modulated onto the line.



3.15.2 Specification of recommended CAN connection cable

When individual CAN connection cables are used, SEW-EURODRIVE recommends the cable type "Belden 9841/LOW-capacitance computer cable for EIA".

Description

24 AWG stranded TC wire, insulated with polyethylen, drilled, shielded with Beldfoil® (100%) + TC braid (90 % shielding), 24 AWG stranded TC drain wire, PVC sheath.

Physical properties (total)

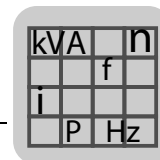
Conductor: AWG			
Twisted-pairs	AWG	Stranding	Conductor material
1	24	7x32	TC – tinned copper

Mechanical properties (total)

Mechanical properties (total)	
Operating temperature	-30 °C to + 80 °C
Rated UL temperature	80 °C
Weight of raw cable	36 lbs/1000 ft.
Max. recommended tensile stress	72.3 lbs.
Min. bending radius	2.5 inches
Applicable specifications and compliance with regulatory specifications (total)	
Applicable standards	
NEC/(UL) specification	CM
CEC/C(UL) specification	CM
AWM specification	UL style 2919 (30 V 80°)
EU CE mark (Y/N)	Yes
EU RoHS compliant (Y/N)	Yes
EU RoHS compliance date (MM/DD/YYYY)	01/01/2004
Plenum / Non-Plenum: Plenum (Y/N)	No
Plenum number	82841, 89841

Electrical properties (total)

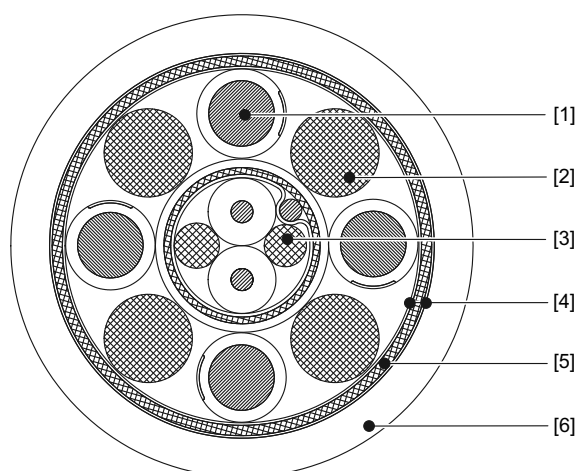
Electrical properties (total)	
Characteristic rated impedance Impedance (ohms)	120
Rated capacity conductor/conductor Capacitance (pF/ft)	12.8
Rated capacitance conductor/other conductor & shield Capacitance (pF/ft)	23.0
Rated propagation speed VP (%)	66
Rated delay time Delay (ns/ft)	1.6
Nominal value of the direct current resistance of the conductor Direct current resistance at 20 °C (ohms/1000 ft)	24.0
Nominal value of the direct current resistance of the outer shield Direct current resistance at 20 °C (ohms/1000 ft)	3.4



Electrical properties (total)	
Rated attenuation Attenuation (dB/100ft)	0.6 (at 1 MHz)
Max. operating voltage – UL Voltage	300 V RMS 20 V RMS (UL AWM Style 2919)
Max. recommended amperage Amperage	2.1 A per conductor at 25 °C

3.15.3 Specification of recommended hybrid cables

SEW-EURODRIVE recommends the following hybrid cables for connecting MOVIGEAR® DSC and controller. The following figure shows the structure of the hybrid cable:



2389090443

	Type: LEONI Elocab EHRK 016281 REV. 00	Type: LEONI Elocab EHRK 018473 REV 00
[1]	4 cores 2.5 mm ² Conductor (141 x 0.15 mm) blank copper Insulation TPE Colors black, with printed numbers 1-3 1 x yellow-green	4 cores 4.0 mm ² Conductor (228 x 0.15 mm) blank copper Insulation TPE Colors black, with printed numbers 1-3 1 x yellow-green
[2]	Filler	
[3]	1 conductor pair 0.25 mm ² Conductor (19 x 0.13 mm) blank copper Insulation PE Colors white/blue	
	Foil shield aluminum-clad side toward the braided shield opt. covered 100%	
	Drain wire 0.25 mm ² Conductor (19 x 0.13 mm) blank copper	
	Shield Conductor (0.10 mm) tinned copper	
	Sheathing TPE Color purple	
[4]	Windings	
[5]	Shield braided Conductor (0.161 mm) tinned copper opt. covered at least 85%	
[6]	Outer sheath Polyurethane, flame retardant, halogen-free Color black	



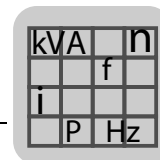
Technical Data and Dimension Drawings

Connection cables

Technical data of hybrid cables

The following table shows the technical data of hybrid cables:

Properties	Type: LEONI Elocab EHRK 016281 REV. 00	Type: LEONI Elocab EHRK 018473 REV 00
UL features	UL style 20234 80 °C 1000 V c  certified 80 °C 600 V	
Operating voltage	1000 V	
Test voltage core/core	DC 4700 V	
Test voltage core/shield	DC 3110 V	
Test voltage shield Position [3]	DC 3000 V (spark test)	
Operating temperature	-30 °C to +80 °C (fixed installation)	
Weight of cable	nom. 291 g/m	nom. 333 g/m
Wave impedance Position [3]	120 Ω .. ± 10%	
Attenuation Position [3]	nom. 1.8 dB/100 m at 1 MHz nom. 5.6 dB/100 m at 10 MHz	
Runtime Position [3]	nom. 5 ns/m	
Bending radii	Single bending when routing the cable: 2 x cable diameters	



4 Project Planning

4.1 Preliminary information



INFORMATION

Data may differ due to continuous product development.

4.1.1 Abbreviation key

The following table provides a description of abbreviations used in this chapter:

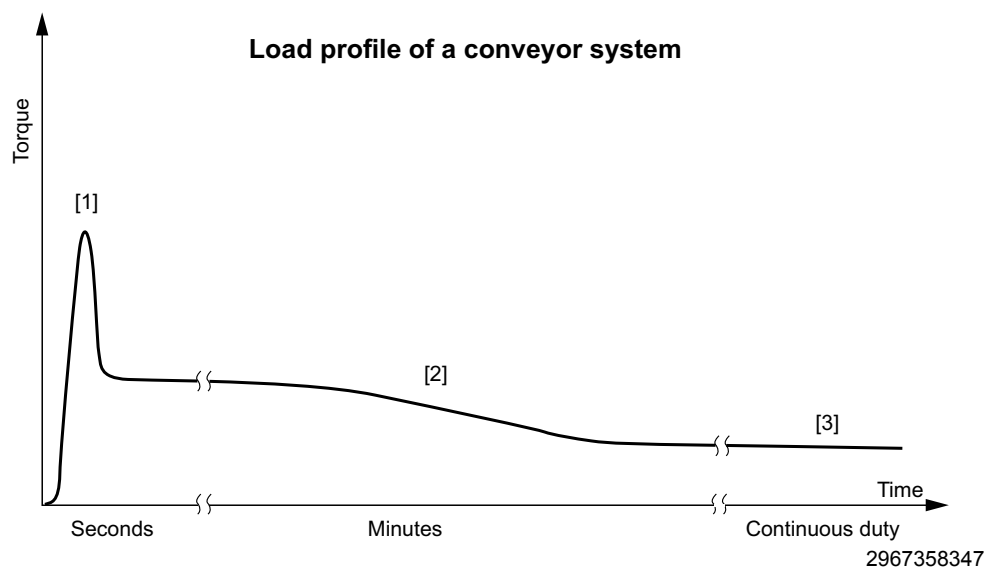
Abbreviation	Description
M_a	MOVIGEAR® continuous output torque
M_{apk}	Maximum permitted torque for short-time duty
$M_{aNotAus}$	Maximum permitted torque for non-cyclical special loads, maximum 1000 cycles
n_a	Output speed
n_e	Motor speed
n_{amin}	Minimum output speed
n_{amax}	Maximum output speed
W	Mean braking work
M_{DSP}	Maximum torque DynaStop® (base torque DynaStop®)
M_{ar}	Retrodriving application torque
η_{Last}	Efficiency of the application



4.2 MOVIGEAR® load profile

The MOVIGEAR® drive unit is specifically designed to match the requirements of horizontal conveyor applications. The following figure shows typical load characteristics.

Refer to the following table for the exact values regarding the static breakaway torque and the continuous torque of the drive units.



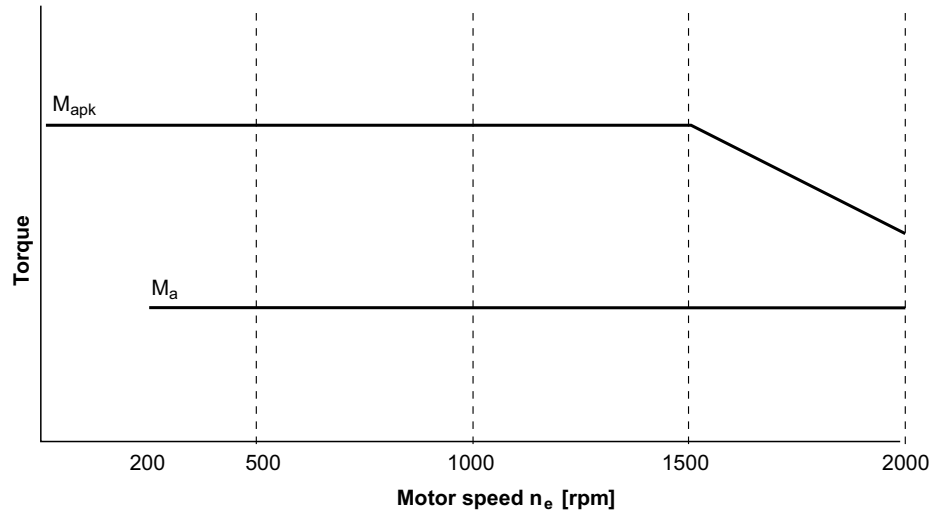
MOVIGEAR® type	Operating range [1] (Static breakaway torque, 5 s)	Operating range [2] (5 min.)	Operating range [3] (duration)
MGF.2	M_{apk}	200 % M_a (but max. M_{apk})	100 % M_a
MGF.4	M_{apk}	200 % M_a (but max. M_{apk})	100 % M_a



4.3 Selecting MOVIGEAR® according to the torque class

4.3.1 Control range 1:10

The following figure shows schematic characteristic curves. The tables below list the exact values..



