SEW EURODRIVE

# Products and Innovations

April 2010 – November 2010

Drive 360° – Seeing the big picture

# Products and Innovations: April 2010 – November 2010

**SEW-EURODRIVE—Driving the world**

## Drive 360° – Seeing the big picture


Power made in Germany: Industrial gear units up to 680 kNm 4
Seeing the big picture:
Product-independent, industry-specific, worldwide 10
CLASSIC drive technology: Variety and quality from the modular system 12
VARIOLUTION® packages: Functionalities for all industries 14
MAXOLUTION® system solutions for individual requirements 18
effiDRIVE® energy-saving concepts 20
Solutions for reducing Total Cost of Ownership 22


## Innovations


Product announcement: MOVIGEAR®, certified for air cleanliness class 2 24
Product announcement: Stainless steel gearmotors 26
Product announcement: Strong combination partner:
MOVIDRIVE® B inverter up to 315 kW 28
Product announcement: CMP servomotor series, sizes 71–100 30
Product announcement: "standard" performance class controller 32


## Services


DriveBenefits 156
DriveGate® 158
DriveConfigurator 159
CDS® – Complete Drive Service 160
DriveAcademy® 162


**Not all the products listed here are available worldwide. If you have any questions on the terms and conditions for delivery, please contact your SEW-EURODRIVE country representative.**

CLASSIC

## Gearmotors and frequency inverters


CLASSIC drive technology:
Gearmotors and frequency inverters 34
Standard gear units / standard gearmotors 36
Accessories and options 40
Electrified monorail systems 42
Explosion-proof drives 44
Aseptic gearmotors 48
Corrosion and surface protection 50
DR motor – One variant for the world 54
DRS/DRE/DRP series standard and energy efficient motors 58
Modular brake system, built-in encoders and additional features 59
DRL/DRM/DRK series AC motors 62
MOVITRAC® LTE B frequency inverters 64
MOVITRAC® B frequency inverters 66
MOVIDRIVE® inverters 68
MOVITRAC® B and MOVIDRIVE® options 70
effiDRIVE® – Energy efficiency of frequency and drive inverters 72
MOVIGEAR® – The mechatronic drive system 74


1

## Servo drive systems


CLASSIC servo drive systems 80
MOVIAXIS® multi-axis servo drives 82
effiDRIVE® – Energy efficiency with servo drive systems 84
Synchronous servomotors 86
Synchronous linear servomotors 90
Electric cylinders 92
Planetary servo gear units 94
Helical-bevel servo gear units 96
Explosion-proof servo drive technology 98
System solutions with servo gearmotors 100
Cable management and connection options 104


2

## Decentralized drive systems


CLASSIC drive systems for decentralized installation 106
MOVIMOT® gearmotor with integrated frequency inverter 108
MOVI-SWITCH® gearmotor with integrated switching and protection function 109
Fieldbus interfaces, field distributors and cable systems 110
MOVIFIT® decentralized drive controller 112
MOVIPRO® SDC/ADC – Compact power for decentralized applications 116
MOVITRANS® contactless energy transfer 118


3

## Industrial gear units


CLASSIC industrial gear units 122
Helical gear units / bevel-helical gear units 124
Planetary gear units 125
Explosion-proof industrial gear units 126


4

## Other system components and services


Other system components and services 129
Control technology 130
Controller – Overview of hardware and accessories 132
Free programming of applications with MOVI-PLC® 136
Configuring applications with the Configurable Control Unit (CCU) 137
DOP operator panels 138
Engineering software MOVITOOLS® MotionStudio 140
Parameterizable plant software MOVIVISION® 142
Project planning tools: Servo project planning tool, EPLAN® macros / Sample programs for SIMATIC S7 144
Fieldbus concepts:
– Industrial EtherNet 146
– EtherCAT® 148
Diagnostic units 150
Functional safety technology 152
Safe fieldbus: PROFIsafe 154


5

# Optimum logistics and quality

Top Services

# Industrial gear units: Power made in Germany

Being one of the leading drive technology experts we also develop powerful industrial gear units. For this purpose we now have completed construction of a state-of-the-art, efficient plant with a unique modular production concept. At the new industrial gear unit plant in Bruchsal, Germany, we have successfully started the central production and assembly of industrial gear units mainly for the European market.

**What are your benefits?**

- Optimum logistics for quick and convenient transport, and a quality that meets the highest standards.
- Top services covering planning and engineering all the way to startup, and beyond
- Customized and at the same time economical solutions, and
- a premium range of industrial gear units based on the proven modular concept that offers 5 series as well as an extensive selection of gear unit types and sizes.

SEW
EURODRIVE

# Customized solutions Premium range of products

# Drive 360° – Seeing the big picture

Drive technology from SEW-EURODRIVE stands for product variety and quality, reliability and innovative strength. Features that all our products of the comprehensive modular system, the **CLASSIC** drive technology, have in common and have made SEW-EURODRIVE one of the globally leading manufacturers of drive technology worldwide.

**CLASSIC** – a perfect basis also for all the challenges of the future. In order to "see the big picture" and to implement all the solutions, SEW-EURODRIVE has been continuously developing its range of products and services: For example, the industry-oriented **VARIOLUTION®** packages and customer-specific **MAXOLUTION®** system solutions set new standards by implementing specific tasks, also in the field of services, to support our customers.

SEW-EURODRIVE is undergoing a change – the change to a drive technology expert: We create and implement solutions today for the tasks of tomorrow – worldwide.

This is what we call Drive 360° – Seeing the big picture: From system availability to problem-solving competence, from low operating costs over energy efficiency to the complete system that handles all your tasks.

Drive 360

Seeing the big picture.

## Focus on the details: Product-independent and industry-specific solutions – worldwide

Ensure smooth and reliable plant operation, minimize the maintenance effort, and maximize the added value for our customers – these are the objectives of SEW-EURODRIVE when talking about industry-specific solutions. We want to make sure that you operate your machines and systems in a safe and efficient manner at any time so that costly downtimes can be avoided.

Products and systems from SEW-EURODRIVE are therefore used all over the world: In industries such as automotive, building and building materials, food and consumer goods, metal processing or wood processing, transportation and logistics, in ports or airports, and many more. The decision to use drive technology "made by SEW-EURODRIVE" means reliability for function and investment.

SEW-EURODRIVE supports and ensures all this by its global presence: Twelve production plants and 67 assembly plants in 47 countries provide for worldwide availability, short delivery times, and comprehensive service, which we view as integrative service concept we consistently implement in customer orientation.

**All these components together – "The big picture" – in their entirety make SEW-EURODRIVE one of the top drive technology suppliers worldwide. Furthermore, they make SEW-EURODRIVE a global partner that solves problems and provides an answer to any challenge.**

# CLASSIC –
## Variety and quality from the modular system

CLASSIC drive components from SEW-EURODRIVE have become firmly established in the international machine and plant engineering industry. The SEW-EURODRIVE modular concept offers millions of combinations and, as a result, provides the perfect condition for choosing the drive that optimally suits the specific application.

**Gearmotors and frequency inverters**
Our gear units and gearmotors offer an unmatched fine graduation of power ranges and excellent economical requirements for use in many machines and systems. Our electronic components, the MOVITRAC® frequency inverters and MOVIDRIVE® drive inverters, supplement our gearmotors and blend perfectly with the systems offered by SEW-EURODRIVE. 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.

**Servo drive systems**
Products of the servo drive system from SEW-EURODRIVE convince by their precision and dynamics. Low-backlash servo gear units, compact servomotors, efficient electric cylinders, and MOVIAXIS® multi-axis servo inverters provide exact movements for any system architecture. From single-axis or multi-axis applications all the way to synchronized process sequences, servo drive systems from SEW-EURODRIVE offer flexible and customized solutions.

No matter whether the components are mechanical, electronic, or mechatronic ones, they are used depending on the speed and torque range, space, and ambient conditions required by the specific application. CLASSIC drive technology from SEW-EURODRIVE implements an infinite number of customized drive solutions matching the specific requirement profiles.

**Decentralized drive systems**

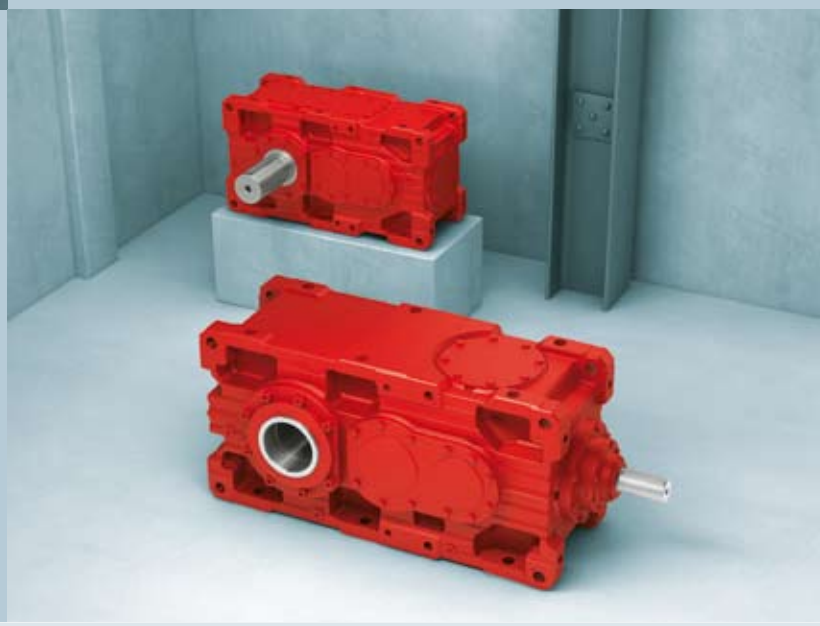
SEW-EURODRIVE provides control cabinet independent components for economical, decentralized installation. For example, the decentralized drive controller MOVIFIT®, the gearmotor with integrated frequency inverter MOVIMOT®, or MOVI-SWITCH®, the gearmotor with integrated switching and protection function. With the hybrid cables specifically designed by SEW-EURODRIVE, we ensure cost-effective solutions, independent of system philosophy or size.