2391325195

MGF..2										
	n_a with $n_e=$ 200 rpm [rpm]	n_a with $n_e=$ 2000 rpm [rpm]	M_a				M_{apk}	$M_{aNotAus}$	i_{tot}	Weight
			with $n_e=$ 500 rpm [Nm]	with $n_e=$ 1000 rpm [Nm]	with $n_e=$ 1500 rpm [Nm]	with $n_e=$ 2000 rpm [Nm]	[Nm]	[Nm]		[kg]
2- stage	40.0	400.0	20	20	20	20	76	210	5.00	15.7
	37.5	374.5	21	21	21	21	81	215	5.34	
	32.0	320.0	25	25	25	25	95	225	6.25	
	28.6	285.7	28	28	28	28	106	235	7.00	
	24.3	242.7	33	33	33	33	125	245	8.24	
	20.6	206.0	39	39	39	39	147	330	9.71	
	19.3	192.9	42	42	42	42	157	330	10.37	
	16.5	164.7	49	49	49	49	184	330	12.14	
	14.7	147.1	55	55	55	55	206	330	13.6	
	12.5	125.0	64	64	64	64	220	330	16.00	
	10.8	108.0	74	74	74	74	220	330	18.52	
	10.1	101.0	80	80	80	80	220	330	19.81	
	8.7	87.5	92	92	92	92	220	330	22.86	



Project Planning

Selecting MOVIGEAR® according to the torque class

MGF..2										
	n_a with $n_e=$ 200 rpm [rpm]	n_a with $n_e=$ 2000 rpm [rpm]	M_a with $n_e=$ 500 rpm [Nm] with $n_e=$ 1000 rpm [Nm] with $n_e=$ 1500 rpm [Nm] with $n_e=$ 2000 rpm [Nm]				M_{apk} [Nm]	$M_{aNotAus}$ [Nm]	i_{tot}	Weight [kg]
3-stage	7.1	71.3	113	113	113	113	220	330	28.07	16.0
	6.1	60.6	133	133	133	133	220	330	33.02	
	5.4	53.7	149	149	149	149	220	330	37.24	
	4.7	47.4	169	169	169	169	220	330	42.19	
	4.4	44.4	181	181	181	181	220	330	45.03	
	3.9	38.8	200	200	200	200	220	330	51.51	
	3.6	36.2	200	200	200	200	220	330	55.25	
	= Preferred gear ratio									
M_{apk}	= Maximum permitted torque for short-time duty ¹⁾									
$M_{aNotAus}$	= Maximum permitted torque for non-cyclical special loads, maximum 1000 cycles									
M_a	= MOVIGEAR® continuous output torque									
n_a	= Output speed									
n_e	= Motor speed									

1) If M_{apk} occurs more often than 10 times per hour, a detailed project planning must be carried out using the SEW Workbench.



MGF..4										
	n_a with $n_e = 200$ rpm [rpm]	n_a with $n_e = 2000$ rpm [rpm]	M_a with $n_e = 500$ rpm [Nm]	M_a with $n_e = 1000$ rpm [Nm]	M_a with $n_e = 1500$ rpm [Nm]	M_a with $n_e = 2000$ rpm [Nm]	M_{apk} [Nm]	$M_{aNotAus}$ [Nm]	i_{tot}	Weight [kg]
2-stage	40.1	400.8	34	34	34	34	121	420	4.99	23.6
	34.7	347.2	39	39	39	39	129	450	5.76	
	31.5	315.5	43	43	43	43	153	470	6.34	
	26.9	268.8	51	51	51	51	180	515	7.44	
	25.4	253.8	54	54	54	54	190	525	7.88	
	22.3	223.2	61	61	61	61	216	560	8.96	
	18.2	182.3	75	75	75	75	265	675	10.97	
	15.8	158.0	87	87	87	87	306	710	12.66	
	14.4	143.6	95	95	95	95	336	710	13.93	
	12.2	122.2	112	112	112	112	395	710	16.36	
	11.5	115.4	119	119	119	119	419	710	17.33	
	10.2	101.5	135	135	135	135	475	710	19.70	
	9.2	91.7	149	149	149	149	475	710	21.82	
	7.8	77.8	176	176	176	176	475	710	25.72	
3-stage	6.9	69.3	198	198	198	198	475	710	28.88	24.0
	5.8	58.3	235	235	235	235	475	710	34.29	
	5.5	54.6	250	250	250	250	475	710	36.61	
	4.7	46.7	293	293	293	293	475	710	42.86	
	4.2	41.7	328	328	328	328	475	710	48.00	
	3.5	35.4	386	386	386	386	475	710	56.49	

	= Preferred gear ratio
M_{apk}	= Maximum permitted torque for short-time duty ¹⁾
$M_{aNotAus}$	= Maximum permitted torque for non-cyclical special loads, maximum 1000 cycles
M_a	= MOVIGEAR® continuous output torque
n_a	= Output speed
n_e	= Motor speed

1) If M_{apk} occurs more often than 10 times per hour, a detailed project planning must be carried out using the SEW Workbench.



Project Planning

Selecting MOVIGEAR® according to the torque class

MGF..4/ET (increased torque)										
	n_a with $n_e = 200$ rpm [rpm]	n_a with $n_e = 2000$ rpm [rpm]	with $n_e = 500$ rpm [Nm]	with $n_e = 1000$ rpm [Nm]	with $n_e = 1500$ rpm [Nm]	with $n_e = 2000$ rpm [Nm]	M_{apk} [Nm]	$M_{aNotAus}$ [Nm]	i_{tot}	Weight [kg]
2-stage	40.1	400.8	40	40	40	40	121	420	4.99	23.6
	34.7	347.2	46	46	46	46	129	450	5.76	
	31.5	315.5	51	51	51	51	153	470	6.34	
	26.9	268.8	59	59	59	59	180	515	7.44	
	25.4	253.8	63	63	63	63	190	525	7.88	
	22.3	223.2	72	72	72	72	216	560	8.96	
	18.2	182.3	88	88	88	88	265	675	10.97	
	15.8	158.0	101	101	101	101	306	710	12.66	
	14.4	143.6	111	111	111	111	336	710	13.93	
	12.2	122.2	131	131	131	131	395	710	16.36	
	11.5	115.4	138	138	138	138	419	710	17.33	
	10.2	101.5	157	157	157	157	475	710	19.70	
	9.2	91.7	174	174	174	174	475	710	21.82	
	7.8	77.8	205	205	205	205	475	710	25.72	
3-stage	6.9	69.3	230	230	230	230	475	710	28.88	24.0
	5.8	58.3	274	274	274	274	475	710	34.29	
	5.5	54.6	292	292	292	292	475	710	36.61	
	4.7	46.7	342	342	342	342	475	710	42.86	
	4.2	41.7	383	383	383	383	475	710	48.00	
	3.5	35.4	400	400	400	400	475	710	56.49	

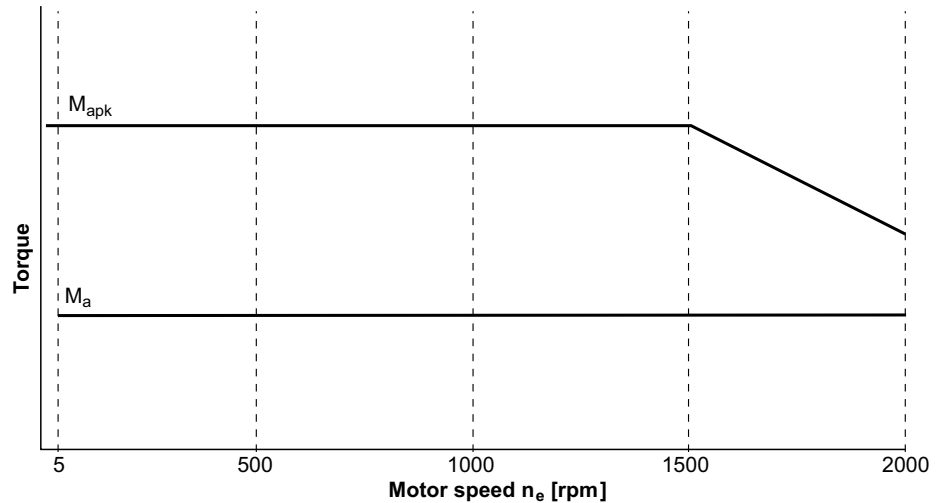
	= Preferred gear ratio
M_{apk}	= Maximum permitted torque for short-time duty ¹⁾
$M_{aNotAus}$	= Maximum permitted torque for non-cyclical special loads, maximum 1000 cycles
M_a	= MOVIGEAR® continuous output torque
n_a	= Output speed
n_e	= Motor speed

1) If M_{apk} occurs more often than 10 times per hour, a detailed project planning must be carried out using the SEW Workbench.



4.3.2 Extended control range 1:2000 (/ECR option)

The following figure shows schematic characteristic curves. The tables below list the exact values.



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MGF..2../ECR (extended control range)

	n_a		$M_a^{1)}$					M_{apk}	$M_{aNotAus}$	i_{tot}	Weight
	with $n_e=1$ rpm [rpm]	with $n_e=2000$ rpm [rpm]	with $n_e=5$ rpm [Nm]	with $n_e=500$ rpm [Nm]	with $n_e=1000$ rpm [Nm]	with $n_e=1500$ rpm [Nm]	with $n_e=2000$ rpm [Nm]				
2-stage	0.20	400.0	20	20	20	20	20	76	210	5.00	15.7
	0.19	374.5	21	21	21	21	21	81	215	5.34	
	0.16	320.0	25	25	25	25	25	95	225	6.25	
	0.14	285.7	28	28	28	28	28	106	235	7.00	
	0.12	242.7	33	33	33	33	33	125	245	8.24	
	0.10	206.0	39	39	39	39	39	147	330	9.71	
	0.10	192.9	42	42	42	42	42	157	330	10.37	
	0.08	164.7	49	49	49	49	49	184	330	12.14	
	0.07	147.1	55	55	55	55	55	206	330	13.6	
	0.06	125.0	64	64	64	64	64	220	330	16.00	
	0.05	108.0	74	74	74	74	74	220	330	18.52	
	0.05	101.0	80	80	80	80	80	220	330	19.81	
	0.04	87.5	92	92	92	92	92	220	330	22.86	



Project Planning

Selecting MOVIGEAR® according to the torque class

MGF..2../ECR (extended control range)											
	n _a		M _a ¹⁾					M _{apk}	M _{aNotAus}	i _{tot}	Weight
	with n _e = 1 rpm [rpm]	with n _e = 2000 rpm [rpm]	with n _e = 5 rpm [Nm]	with n _e = 500 rpm [Nm]	with n _e = 1000 rpm [Nm]	with n _e = 1500 rpm [Nm]	with n _e = 2000 rpm [Nm]	[Nm]	[Nm]		[kg]
3- stage	0.04	71.3	113	113	113	113	113	220	330	28.07	16.0
	0.03	60.6	133	133	133	133	133	220	330	33.02	
	0.03	53.7	149	149	149	149	149	220	330	37.24	
	0.02	47.4	169	169	169	169	169	220	330	42.19	
	0.02	44.4	181	181	181	181	181	220	330	45.03	
	0.02	38.8	200	200	200	200	200	220	330	51.51	
	0.02	36.2	200	200	200	200	200	220	330	55.25	

1) For motor speeds $n_e < 5$ rpm, you have to reduce the output torque M_a by factor 0.9.

	= Preferred gear ratio
M_{apk}	= Maximum permitted torque for short-time duty ¹⁾
$M_{aNotAus}$	= Maximum permitted torque for non-cyclical special loads, maximum 1000 cycles
M_a	= MOVIGEAR® continuous output torque
n_a	= Output speed
n_e	= Motor speed

1) If M_{apk} occurs more often than 10 times per hour, a detailed project planning must be carried out using the SEW Workbench.