Latest developments of SEW-EURODRIVE:

– System components for contactless energy transfer MOVITRANS®
– MOVIPRO® SDC/ADC compact power for decentralized applications

**Industrial gear units**

Power, quality, and sturdy design combined in one standard product: Industrial gear units from SEW-EURODRIVE combine all requirements of modern industrial gear units. Standardized but always flexible due to the modular concept, industrial gear units from SEW-EURODRIVE can even be operated under difficult conditions and provide movement wherever high torque ratings and maximum reliability are required.



# Scalable application solutions from one source: **VARIOLUTION®** packages

With the new VARIOLUTION® packages, SEW-EURODRIVE has succeeded in developing scalable solutions for industry-specific drive tasks. These complete technical solutions support machine and plant manufacturers already in the planning phase and in this way contribute to optimizing the value creation chain.

## We focus on your requirements

In addition to drive technology, we provide the software matching the application with warranty of proper functioning, optimized order and delivery processes as well as user-specific documentation. The range of services matching the specific package, such as startup or customizing the software module, provides even more added value for project planners and operators.

**VARIOLUTION® packages:**
**Innovative and comprehensive**

- Proven drive and automation technology
- Function-oriented software modules
- Optimized order and delivery processes
- Application-specific documentation
- Individual adaptations are possible

**Your added value when using VARIOLUTION® packages:**

- Scalable solutions
- Reliable plant planning
- Faster implementation
- Optimized process costs

**VARIOLUTION® conveyor line**
This package is characterized by its modularity and high efficiency and was designed to meet the requirements of modern conveyor lines. It consists of decentralized technology with energy-saving drive technology and satisfies all the requirements of flexible system design.

**VARIOLUTION® corner transfer unit**
Corner transfer units are an integral part of conveyor lines for the most various products. Whether for rotary table applications or change of direction by means of lifting or transverse movement, this package offers the optimal drive and control concept for all kinds of requirements.

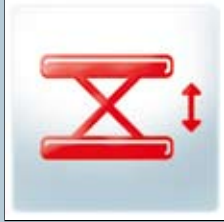
**VARIOLUTION® item transport**
This package takes account of the special aspects for transporting different containers in filling systems. Optimized for applications in wet areas, this package meets hygienic property requirements and is resistant against cleaning agents.

**VARIOLUTION® packaging unit transport**
These package types allow for universal but still flexible solutions for transporting empties, packages, and pallets. And the mechatronic drive system MOVIGEAR® lets you significantly reduce installation costs.

**VARIOLUTION® FFS machine**
This package comprises the main functions of an FFS machine. The dynamic servo drives are controlled by the modular software concept “MultiMotion packaging machine” and connect all functions via standardized interfaces.

**VARIOLUTION® packing/unpacking**
Package for gentle and dynamic packing and unpacking. Integrated software modules meet these requirements while at the same time allowing for flexible product positioning.

**VARIOLUTION® vertical conveyor**
Depending on the application, lifting applications can be designed with control cabinet or decentralized technology. The integrated function enables accurate positioning of both axes. This package is characterized by safe lifting and flexible positioning.



**VARIOLUTION® scissor lift table**
Scissor lift tables are used for lifting heavy loads within the work area. These packages allow for concepts with control cabinet or decentralized technology. Simple positioning is possible with just two lifting heights or with several levels.

# **VARIOLUTION®** storage/retrieval system: A package from practical experience

## Up to 30 % less energy consumption due to intelligent software and energy regeneration

The VARIOLUTION® storage/retrieval system type “with regeneration unit for energy efficieny” is designed for pallet storage in high bay warehouses that are to be operated with a minimum of energy consumption.

All drives are coordianted by the MOVI-PLC® controller, which is integrated in the MOVIAXIS® multi-axis servo inverter. An innovative software application module enables energy savings of up to 25 % due to optimized travel cycles of vertical lifting drive and horizontal travel drive. Even up to 30 % of energy can be saved when energy released via capacitor module during deceleration and downward movement is fed back to the system.