MGF..4../ECR (extended control range)											
	n_a		$M_a^{1)}$					M_{apk}	$M_{aNotAus}$	i_{tot}	Weight
	with	with	with	with	with	with	with				
	$n_e = 1$ rpm [rpm]	$n_e = 2000$ rpm [rpm]	$n_e = 5$ rpm [Nm]	$n_e = 500$ rpm [Nm]	$n_e = 1000$ rpm [Nm]	$n_e = 1500$ rpm [Nm]	$n_e = 2000$ rpm [Nm]				
2-stage	0.20	400.8	34	34	34	34	34	121	420	4.99	23.6
	0.17	347.2	39	39	39	39	39	129	450	5.76	
	0.16	315.5	43	43	43	43	43	153	470	6.34	
	0.13	268.8	51	51	51	51	51	180	515	7.44	
	0.13	253.8	54	54	54	54	54	190	525	7.88	
	0.11	223.2	61	61	61	61	61	216	560	8.96	
	0.09	182.3	75	75	75	75	75	265	675	10.97	
	0.08	158.0	87	87	87	87	87	306	710	12.66	
	0.07	143.6	95	95	95	95	95	336	710	13.93	
	0.06	122.2	112	112	112	112	112	395	710	16.36	
	0.06	115.4	119	119	119	119	119	419	710	17.33	
	0.05	101.5	135	135	135	135	135	475	710	19.70	
	0.05	91.7	149	149	149	149	149	475	710	21.82	
	0.04	77.8	176	176	176	176	176	475	710	25.72	
3-stage	0.03	69.3	198	198	198	198	198	475	710	28.88	24.0
	0.03	58.3	235	235	235	235	235	475	710	34.29	
	0.03	54.6	250	250	250	250	250	475	710	36.61	
	0.02	46.7	293	293	293	293	293	475	710	42.86	
	0.02	41.7	328	328	328	328	328	475	710	48.00	
	0.02	35.4	386	386	386	386	386	475	710	56.49	

1) For motor speeds $n_e < 5$ rpm, you have to reduce the output torque M_a by factor 0.9.

	= Preferred gear ratio
M_{apk}	= Maximum permitted torque for short-time duty ¹⁾
$M_{aNotAus}$	= Maximum permitted torque for non-cyclical special loads, maximum 1000 cycles
M_a	= MOVIGEAR® continuous output torque
n_a	= Output speed
n_e	= Motor speed

1) If M_{apk} occurs more often than 10 times per hour, a detailed project planning must be carried out using the SEW Workbench.



MGF..4../ECR/ET (extended control range /ECR and increased torque /ET)											
	n_a		$M_a^{1)}$					M_{apk}	$M_{aNotAus}$	i_{tot}	Weight
	with $n_e = 1$ rpm [rpm]	with $n_e = 2000$ rpm [rpm]	with $n_e = 5$ rpm [Nm]	with $n_e = 500$ rpm [Nm]	with $n_e = 1000$ rpm [Nm]	with $n_e = 1500$ rpm [Nm]	with $n_e = 2000$ rpm [Nm]	[Nm]	[Nm]		[kg]
2-stage	0.20	400.8	40	40	40	40	40	121	420	4.99	23.6
	0.17	347.2	46	46	46	46	46	129	450	5.76	
	0.16	315.5	51	51	51	51	51	153	470	6.34	
	0.13	268.8	59	59	59	59	59	180	515	7.44	
	0.13	253.8	63	63	63	63	63	190	525	7.88	
	0.11	223.2	72	72	72	72	72	216	560	8.96	
	0.09	182.3	88	88	88	88	88	265	675	10.97	
	0.08	158.0	101	101	101	101	101	306	710	12.66	
	0.07	143.6	111	111	111	111	111	336	710	13.93	
	0.06	122.2	131	131	131	131	131	395	710	16.36	
	0.06	115.4	138	138	138	138	138	419	710	17.33	
	0.05	101.5	157	157	157	157	157	475	710	19.70	
	0.05	91.7	174	174	174	174	174	475	710	21.82	
	0.04	77.8	205	205	205	205	205	475	710	25.72	
3-stage	0.03	69.3	230	230	230	230	230	475	710	28.88	24.0
	0.03	58.3	274	274	274	274	274	475	710	34.29	
	0.03	54.6	292	292	292	292	292	475	710	36.61	
	0.02	46.7	342	342	342	342	342	475	710	42.86	
	0.02	41.7	383	383	383	383	383	475	710	48.00	
	0.02	35.4	400	400	400	400	400	475	710	56.49	

1) For motor speeds $n_e < 5$ rpm, you have to reduce the output torque M_a by factor 0.9.

	= Preferred gear ratio
1)	For motor speeds $n_e < 5$ rpm, you have to reduce the output torque M_a by factor 0.9
M_{apk}	= Maximum permitted torque for short-time duty ¹⁾
$M_{aNotAus}$	= Maximum permitted torque for non-cyclical special loads, maximum 1000 cycles
M_a	= MOVIGEAR® continuous output torque
n_a	= Output speed
n_e	= Motor speed

1) If M_{apk} occurs more often than 10 times per hour, a detailed project planning must be carried out using the SEW Workbench.



4.4 Drive selection data

Certain data is required to be able to precisely define the components for your drive. These are:

Drive selection data			Your entry
n_{amin}	Minimum output speed	rpm	
n_{amax}	Maximum output speed	rpm	
M_a at n_{amin}	Output torque at minimum Output speed	Nm	
M_a at n_{amax}	Output torque at maximum Output speed	Nm	
S., ..% cdf	Duty type and cyclic duration factor (cdf) or exact load cycle can be entered.		
Z	Starting frequency; alternatively, exact load cycle can be specified	1/h	
M4, M1..M6	Mounting position		
IP..	Required degree of protection		
ϑ_{Amb}	Ambient temperature	°C	
H	Installation altitude	m	

4.4.1 Determining the motor data

First, you require the data (mass, speed, setting range, etc.) of the machine to be driven to select the correct drive.

These data help determine the required power, torque and speed. Refer to the "Drive Engineering – Practical Implementation, Project Planning" publication or the SEW-WORKBENCH project planning software for assistance.

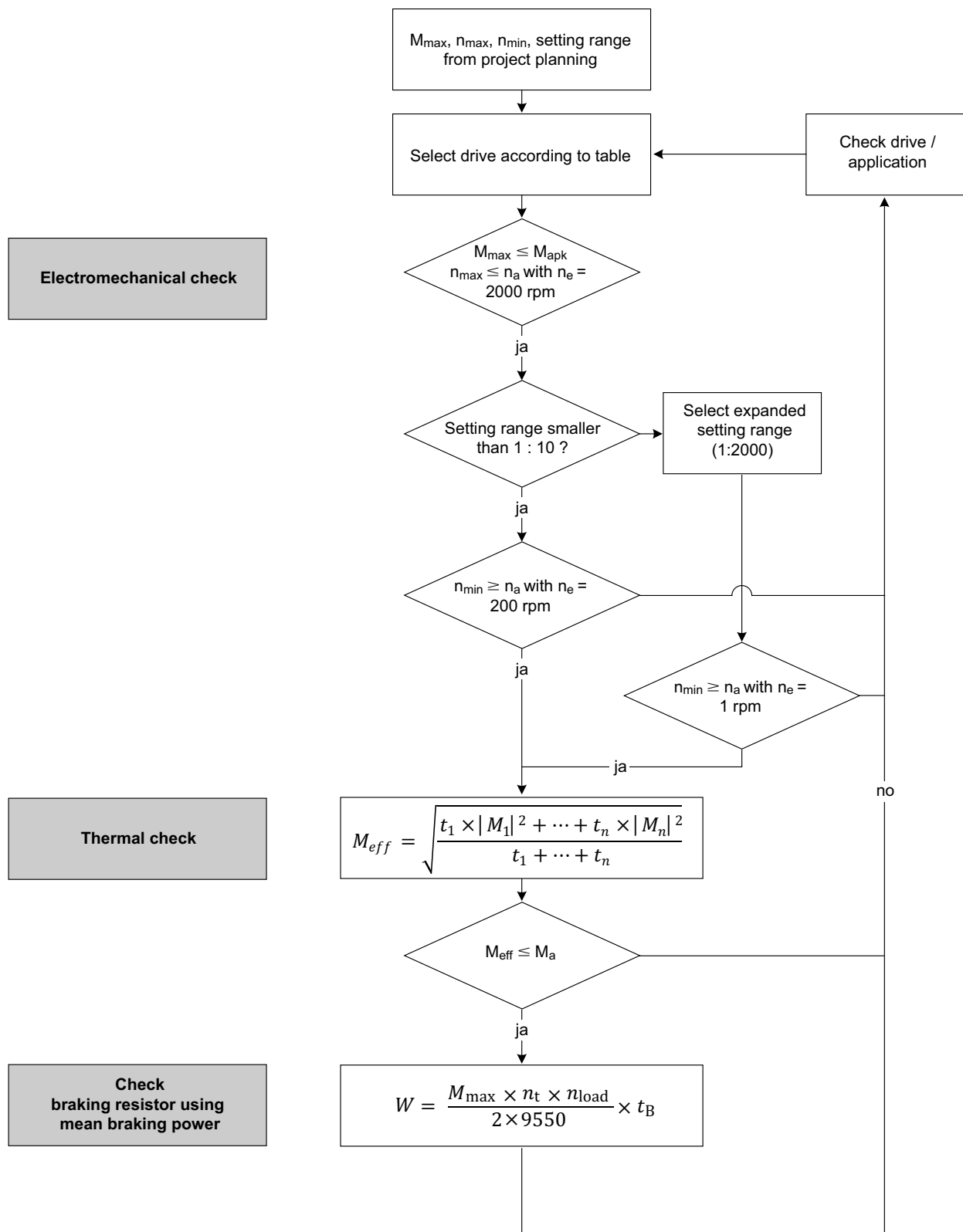
4.4.2 Selecting the proper drive

The appropriate drive can be determined with the calculated power and speed and with other mechanical requirements taken into account.