**Software:**
**Energy-saving SRU application module**

- Special energy-saving algorithm for coordinating horizontal travel and vertical lifting drives
- Energy saving of up to 25 %
- Graphical startup and diagnostics
- A maximum of four auxiliary drives are supported
- Individual adaptation in IEC 61131-3 possible

**Energy efficiency by integrated energy regeneration**

- Up to 30 % of energy saved in combination with the application module
- Braking resistors are no longer required
- Less complex wiring

# MAXOLUTION® – Individual system solutions for every movement

MAXOLUTION® systems provide future-oriented, new standards: Individual system solutions by SEW-EURODRIVE with guarantee for success. MAXOLUTION® systems offer all the components needed to implement customer-specific solutions for systems and machines. These components range from electromechanical drives and the controller to communication and visualization to contactless energy transfer.

## From planning to maintenance – everything from one source

System specialists with industry-specific expertise make up a core team that cooperates closely with the sales and service staff you know. In this way we guarantee optimum support and technical advice from project planning to maintenance – competent, fast, straightforward and comprehensive.

Based on our CLASSIC components and the VARIOLUTION® packages, such as AGV or EMS, we offer individual, customized solutions for systems and machines in all areas of system automation. The resulting standardization and optimum matching of all components make for fewer interfaces and less maintenance storage.

As a consequence, the costs incurred throughout the entire product life cycle decrease significantly. At the same time, the performance and flexibility of your machines is improved and power consumption is reduced.

## Individual system solutions

- System expertise, consulting competence
- concept preparation, project planning
- technology modules
- project management and processing
- startup, acceptance, production monitoring
- system documentation
- training, maintenance

The Guedel "RoboLoop" robot –
a versatile all-rounder
with SEW-EURODRIVE.

# Go the energy-efficient way with effiDRIVE®

SEW-EURODRIVE offers a comprehensive energy-saving concept to enable customers to tap all of the available energy-saving potential in drive technology. Solutions that achieve the desired energy savings in one application may lead to higher overall energy consumption in another application. For this reason, the effiDRIVE® energy-saving concept forces a comprehensive review and consistent implementation of all-energy saving factors that come into consideration – for each individual application.

Since the requirements for electrical drive technology are determined by its different applications, it is impossible to make a blanket statement about the possible savings potential. The concept is based on three pillars:

## 1. Modular energy-saving system

The concept is shaped by the proven modular concept of SEW-EURODRIVE. The components contained in the modular energy-saving system are optimized, taking both energy consumption and efficiency into account. The energy-saving properties of the individual components are considered as early as the development, according to the specific requirements of the application.

## 2. Energy consulting

Energy consulting is the primary service in the SEW-EURODRIVE energy-saving concept. Customer-specific consulting is absolutely necessary to determine the individual requirements for the industry and application and to find the optimal energy-saving solution. This applies to both existing systems and new systems that are yet to be developed.

## 3. Energy-efficient solutions

Within the effiDRIVE® concept, the energy-efficient solutions represent the measurable result for the customer. Working closely together, SEW-EURODRIVE consultants develop the optimal solution for the customer. Drawing upon an extensive wealth of experience, they come up with energy-saving solutions which have already been successfully implemented and tested.

effiDRIVE®

1

Modular energy-saving system

2

Energy consulting

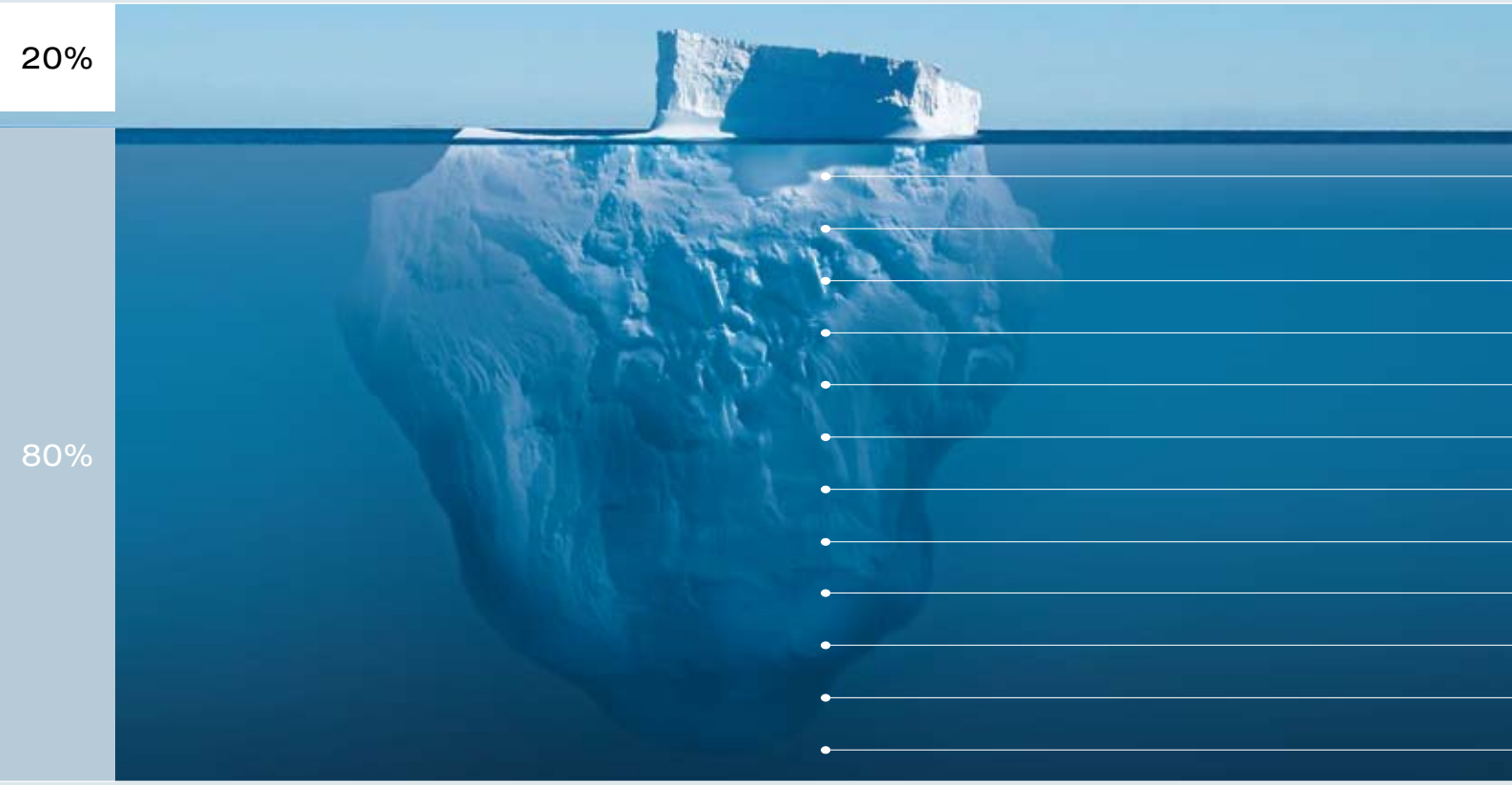
3

Energy-efficient solutions

# Solutions for reducing the total cost of ownership

The decision to buy a product in the global competition is increasingly being influenced by the follow-up costs arising from the purchase, utilization, and disposal of the product. These follow-up costs are, among others, also influenced by the drive-relevant components installed in a machine or system, such as

– operating functionality and effectiveness,
– maintenance effort, energy costs and
– costs resulting from planned and unplanned downtimes




**Detect and minimize hidden costs**

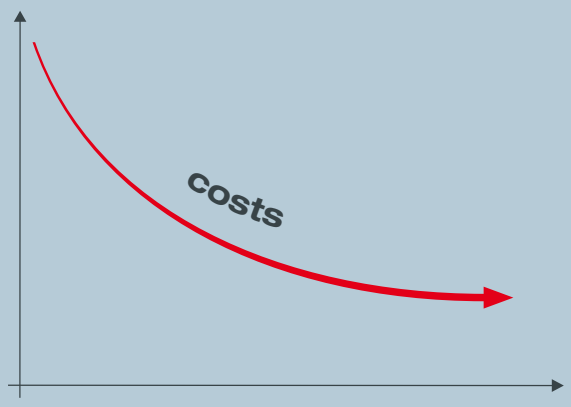
TCO solutions by SEW-EURODRIVE let you achieve cost transparency and act in a future-oriented manner.

## Investment costs

- Startup
- Training
- Additional accessories
- Spare parts
- Maintenance/service
- Personnel
- Tax
- Insurance
- Energy
- Replacement system procurement
- Retrofitting
- Disposal

**Total Cost of Ownership (TCO)**

## Reducing follow-up costs:




**Reducing energy costs**
More than 95 % of a motor's life cycle costs are energy costs. The highly efficient energy-saving motors from SEW-EURODRIVE are equipped with copper die-cast rotors. These rotors have a high electric conductance and minimized heat and additional losses resulting in great energy-saving potential when it comes to energy consumption.

**Reducing maintenance effort**
For example with MOVITRANS® contactless energy transfer. This technology is based on the principle of induction allowing for contactless energy transfer. Its application is simple and robust, and it is free of wear and soiling. Result: longer maintenance intervals and higher system availability.

**Reducing overall costs**
The MOVIGEAR® mechatronic drive system combines motor, gear unit and electronics in a compact housing with the result that energy is reduced by up to 50 %. Installation, startup, and integration can be carried out quickly thanks to the networking capability of the components. Result: reduction of overall costs.