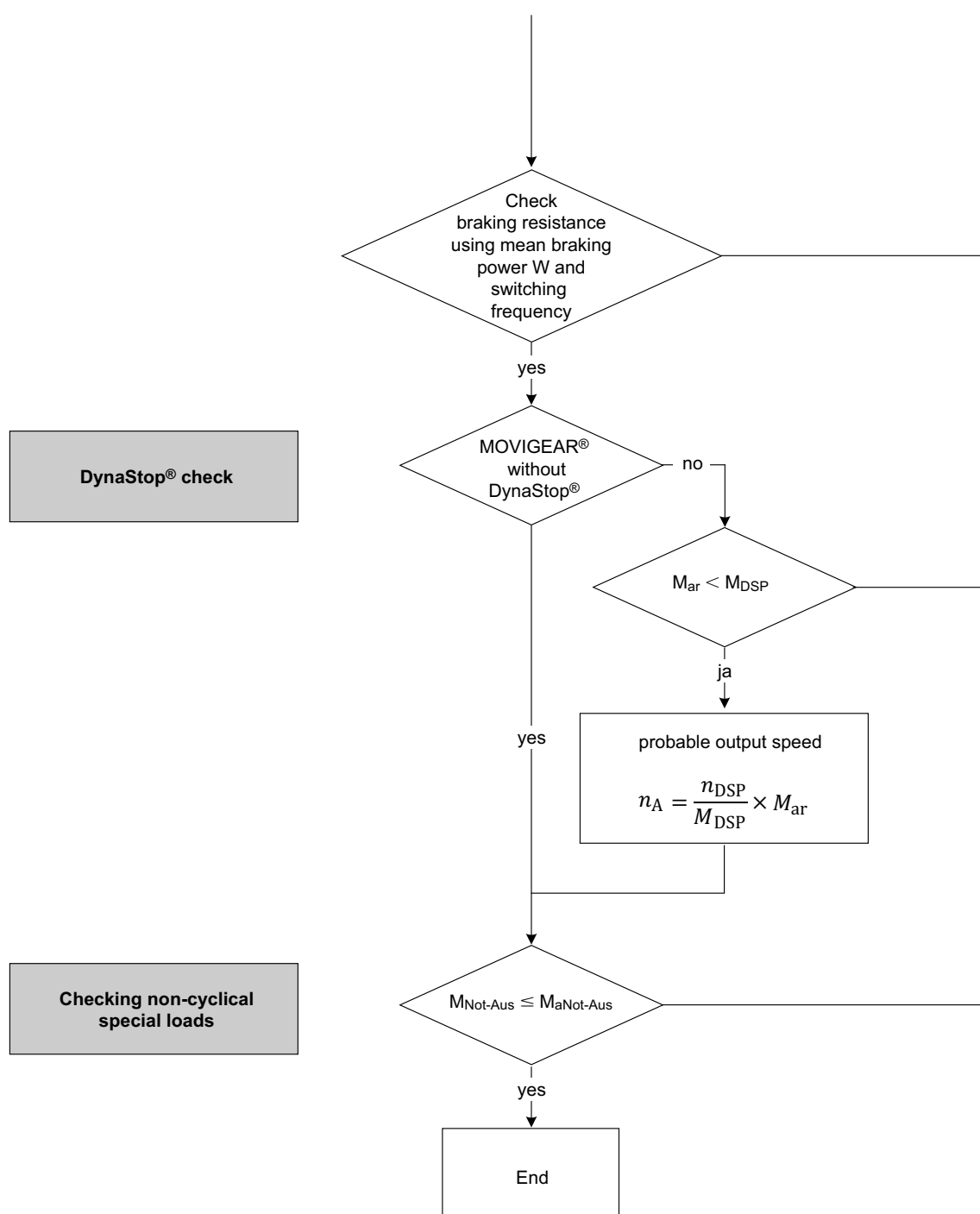


4.5 Project planning procedure

The following flow diagram illustrates the project planning procedure for MOVIGEAR®:



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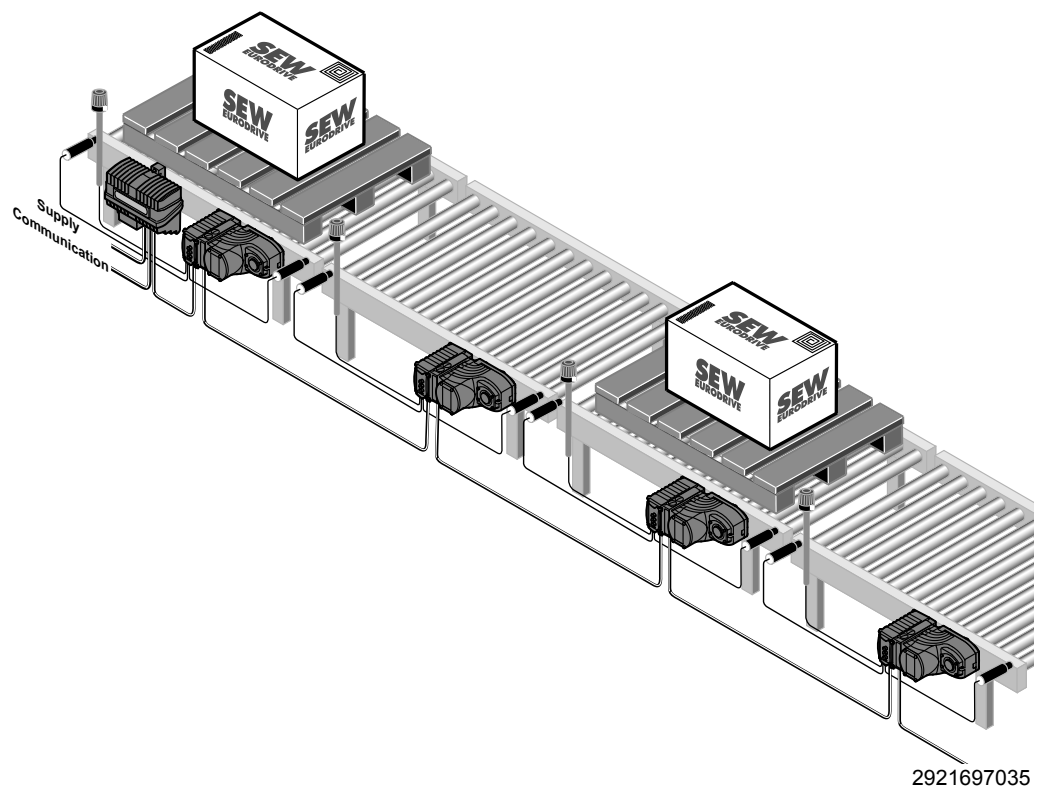
4.6 Drive selection using the example of a roller conveyor

4.6.1 Description of the application

This chapter illustrates the MOVIGEAR® drive unit selection using the example of a roller conveyor for transporting wooden pallets with the following specifications:

Load mass	m	2500 kg
Transport speed	v	22 m/min
Positioning speed		5 m/min
Acceleration	a	0.4 m/s ²
Number of rollers		8
Efficiency of the application with rollers	η_{App}	0.7
Roller diameter	D	140 mm
Lever arm of the rolling friction (wood/steel)	f	1.2
Bearing diameter	d	28 mm
Bearing friction value	$\mu_{bearing}$	0.005
Switching frequency		6 times/hour
Maximum external force at standstill	F_{ext}	800 N

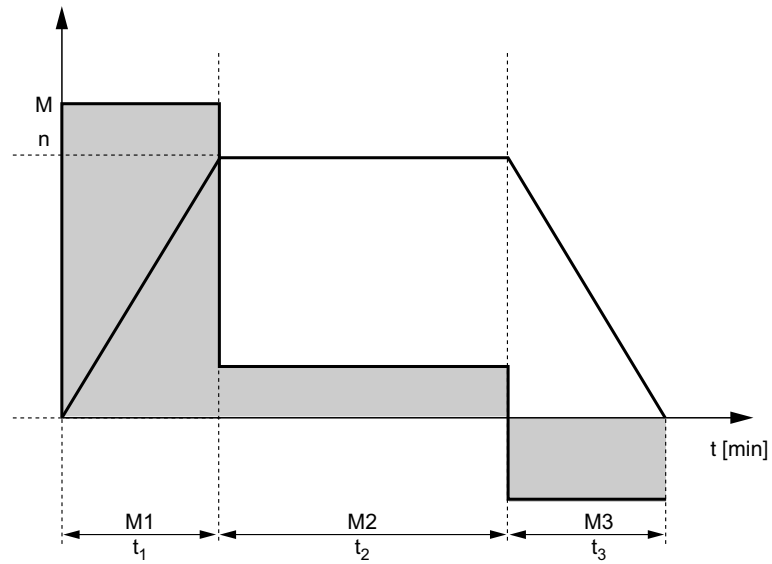
The following figure shows a schematic illustration:





4.6.2 Calculating the application

The travel profile consists of the 3 travel sections acceleration, constant movement, and deceleration.



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Project Planning

Drive selection using the example of a roller conveyor

The following table shows the calculations for the application that are required to determine the MOVIGEAR® drive units:

Calculations	
Static travel resistance	$F_R = \mu \times m \times g$ $\mu = \left[\frac{2}{D} \times \left(\mu_{bearing} \times \frac{d}{2} + f \right) + c \right]$ $\mu = \left[\frac{2}{140mm} \times \left(0.005 \times \frac{28mm}{2} + 1.2 \right) + 0 \right]$ $\mu = 0.01814$ $F_R = 0.01814 \times 2500kg \times 9.81$ $F_R = 445N$
Dynamic travel resistance	$F_{Dyn} = m \times a$ $F_{Dyn} = 2500kg \times 0.4 m/s^2$ $F_{Dyn} = 1000N$
Torque in range M1	$M_1 = \frac{(F_R + F_{Dyn}) \times D}{2 \times \eta}$ $M_1 = \frac{(445N + 1000N) \times 0.14m}{2 \times 0.7} = 145.5Nm$
Torque in range M2	$M_2 = \frac{F_R \times D}{2 \times \eta} = 45.5Nm$
Torque in range M3	$M_3 = \left(\frac{F_R}{\eta} - F_{Dyn} \times \eta \right) \times \frac{D}{2}$ $M_3 = \left(\frac{445N}{0.7} - 1000 \times 0.7 \right) \times \frac{0.14m}{2} = -4.5Nm$
Output speed	$n_{amin} = \frac{v_{min}}{\pi \times D} = \frac{5 m/min}{\pi \times 0.14m} = 11.4 min^{-1}$ $n_{amax} = \frac{v_{max}}{\pi \times D} = \frac{22 m/min}{\pi \times 0.14m} = 50.0 min^{-1}$



4.6.3 Selecting the MOVIGEAR® drive unit

Observe the following procedure when selecting the MOVIGEAR® drive unit:

1. Which torque class (size) is required?

Requirement: The maximum possible startup torque of the MOVIGEAR® drive unit must be higher than the maximum application moment:

$$M_{\max} \leq M_{apk}$$

Due to the application calculations, the maximum application torque is $M_{\max} = 145 \text{ Nm}$.

MGF..2 drive units with $i > 10.37$ meet this requirement.

Result: A MOVIGEAR® of torque class MGF..2 is selected.

2. Select the ratio with the output speed:

Requirement: Due to the application calculations, the output speed is $n_a = 50 \text{ rpm}$. In order to achieve a high setting range and an optimum efficiency, the required output speed should be achieved as precisely as possible at an input speed of $n_e = 2000 \text{ rpm}$.

Result: The drive with a ratio of $i_{\text{tot}} = 37.24$ and an output speed of $n_a = 53.7$ at $n_e = 2000 \text{ rpm}$ is selected from the table in chapter "Selecting MOVIGEAR® according to torque class":

MGF..2										
	n_a with $n_e =$ 2000 rpm [rpm]	n_a with $n_e =$ 2000 rpm [rpm]	M_a				M_{apk}	$M_{aNotAus}$	i_{tot}	Weight
			with $n_e =$ 500 rpm [Nm]	with $n_e =$ 1000 rpm [Nm]	with $n_e =$ 1500 rpm [Nm]	with $n_e =$ 2000 rpm [Nm]	[Nm]	[Nm]		[kg]
2- stage	40.0	400.0	20	20	20	20	76	210	5.00	15.7
	37.5	374.5	21	21	21	21	81	215	5.34	
	32.0	320.0	25	25	25	25	95	225	6.25	
	28.6	285.7	28	28	28	28	106	235	7.00	
	24.3	242.7	33	33	33	33	125	245	8.24	
	20.6	206.0	39	39	39	39	147	330	9.71	
	19.3	192.9	42	42	42	42	157	330	10.37	
	16.5	164.7	49	49	49	49	184	330	12.14	
	14.7	147.1	55	55	55	55	206	330	13.6	
	12.5	125.0	64	64	64	64	220	330	16.00	
	10.8	108.0	74	74	74	74	220	330	18.52	
	10.1	101.0	80	80	80	80	220	330	19.81	
3- stage	8.7	87.5	92	92	92	92	220	330	22.86	16.0
	7.1	71.3	113	113	113	113	220	330	28.07	
	6.1	60.6	133	133	133	133	220	330	33.02	
	5.4	53.7	149	149	149	149	220	330	37.24	
	4.7	47.4	169	169	169	169	220	330	42.19	
	4.4	44.4	181	181	181	181	220	330	45.03	
	3.9	38.8	200	200	200	200	220	330	51.51	
	3.6	36.2	200	200	200	200	220	330	55.25	





Project Planning

Drive selection using the example of a roller conveyor

3. Check the setting range and minimum speed

Setting range 5 m/min: 22 m/min $\approx$ 1:4.4.