**TCO solution by SEW-EURODRIVE increase the efficiency of your processes and make a sustainable contribution to the reduction of $CO_2$ emissions.**

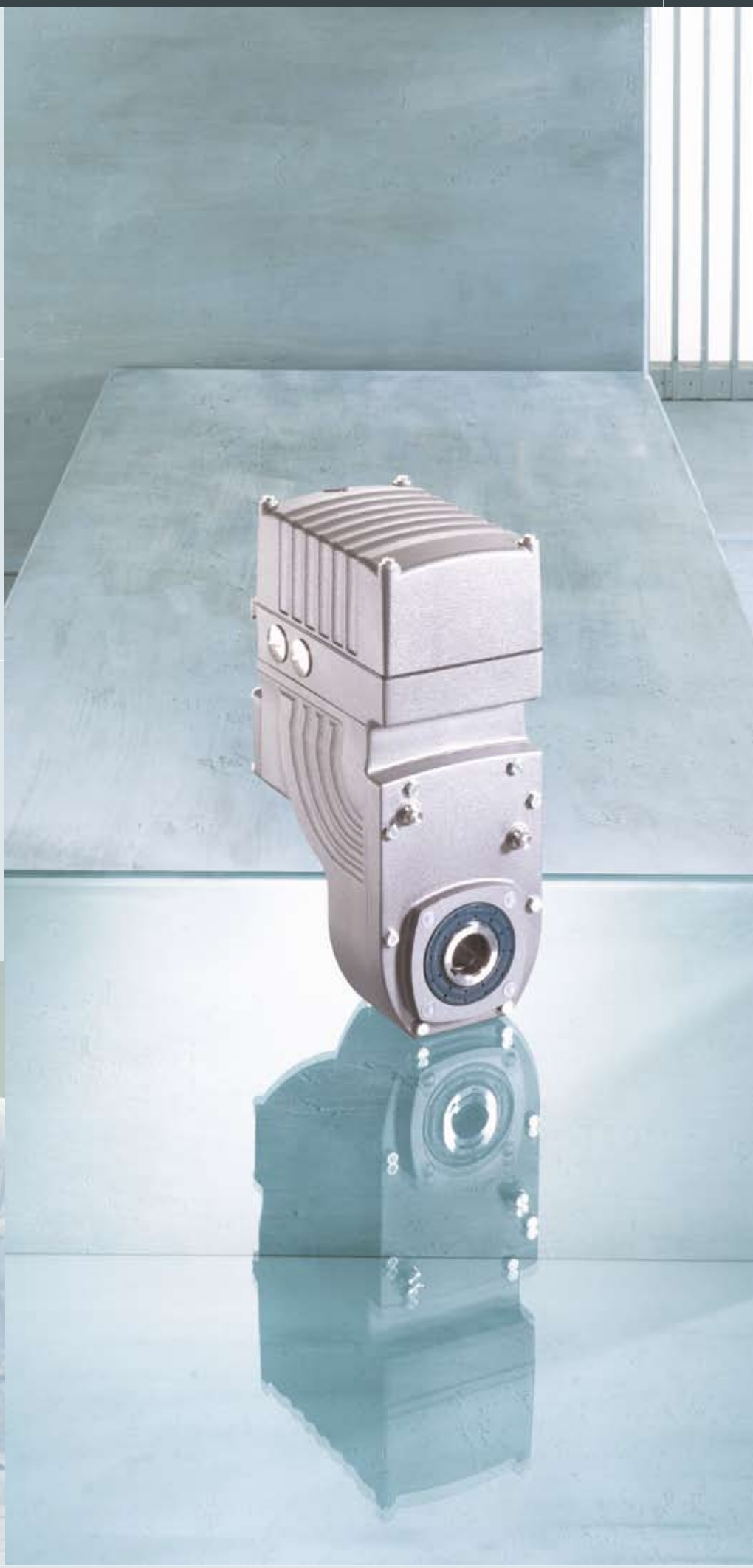
# NEW: Certified for air cleanliness class 2*: the MOVIGEAR® mechatronic drive system

High requirements are placed on the drive technology used in the production and logistics systems of industries such as the chemical, pharmaceutical and cosmetic industries, biotechnology, food industry, medical technology as well as the seminconductor industry and solar panel production. The requirements on air quality and the permitted number and size of released particles are particularly demanding in these industries

The new MOVIGEAR® mechatronic drive system type for air cleanliness class 2* meets all the hygienic requirements and offers another decisive advantage: up to 50 % less energy consumption compared to conventional drive technology. This makes this type of MOVIGEAR® the perfect choice for nearly any application in clean room environments and offers many plant and machine manufacturers as well as operators completely new perspectives.