This means the standard setting range of 1:10 is sufficient. The /ECR option (expanded control range 1:2000) need not be selected.

n_a with n_e 200 rpm = 5.4 rpm $<$ n_{min} = 11.4 rpm.

4. MOVIGEAR® – thermal check:

Requirement: In order to avoid thermal problems, the effective torque of the application must be smaller than the continuous output torque of the MOVIGEAR® drive unit:

$$M_{eff} < M_a$$

$$t_1 = t_3 = \frac{v}{a} = \frac{22 \frac{m}{min}}{0.4 \frac{m}{s^2} \times 60} = 0.92s$$

$$t_2 = 10 \text{ min} \times 60 \frac{s}{min} - t_1 - t_3 = 598.16s$$

$$M_{eff} = \sqrt[2]{\frac{t_1 \times |M_1|^2 + t_2 \times |M_2|^2 + t_3 \times |M_3|^2}{t_1 + t_2 + t_3}}$$

$$M_{eff} = \sqrt[2]{\frac{0.92s \times |145.5Nm|^2 + 598.16s \times |45.5Nm|^2 + 0.92s \times |-4.5Nm|^2}{0.92s + 598.16s + 0.92s}} = 45.1Nm$$

Due to the application calculation, the effective torque is $M_{eff} = 45.1 \text{ Nm}$. The continuous output torque of the selected MOVIGEAR® drive unit is M_a at n_e 2000 rpm = 149 Nm.

If applicable, observe derating factors (derating for installation altitude and ambient temperature).

Result: The requirements are met.

5. Check the braking resistance

Calculate the regenerative braking power during deceleration:

$$P_{brake} = \left| \frac{1}{2} \times \frac{M_3 \times n_3}{9.55} \right|$$

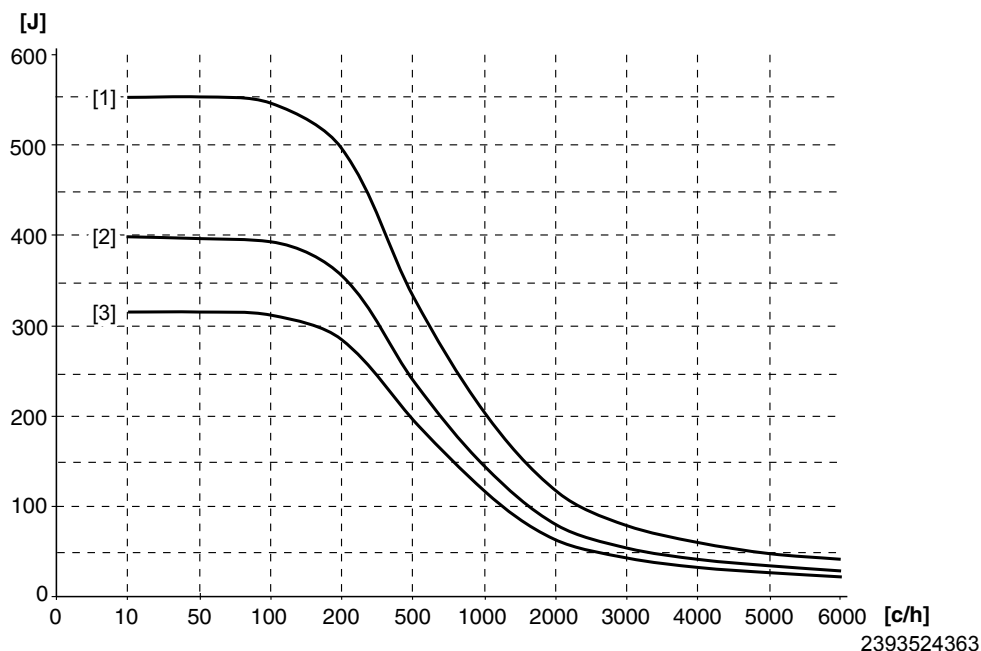
$$P_{brake} = \left| \frac{1}{2} \times \frac{4.5Nm \times 50 \frac{1}{min}}{9.55} \right| = 11.8W$$

Proceed as described in chapter "Regenerative load capacity – integrated braking resistor".



4.7 Regenerative load capacity – integrated braking resistor

The following diagram shows the load capacity of the BW1 braking resistor integrated in MOVIGEAR® as standard:



- [1] Brake ramp 10 s
 - [2] Brake ramp 4 s
 - [3] Brake ramp 0.2 s
- c/h cycles per hour

4.7.1 Calculation example

The known values are:

- Average braking power: 11.8 W
- Brake ramp: 0.92 s
- 6 brake applications per hour

Calculating the energy from the power of the brake ramp:

$$W = P \times t = 11.8W \times 0.92s = 10.9J$$

The specified brake ramp in seconds refers to a speed change of 3000 rpm.

Calculating the brake ramp of MOVIGEAR®: $a_{out} = 3000 \text{ rpm} \times 0.92 \text{ s} / 1863 \text{ rpm} = 1.5 \text{ s}$.

The brake ramp [3] (0.2 s) can be used for the brake ramp of 1.5 s in the diagram. Use the characteristic curve with the shorter brake ramp because a shorter brake ramp means more power.

The diagram allows a power of 310 J with a 0.2 s brake ramp at 6 cycles per hour. In this case, the required 10.9 J can be dissipated with BW1.



4.8 DynaStop® – the electrodynamic deceleration function

4.8.1 Functional description

DynaStop® allows for generating a speed-dependent torque when the motor is de-energized or "controller inhibit" is activated. This prevents the application from excessive acceleration due to external forces (e.g. sagging on inclining tracks).

MOVIGEAR® has the following function when the drive is running: In the event of a voltage failure, the kinetic energy is used to supply the frequency inverter via regeneration. This allows for controlled deceleration.

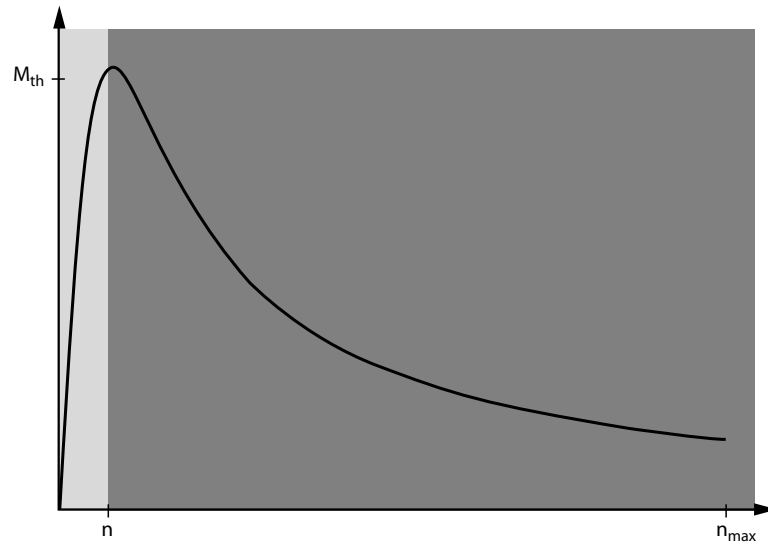
DynaStop® is activated when the regenerative power is insufficient.

	Warning The electrodynamic deceleration function DynaStop® does not allow for a definite stop at a position. Severe or fatal injuries. • The electrodynamic deceleration function must not be used for hoists. • For ascending track sections, DynaStop® must only be used following a risk assessment.
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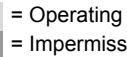
	NOTICE Setting the controller inhibit when the drive is running will activate DynaStop®. High torques can occur, which in turn may damage the drive and the application! • Only activate controller inhibit when the speed is "0".
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4.8.2 Deceleration torques DynaStop®



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 = Operating range of DynaStop®
 = Impermissible operating range of DynaStop®

MGF..2	i_{tot}	Deceleration torque	
		M_{DSP}	with n_{DSP} (gear unit shaft speed)
		[Nm]	[rpm]
3-stage	55.25	200	2.08
	51.51	189	2.23
	45.03	173	2.55
	42.19	162	2.73
	37.24	143	3.08
	33.02	127	3.48
	28.07	108	4.10
2-stage	22.86	89	5.03
	19.81	77	5.81
	18.52	72	6.2
	16.00	62	7.19
	13.60	53	8.46
	12.14	47	9.47
	10.37	40	11.09
	9.71	38	11.84
	8.24	32	13.96
	7.00	27	16.43
	6.25	24	18.40
	5.34	21	21.54
	5.00	19	23.00

 = preferred gear ratio

MGF..4 MGF..4 /ET	i_{tot}	Deceleration torque	
		M_{DSP}	with n_{DSP} (gear unit shaft speed)
		[Nm]	[rpm]
3-stage	48.00	369	0.83
	42.86	329	0.93
	36.61	281	1.09
	34.29	263	1.17
	28.88	222	1.39
	25.72	200	1.56
2-stage	21.82	169	1.83
	19.70	153	2.03
	17.33	134	2.31
	16.36	127	2.44
	13.93	108	2.87
	12.66	98	3.16
	10.97	85	3.65
	8.96	70	4.46
	7.88	61	5.08
	7.44	58	5.38
	6.34	49	6.56
	5.76	45	6.94
	4.99	39	8.02



4.8.3 Checking whether DynaStop® can be used

Requirement:

In order to use DynaStop®, the retrodriving torque M_{ar} must be smaller than the maximum deceleration torque M_{DSP} :

$$M_{ar} < M_{DSP}$$

Calculate the retrodriving torque:

Known values of the application:

$$F_{ex} = 800 \text{ N}$$

$$F_R = 445 \text{ N}$$

$$M_{ar} = (F_{ex} - F_R) \times \eta \times \frac{D}{2}$$

$$M_{ar} = (800 \text{ N} - 445 \text{ N}) \times 0.7 \times \frac{0.14 \text{ m}}{2} = 17 \text{ Nm}$$

Result:

In the application, an MGF2 unit with $i_{tot} = 37.24$ is used. The maximum deceleration torque M_{DSP} 143 Nm with n_{DSP} 3.08 rpm for this variant can be seen from the table in the "DynaStop® deceleration torques" chapter.

The retrodriving torque M_{ar} is smaller than the maximum deceleration torque. This means DynaStop® can be used:

$$M_{ar} < M_{DSP}$$

$$17 \text{ Nm} < 143 \text{ Nm}$$

Checking the application velocity:

$$n_A = \frac{n_{DSP}}{M_{DSP}} \times M_{ar}$$

$$n_A = \frac{3.08 \frac{1}{\text{min}}}{143 \text{ Nm}} \times 17 \text{ Nm} = 0.37 \frac{1}{\text{min}}$$

$$v = n_a \times D \times \pi = 0.37 \frac{1}{\text{min}} \times 0.14 \times \pi = 0.16 \frac{\text{m}}{\text{min}}$$

Result:

Due to the external force, the velocity for the application example is 0.16 m/min.