* meets ISO 14644-1

| **Overview of the features:** | |
|---|---|
| **Design** | – The smooth overall design and the compact unit comprising gear unit, motor, and electronics facilitates thorough cleaning of the entire drive system and results in a reduced emission of particles.<br>– At present available in two sizes covering a torque range from 20 Nm to 400 Nm. |
| **Special anti-stick surface** | – Makes for easier cleaning<br>– Prevents paint flaking because the surface is treated before assembly by burning into the housing material<br>– Prevents particles from sticking to the surface<br>– Enables resistance against mechanical stress and common cleaning agents |
| **No fan** | – No swirling of air, dirt, and particles<br>– Reduction in noise emission allows for complying with noise limits at the workplace |
| **Cost-effective** | – Reduction in energy costs by up to 50 % due to high overall efficiency |
| **Certificate** | – The Fraunhofer Institute certifies that the MOVIGEAR® drive for clean room applications meets the requirements up to air cleanliness class 2 according to ISO 14644-1, depending on the motor speed, and that the drive can be operated in such applications. |



# NEW: Stainless steel gearmotors for all applications in areas subject to frequent cleaning

Stainless steel gearmotors from SEW-EURODRIVE keep things moving wherever machines and systems are subject to particularly intensive cleaning. Regardless of whether the gear units are used for materials handling, intralogistics or hygienic applications: due to their hygienic properties, their long service life and their ease maintenance, they are perfectly suited for the specific production conditions in the food and beverage industry, the pharmaceutical industry, and in permanently wet environments.

The efficiency optimized KES37 helical-bevel gearmotors and RES37 helical gearmotors impress with their special housing design and the use of high-quality stainless steel making their surface easy to clean and highly resistant against acids and alkalis. Recesses where dirt and liquid might accumulate were eliminated as far as possible. The stainless gear units from SEW-EURODRIVE are available with adapter for mounting IEC and NEMA motors or as gearmotors for direct mounting. The complete stainless steel version efficiently prevents any corrosion.

| **Technical data** | | |
|---|---|---|
| **Type** | **Max. output torque [Nm]** | **Gear unit reduction ratio [i]** |
| KES37 | 200 | 3.98 … 106.38 |
| RES37 | 200 | 3.41 … 134.83 |

# NEW: Powerful combination partner: MOVIDRIVE® B inverter up to 315 KW

Powerful drive units consisting of industrial gear units, motors, and perfectly matching drive electronics are employed in many industries. The modular system from SEW-EURODRIVE offers an impressive and fine-tuned range of drive components.

## Overview of combination partners:

**MOVIDRIVE® inverter up to 315 kW**
Supply voltage: 3 x AC 380 … 500 V
Line frequency: 50 … 60 Hz
Motor control mode: V/f, VFC, CFC, Servo

- Process adaptation with full functionality opens up great energy savings potential
- Highly flexible, especially when installed in commercial control cabinet systems
- Coated printed-circuit boards as standard
- Separate line chokes are not required
- Extremely easy to service due to modular design
- Tried and tested preprogrammed control programs (application modules)
- Integrated “Safe Stop” safety function (STO) according to DIN EN 954-1 category 3 and EN ISO 13849-1 PL d
- Pluggable service module to transfer unit data simply and quickly when service is required

The new and particularly powerful inverters of the MOVIDRIVE® B series cover the upper power range up to 315 kW. Combined with the powerful industrial gear units up to 680 kNm and reliable motors up to 200 kW, they offer impressive drive solutions for many applications, such as heavy-duty storage and retrieval applications, crane drives, belt conveyors for mining applications, bucket elevator drives, rotation drives for furnaces, ventilation systems and pumps with high power ratings.

**Industrial gear units up to 680 kNm**

- Helical gear units
- Bevel-helical gear units
- Helical planetary gear units
- Bevel-helical planetary gear units

Available motor connections:

- Motor adapter with elastic coupling for connecting IEC/NEMA motors
- Steel construction (swing base or base plate)
- Motor bracket with V-belt drive (motor bracket, belt pulleys, V-belts, and belt guard)
- Motor scoop including AC motor, coupling and protection guard

**DR.315 motors**

- Number of poles: 4
- Lengths: K, S, M and L
- Energy efficiency classes:
  - IE1 (DRS315)
  - IE2 (DRE315)
  - IE3 (DRP315)
  - IE1, IE2 and IE3 to IEC 60034-2-1 and IEC 60034-30
- Power ratings [kW (hp)]: 90 (125) to 225 (300)
- Voltages [V]: 3 x 230 to 3 x 690
- Frequencies [Hz]: 50, 60, 50/60
- Optional additional features: Bearing, brakes, encoder, forced cooling fan, monitoring, and much more.