4.9 Applications in wet areas

SEW-EURODRIVE recommends to use MOVIGEAR® with optional package for applications in wet areas under the following conditions:

- Large temperature differences (e.g. when the drive is cleaned with cold water immediately after operation).
- In case of changing temperatures (e. g. "Cold storage lock" application)
- When sealing surfaces come into contact with water during operation
- When the drive is cleaned with low surface tension water and/or chemicals
- In case of cycle operation (S3) in cold and/or humid environment

4.9.1 Support through special consultants

	INFORMATION
	• These requirements cannot always be imparted in written form. Consulting talks between system operators, system suppliers and component suppliers have proved to be productive means to clarify the existing conditions and necessary measures. • SEW-EURODRIVE has a team of competent consultants that offer their active support when it comes to selecting optimum configurations and economical solutions.



4.9.2 Questionnaire



INFORMATION

Please complete the following questionnaire and submit it to SEW in order to provide for an optimal preparation for a consultation with SEW-EURODRIVE.

Company:.....

Contact person:

Phone/Fax:

Email:

Street:

Zip code:.....

Place, date:.....



1. Information on location

- Detailed description of the plant (e.g. bottle filling, transportation of empty bottles, cans etc.)

.....

.....

.....

- What is the ambient temperature in the plant?

In the summer approx.:..... In the winter approx.:.....

- What is the relative humidity in the vicinity of the motor?

min.: max.:

- Which duty cycles apply to the motor? (e.g. S1, S3, etc.)

.....

.....

- Is the drive subject to extreme temperature fluctuations? (e.g. does the drive run for an extended period of time and then cool down or does the operating environment heat up and then cool down again?)

.....

.....

.....

- Are you operating other products (non-SEW products) in the same area?

.....

.....



2. Cleaning the location

- How often does cleaning take place?

..... times daily

..... times weekly

- Are pressure washers used to clean the location? (e.g. Kärcher)

☐

yes, with:

☐

no

- Does the water contain solvents or cleaning agents?

☐

yes, with:

☐

no

- Is the drive regularly exposed to liquids, emulsions or other substances used in the current production?

☐

yes, with:

☐

no

- Are the components compatible with sealing compounds?

☐

yes

☐

no



5 Address Directory

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	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 CZ-50202 Hradec Králové	Tel. +420 495 510 141 Fax +420 495 521 313



Czech Republic			
	Plzeň	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradni 173/2 CZ-32600 Plzeň	Tel. +420 378 775 300 Fax +420 377 970 710
	Ostrava	SEW-EURODRIVE CZ S.R.O. Studentská 6202/17 CZ-708 00 Ostrava-Poruba	Tel. +420 597 329 044 Mobile +420 724 889 965
	Klatovy	SEW-EURODRIVE CZ S.R.O. Technická kancelář Klatovy Domažlická 800 CZ-33901 Klatovy	Tel. +420 376 310 729 Fax +420 376 310 725
Denmark			
Assembly Sales Service	Copenhagen	SEW-EURODRIVE A/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg
Estonia			
Sales	Tallin	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee
Finland			
Assembly Sales Service	Lahti	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Technical Offices	Helsinki	SEW-EURODRIVE OY Luutnantintie 5 FIN-00410 Helsinki	Tel. +358 201 589-300 Fax + 358 9 5666-311 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Hietasaarenkatu 18 FIN-65100 Vaasa	Tel. +358 201 589-300 Fax +358 6 3127-470 sew@sew.fi
	Rovaniemi	SEW-EURODRIVE OY Valtakatu 4 A FIN-96100 Rovaniemi	Tel. +358 201 589-300 Fax +358 201 589-239 sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi
Gabon			
Sales	Libreville	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr



Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 Normanton, West-Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Technical Offices	London	SEW-EURODRIVE Ltd. 764 Finchely Road, Temple Fortune London N.W.11 7TH	Tel. +44 20 8458-8949 Fax +44 20 8458-7417
	Midlands	SEW-EURODRIVE Ltd. 5 Sugar Brook court, Aston Road, Bromsgrove, Worcs B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245
	Scotland	SEW-EURODRIVE Ltd. Scottish Office No 37 Enterprise House Springkerse Business Park Stirling FK7 7UF Scotland	Tel. +44 17 8647-8730 Fax +44 17 8645-0223
Greece			
Sales Service	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Technical Office	Thessaloniki	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr
Hong Kong			
Assembly Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Vélaverk ehf. Bólholti 8, 3h. IS - 105 Reykjavik	Tel. +354 568 3536 Fax +354 568 3537 velaverk@velaverk.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com



India			
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com
Technical Offices	Ahmedabad	SEW-EURODRIVE India Private Limited 306, Shaan office complex, Behind Sakar-IV, Ellisebridge, Ashram Road Ahmedabad – Gujarat	Tel. +91 79 40072067/68 Fax +91 79 40072069 subodh.ladwa@seweurodriveindia.com
	Bengaluru	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bengaluru - 560052 - Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveindia.com ganesh@seweurodriveindia.com
	Chandigarh	SEW EURODRIVE India Private Limited Sujit Kumar Mishra H.No.5464/3 Modern Housing Complex Manimajra Chandigarh -160101	Tel. +91 9878469579 Fax +91 1722738664 saleschand@seweurodriveindia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu	Tel. +91 44 42849813 Fax +91 44 42849816 saleschen@seweurodriveindia.com c.v.shivkumar@seweurodriveindia.com
	Coimbatore	SEW-EURODRIVE India Private Limited Office No 60 Arpee Centre (Opp Annapoorna Hotel) 420 N, NSR Road, Saibaba Colony Coimbatore 641 0111 - Tamil Nadu	Tel. +91 422 2455420 Fax +91 422 2443988 salescmb@seweurodriveindia.com p.selvakumar@seweurodriveindia.com
	Cuttack	SEW-EURODRIVE India Private Limited Plot No.- 1764, Nuasahi, Nayapalli Bhubaneswar-12 Orissa	Tel. +91 9937446333 manoranjana.sahoo@seweurodriveindia.com
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpet Hyderabad - 500016 - Andhra Pradesh	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyd@seweurodriveindia.com ma.choudary@seweurodriveindia.com
	Jamshedpur	SEW-EURODRIVE India Private Limited Flat No.: B/2, B.S. Apartment Road No.: 4, Contractor's area, Bistupur Jamshedpur 831 001 - Chhattisgarh	Tel. +91 9934123671 siddaratha.mishra@seweurodriveindia.com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal	Tel. +91 33 22827457 Fax +91 33 22894204 saleskal@seweurodriveindia.com a.j.biswas@seweurodriveindia.com
	Lucknow	SEW-EURODRIVE India Private Limited 69, Shiv Vihar Colony Vikas Nagar-5 Lucknow 226022 - Uttar Pradesh	Tel. +91 9793627333 amit.nigam@seweurodriveindia.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com p.s.ray@seweurodriveindia.com



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	Pune	SEW-EURODRIVE India Private Limited Lunawat Prism 4th floor, S. No. 148, Neena Co-Operative Housing Society, Paud Road, Pune 411038 - Maharashtra	Tel. +91 20 25380730 / 735 Fax +91 20 25380721 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited A-42, Ashoka Millenium Complex, Ring Road-1, Raipur 492 001 - Chhattisgarh	Tel. +91 771 4090765 Fax +91 771 4090765 sutanu.sarkar@seweurodriveindia.com
Indonesia			
Sales	Medan II	PT. Serumpun Indah Lestari Jl. Pulau Solor NO. 8 Kawasan Industri Medan II	Tel. +62 61 687 1221 Fax +62 61 687 1429 serumpunindah@yahoo.com
Ireland			
Sales Service	Dublin	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie
Israel			
Sales	Tel-Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly Sales Service	Solaro	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical Offices	Bologna	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 I-40064 Ozzano dell'Emilia (Bo)	Tel. +39 051 65-23-801 Fax +39 051 796-595
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 I-81020 S. Nicola la Strada (Caserta)	Tel. +39 0823 219011 Fax +39 0823 421414
	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 799781
	Pescara	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa,132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 085 41-59-643
	Torino	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C I-10135 Torino	Tel. +39 011 3473780 Fax +39 011 3473783
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via P. Sgulmero, 27/A I-37132 Verona	Tel. +39 045 89-239-11 Fax +39 045 97-6079



Ivory Coast			
Sales	Abidjan	SICA Société industrielle & commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1115 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical Offices	Fukuoka	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th floor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Omarimon Yusen Bldg. 13th floor 3-23-5 Nishinbashi, Minato-ku Tokyo 105-0003	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp
Kazakhstan			
Sales	Almaty	TOO "СЕВ-ЕВРОДРАЙВ" 050061, Республика Казахстан г.Алматы, пр.Райымбека, 348	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com
Lebanon			
Sales	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@info.com.lb
Jordan Kuwait Saudi Arabia Syria	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
Assembly Sales Service	Brüssel	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be



Malaysia			
Assembly Sales Service	Johore	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical Offices	Kota Kinabalu	SEW-EURODRIVE Sdn Bhd (Kota Kinabalu Branch) Lot No. 2, 1st Floor, Inanam Baru Phase III, Miles 5.1 /2, Jalan Tuaran, Inanam 89350 Kota Kinabalu Sabah, Malaysia	Tel. +60 88 424792 Fax +60 88 424807
	Kuala Lumpur	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 5229633 Fax +60 3 5229622 sewpjy@po.jaring.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTL D Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 seweurodrive@po.jaring.my
Mauritania			
Sales	Zouérate	AFRICOM - SARL En Face Marché Dumez P.B. 88 Zouérate	Tel. +222 544 0 314 Fax +222 544 0 538 cybertiris@mauritel.mr
Mexico			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Morocco			
Sales	Casablanca	Afit Route D'El Jadida KM 14 RP8 Province de Nouaceur Commune Rurale de Bouskoura MA 20300 Casablanca	Tel. +212 522633700 Fax +212 522621588 fatima.haqui@premium.net http://www.groupe-premium.com
Netherlands			
Assembly Sales Service	Rotterdam	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz



New Zealand			
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Technical Office	Palmerston North	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Peru			
Assembly Sales Service	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Poland			
Assembly Sales Service	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	24 Hour Service		Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Technical Office	Tychy	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fabryczna 5 PL-43-100 Tychy	Tel. +48 32 32 32 610 Fax +48 32 32 32 647
	Bydgoszcz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fordońska 246 PL-85-959 Bydgoszcz	Tel. +48 52 3606590 Fax +48 52 3606591
	Poznan	SEW-EURODRIVE Polska Sp.z.o.o. ul. Romana Maya 1 PL-61-371 Poznań	Tel. +48 61 8741640 Fax +48 61 8741641
	Radom	SEW-EURODRIVE Polska Sp.z.o.o. ul. Słowackiego 84 PL-26-600 Radom	Tel. +48 48 365 40 50 Fax +48 48 365 40 51
	Szczecinek	SEW-EURODRIVE Polska Sp.z.o.o. ul. Mickiewicza 2 PL-78-400 Szczecinek	Tel. +48 94 3728820 Fax +48 94 3728821
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt



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	Porto	SEW-EURODRIVE, LDA. Av. 25 de Abril, 68 4440-502 Valongo	Tel. +351 229 350 383 Fax +351 229 350 384 MobilTel. +351 9 32559110 esc.porto@sew-eurodrive.pt
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly Sales Service	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
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	Irkutsk	ZAO SEW-EURODRIVE 5-Armii Str., 31 RUS-664011 Irkutsk	Tel. +7 3952 25 5880 Fax +7 3952 25 5881 iso@sew-eurodrive.ru
	Moskau	ZAO SEW-EURODRIVE RUS-107023 Moskau	Tel. +7 495 9337090 Fax +7 495 9337094 mso@sew-eurodrive.ru
	Novosibirsk	ZAO SEW-EURODRIVE pr. K Marksa, d.30 RUS-630087 Novosibirsk	Tel. +7 383 3350200 Fax +7 383 3462544 nso@sew-eurodrive.ru
	Togliatti	ZAO SEW-EURODRIVE Sportivnaya Str. 4B, office 2 Samarskaya obl. RUS-445057 Togliatti	Tel. +7 8482 710529 Fax +7 8482 810590
Senegal			
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Serbia			
Sales	Beograd	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com



Slovakia			
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	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
	Port Elizabeth	SEW-EURODRIVE PTY LTD. 8 Ruan Access Park Old Cape Road Greenbushes 6000 Port Elizabeth	Tel. +27 41 3722246 Fax +27 41 3722247 dtait@sew.co.za
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Index

A

Abbreviation key	120
Adapter cable	44
Air admission and accessibility	26
Ambient temperature	63, 65, 68, 71
Application options	
GIO12A	73
GIO13A	73
Technical data	73
AS-Interface	
Binary slave GLK30A	67
GLK31A double slave	67
Technical data	67

B

Binary inputs	64, 66
Binary slave	67
Braking resistor	
BW1	137
Calculation example	137
Regenerative load capacity	137

C

Cable entry position	42
Cable glands	38
Cables, available	80, 82, 84, 85, 89, 91, 93, 94, 97, 99, 101, 104, 106, 107, 110, 112, 114, 115
Cables, recommended	117, 118
Cables, required	116
CAN adapter	44
CAN connection cable	117
Cleaning	35
Coating	26
Connection	
PC	44
Connection cable notes	75
Connection cables, available	80, 82, 84, 85, 89, 91, 93, 94, 97, 99, 101, 104, 106, 107, 110, 112, 114, 115
Connection cables, recommended	117, 118
Connection cables, required	116
Content of this publication	7
Control range, extended	126

D

Design notes	46, 49
Dimension drawings	52
Information	52
MGF..2	53
MGF..2 with application option	56
MGF..4	54
MGF..4 with application option	57
MGF..4.. /ET	55
MGF..4.. /ET with application option	58
MOVIGEAR® DAC plug connectors	60
MOVIGEAR® DBC plug connectors	59
MOVIGEAR® DSC plug connectors	61
Documentation, additional	7
Double slave	67
Drive selection (pallet conveyor example)	133
DynaStop®	43, 138
Deceleration torques	139
Functional description	138

E

Electronics design	43
Extended control range /ECR	43, 126
Extended storage	39

F

FKM oil seal	31
--------------------	----

G

GIO12A	73
GIO13A	73
GLK30A	67
GLK31A	67

H

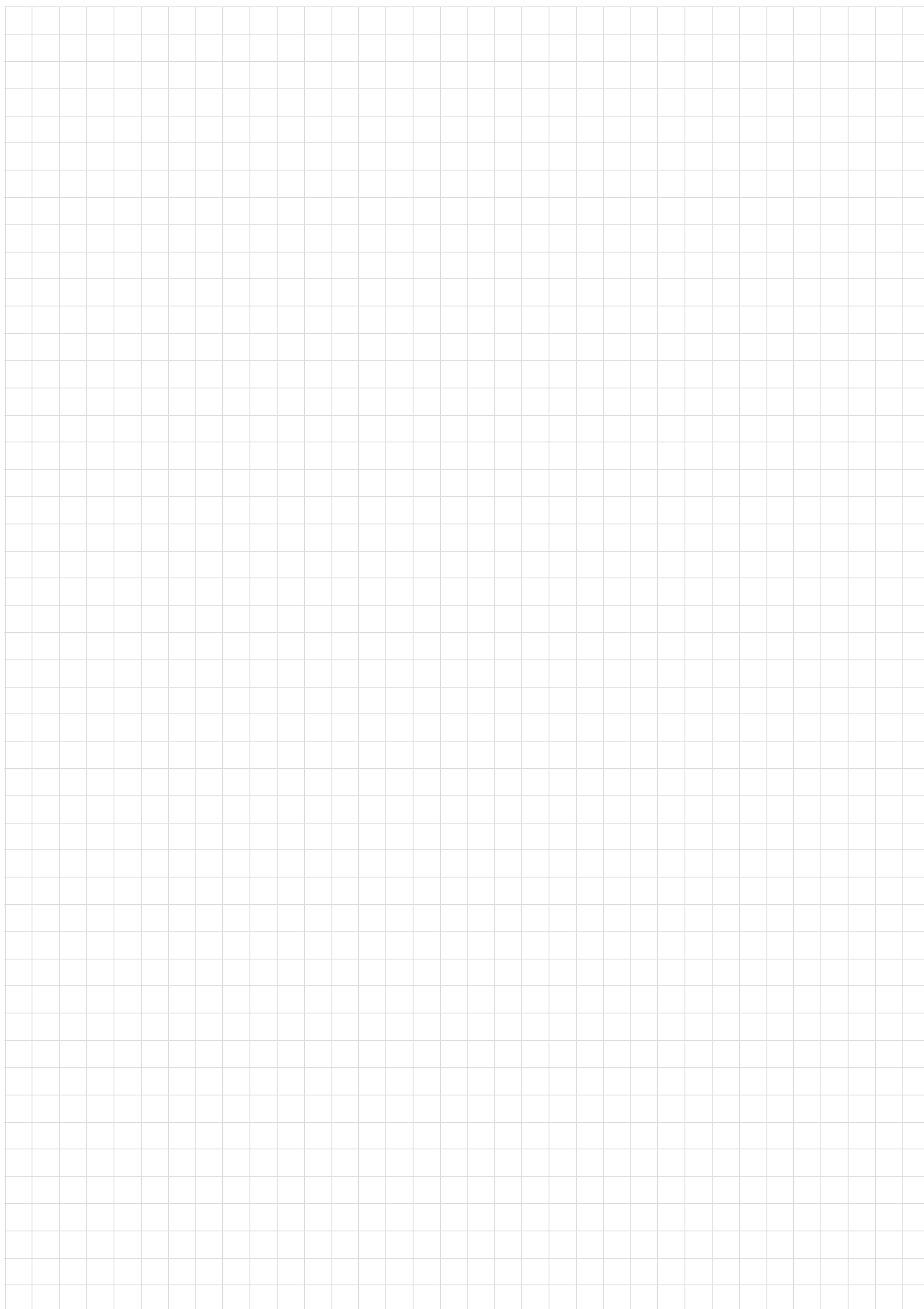
High protection coating HP200	
Certificate	36
High Protection surface HP200	
Technical data	35
High Protection surface treatment HP200	30
Hollow shaft with key (MGFA..)	49
Hollow shaft with keyway (MGFA..)	
Assembly options	49
Installation/removal kit	50
Provided fastening parts	49

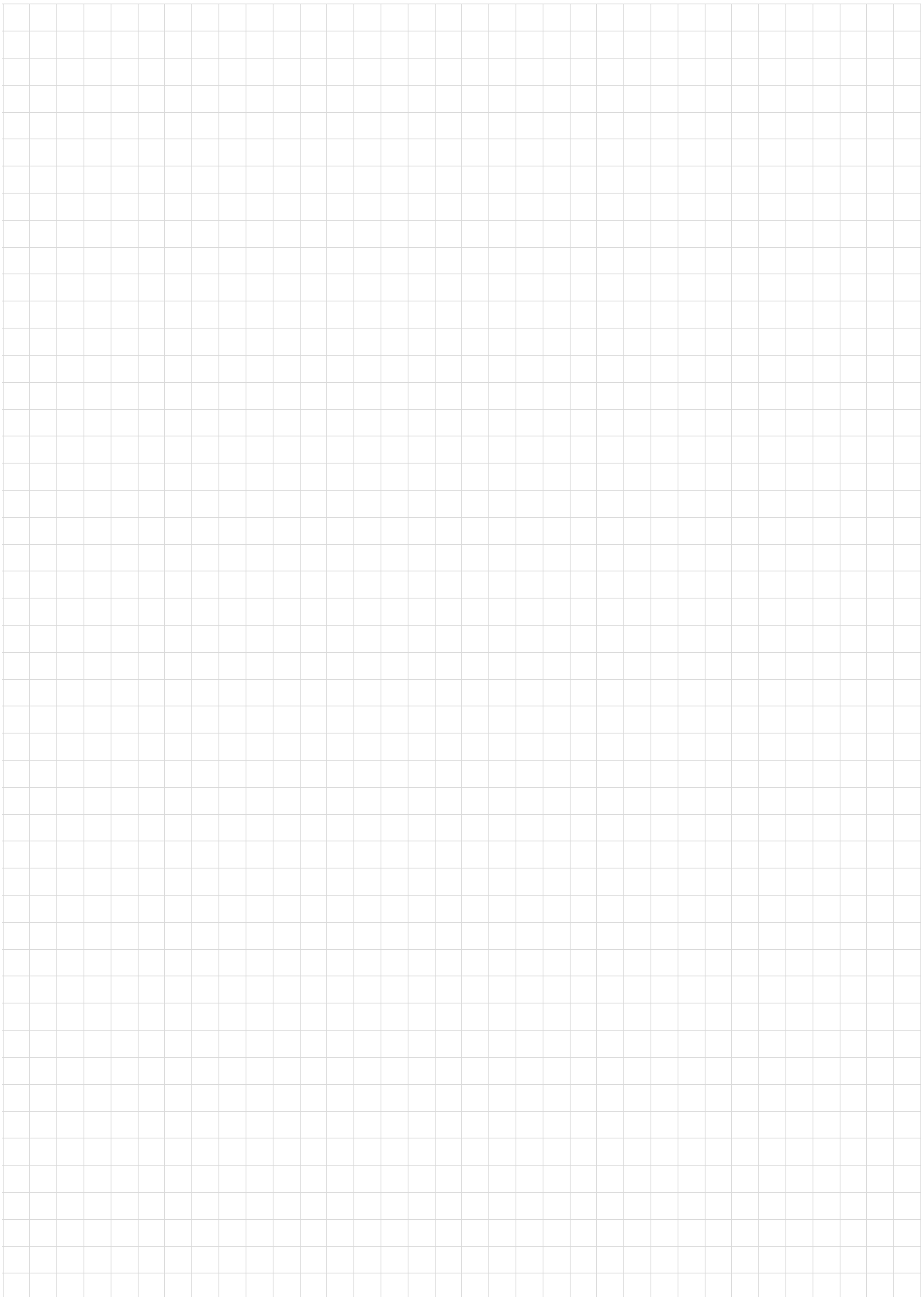


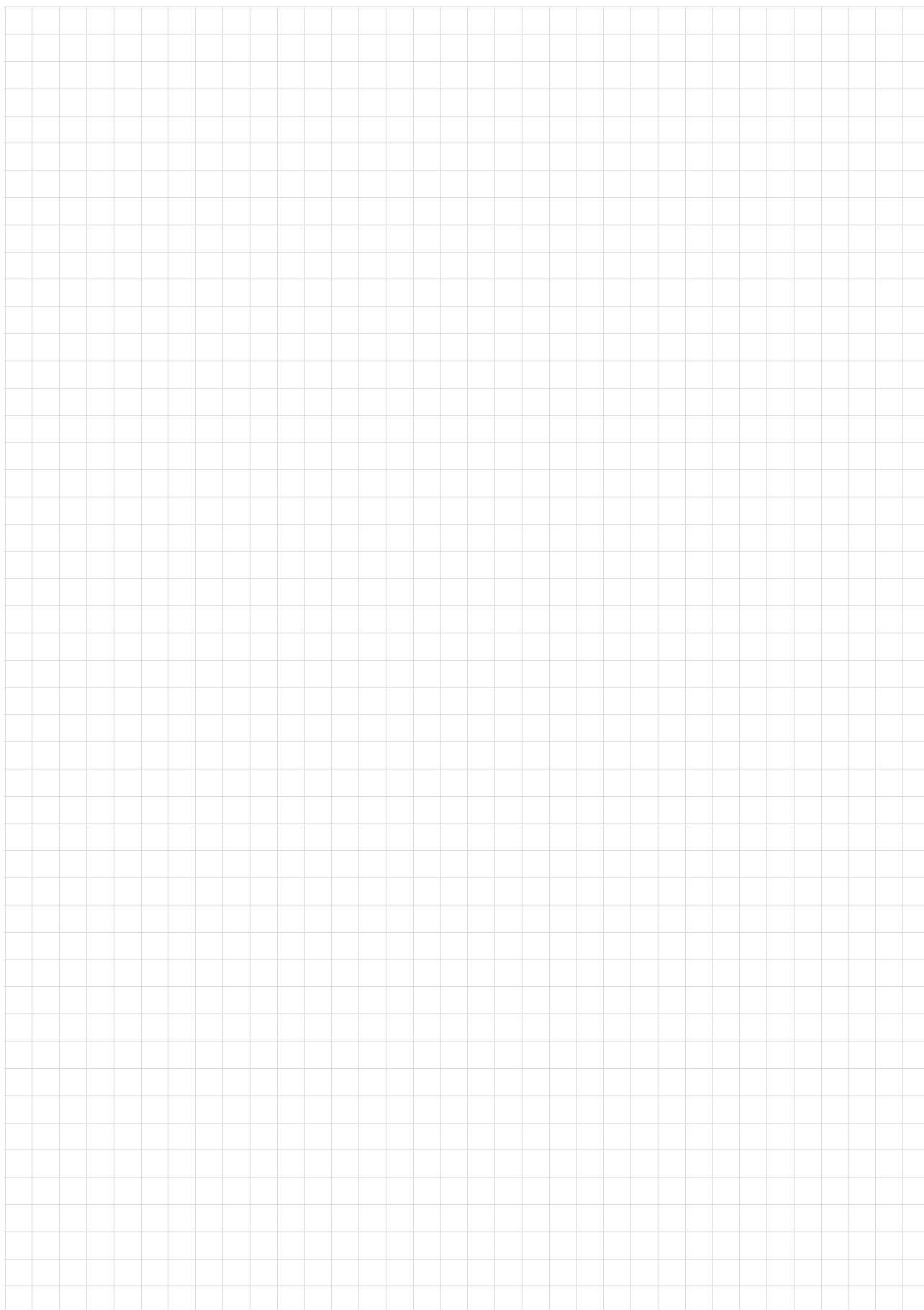
Housing mounting	28	Plug connectors	44
Housing with threads (MGF.S).....	28	Connection cables	75
Torque arm (MGF.T).....	28	Designation key	75
HP200	30, 35	Plug connector positions.....	78, 86, 95, 108
Hybrid cables	118	Plug connector variants	77
I		Restrictions	76
Increased torque /ET	43, 125, 129	Power and torque ratings.....	26
Installation (electrical)		Product groups	5
PC connection.....	44	Project Planning	
J		MOVIGEAR® load profile.....	121
Jumper plug STO	75	Project planning	
L		Abbreviation key	120
Lubricants	46	Drive selection data	130
Fill quantities	46	DynaStop®	138
Key.....	47	Load capacity – integrated braking resistor	137
Lubricant table	48	Pallet conveyor example.....	133
Roller bearing greases	47	Project planning procedure.....	131
M		Selection according to the torque class	122
Motion control inputs	69, 72	Wet areas	141
Mounting positions	41	Project planning procedure.....	131
MOVIGEAR® electronics cover.....	43	Protection measures, special.....	31
MOVIGEAR® load profile	121	S	
MOVIGEAR® package for wet applications	44	Screw connections.....	38
MOVIGEAR® torque class	122	Diagnostic interface	38
N		Plug connector.....	38
NOCO® fluid.....	31	Potentiometer	38
Noise levels.....	26	Pressure compensation	38
Nomenclature.....	29	Screw plugs	38
O		Sealing material	34
Operating notes	46	Selecting MOVIGEAR® according to the	
Order specifications	41	torque class	122
P		Sensor inputs.....	69, 72
Package for wet areas, MOVIGEAR®		Service	
Mounting positions	33	Extended storage.....	39
Package for wet areas, optional.....	32	SEW-EURODRIVE	
PC connection.....	44	Group of companies	4
PEAK CAN adapter.....	44	Products.....	5
		systems.....	5
		Shaft variants.....	27
		Hollow shaft and keyway (MGFA..)	27
		TorqLOC® hollow-shaft mounting system	
		(MGFT..)	27
		Signal relay	64, 66
		SNI cables	116
		Speed ratings.....	26
		Storage conditions	39
		Surface and corrosion protection.....	26
		Surface protection.....	30

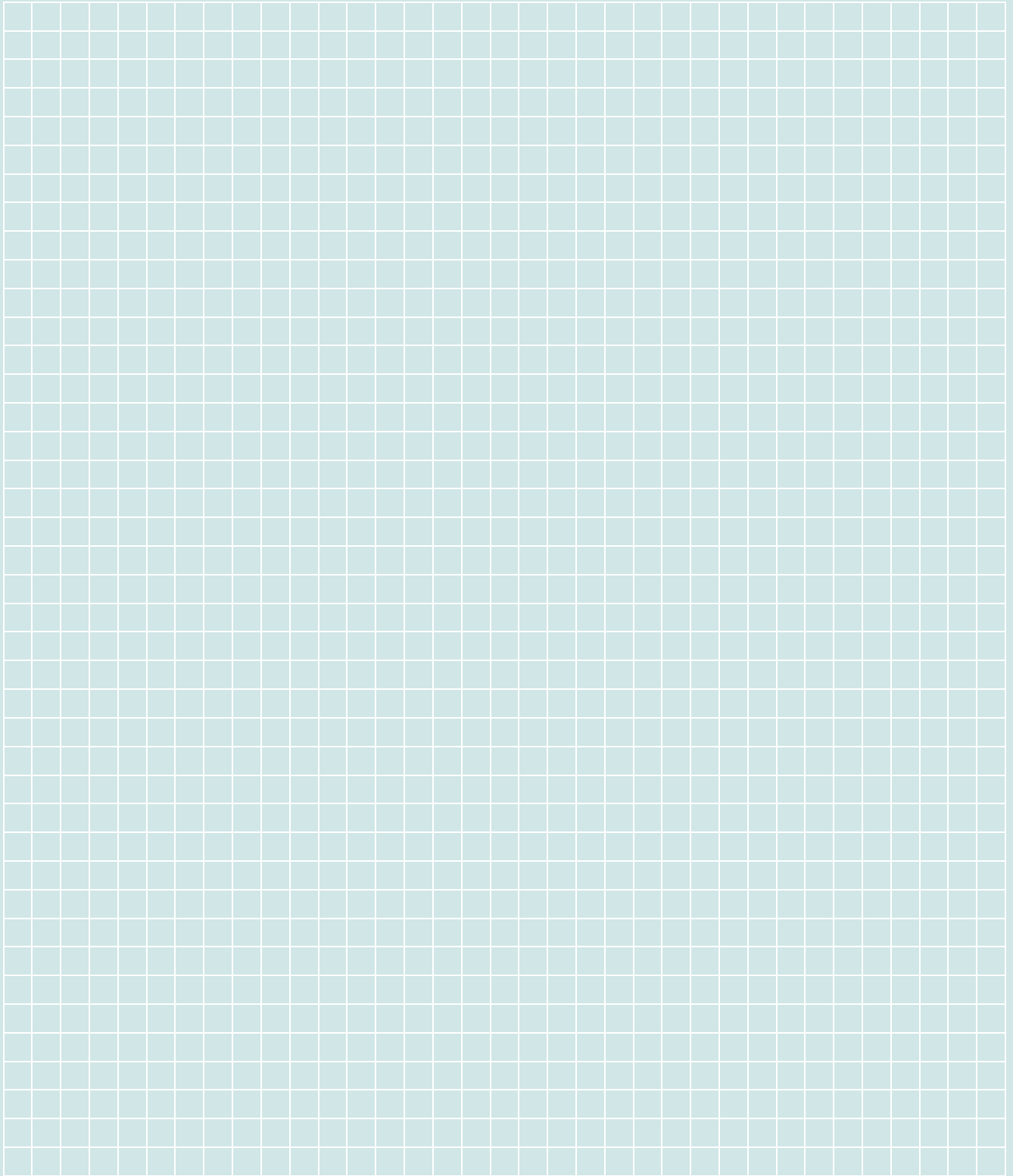


System Description	8	Torque, increased /ET	125, 129
Advantages at a glance	9	Type designatin	
MOVIGEAR®	8	MOVIGEAR®	29
System description		Type designation	
Controller	23	Application options.....	29
Direct AS-Interface Communication (DAC).....	16	Plug connectors	75
Direct Binary Communication (DBC)	14		
Direct SBus Communication (DSC).....	19	U	
MOVIGEAR® drive units	10	Unit design	
Single Line Network Installation (SNI)	21	Housing mounting.....	28
		Optional package for wet areas	32
T		Position of the cable entry	42
Technical data		Shaft variants.....	27
Ambient temperature	63, 65, 68, 71		
Application options.....	73	W	
AS-Interface	67	Weight data.....	26
Binary inputs/signal relay	64, 66	Wet areas	141
Connection cables	116		
Deceleration torques DynaStop®	139	X	
Design notes	49	X1203_1	79, 88, 96
Dimension drawings.....	52	X1203_2	79, 88, 96
General technical data	63, 65, 68, 71	X1231	98
HP200 surface	35	X1241_1	109
Lubricants	46	X1241_2	109
Motion control inputs.....	69, 72	X2324	100
SBus interface.....	70	X4103	102
Screw connections.....	38	X4104	102
Surface protection.....	30	X4271	87
TorqLOC® hollow shaft mounting system		X5011	87
(MGFT..)	51	X5131	103, 111
Torque characteristics		X5132	81, 90
Extended control range (/ECR option)	126	X5502	83, 92, 105, 113
MGF..2	122	X5503	85, 94, 107, 115
MGF..2../ECR	126		
MGF..4	124	Symbols	
MGF..4../ECR	128	/DSP	43
MGF..4../ECR/ET	129	/ECR	43, 126
MGF..4/ET	125	/ET	43, 125, 129
Standard control range	122		











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