**Power, quality and reliability, innumerable combination options, installation flexibility, integrated functional safety, and robustness with high power demands are just a few advantages of a drive unit from one source. The modular system from SEW-EURODRIVE offers amazing energy savings potential even at high torques. Moreover, the global network with 12 production plants and 67 assembly plants in 47 countries ensures short delivery times and worldwide service.**

# NEW: CMP synchronous servomotor series extended by sizes 71–100

Labeling or sealing applications in the food and beverage industry with 1,200 cycles per minute or stacking heavy loads weighing 1,200 kg in the construction, automotive or timber industry – almost always, there is a CMP servomotor from SEW-EURODRIVE behind it. The newly developed sizes 71, 80 and 100 now also open up the range up to 179 Nm peak torque. They combine all advantages of the known CMP servomotors with those of the proven DS/CM motors.

**Overview of benefits**

- Quick and reliable project planning for all system components with SEW Workbench
- Motor mounted to the gear unit and prefabricated cables for quick installation
- Resolver or optionally scalable HIPERFACE® encoder
- Electronic nameplate for quick and simple startup
- Low-inertia rotor of the CMP minimizes the percentage of energy required for motor acceleration
- Powerful rotor of the CMPZ controls even extreme loads stiffly, safely and accurately
- Finely scaled and stepped motor range with 18 levels
- Powerful spring-loaded brake with working capacity suitable for hoist axes
- Working brake with manual brake release
- Can be used worldwide thanks to CSA and UL®
- Quick support by global assembly centers

**Technical data**

| Type | Rated speed [rpm] | $M_0$ [Nm] | $M_{pK}$ [Nm] | CMP $J_{mot}$ [kgcm²] | CMPZ $J_{mot}$ [kgcm²] |
|---|---|---|---|---|---|
| CMP71S / CMPZ71S | 2000 / 3000 / 4500 / 6000 | 6.4 | 19.2 | 3.04 | 9.32 |
| CMP71M / CMPZ71M | 2000 / 3000 / 4500 / 6000 | 9.4 | 30.8 | 4.08 | 10.37 |
| CMP71L / CMPZ71L | 2000 / 3000 / 4500 / 6000 | 13.1 | 46.9 | 6.18 | 12.47 |
| CMP80S / CMPZ80S | 2000 / 3000 / 4500 / 6000 | 13.4 | 42.1 | 8.78 | 27.18 |
| CMP80M / CMPZ80M | 2000 / 3000 / 4500 / 6000 | 18.7 | 62.6 | 11.9 | 30.3 |
| CMP80L / CMPZ80L | 2000 / 3000 / 4500 / 6000 | 27.5 | 107 | 18.1 | 36.51 |
| CMP100S / CMPZ100S | 2000 / 3000 / 4500 | 25.5 | 68.3 | 19.59 | 79.76 |
| CMP100M / CMPZ100M | 2000 / 3000 / 4500 | 31 | 108 | 26.49 | 86.66 |
| CMP100L / CMPZ100L | 2000 / 3000 / 4500 | 47 | 178.8 | 40.24 | 100.41 |

For more information and technical data for the entire CMP series, refer to page 86 of the servo drive system section.

# NEW: “Standard” performance class controller

The new “standard” performance class of the controller series from SEW-EURODRIVE completes the “advanced” class and offers the same excellent engineering and service options. It supports single-axis functions, such as speed control, as well as all types of positioning and is therefore ideally suited for coordinating up to 16 axes in standard applications. When combined with MOVITRAC®, MOVIDRIVE® or MOVIGEAR®, it allows for a number of cost-effective application solutions.

**Overview of features:**

- Motion control in accordance with IEC 61131-3 and PLCopen
- Single-axis motion control libraries and program modules
- Motion control for up to 16 axes via SBus
- Ideal for standard applications with MOVITRAC®, MOVIDRIVE® and MOVIGEAR®
- MOVI-PLC® IO system via SBus
- SD card for simple unit replacement and recipe management
- Fast engineering via USB and EtherNet
- Available fieldbus slave interfaces: PROFIBUS, PROFINET, DeviceNet, EtherNet/ IP and Modbus TCP

## NEW:
## MultiMotion program module – the flexible motion control solution for packaging machines

The MultiMotion program module makes the most frequently needed technology functions for packaging machines available in a graphical interface for setting parameters. A data interface allows for simple programming of machine applications in IEC 61131-3. Extensive graphical diagnostic options ensure quick startup of complex machines:

**Some of the impressive MultiMotion features include:**
- Graphical configuration and diagnostics via MOVITOOLS® MotionStudio
- Electronic cam technology function:
  - Curves calculated online defined in IEC 61131-3 or via electronic cam editor
  - Curve point-based curves with various interpolation options
  - Automatic alignment/placement on the curves (e.g. after emergency stop)
- Synchronous operation
- Register loop control
- Rotating knife/flying saw for sealing station
- All operating modes can be superimposed
- The size of the trace buffer is not limited
- Cascade virtual and real axes as you like
- Functionality is independent of MOVIAXIS®, MOVIDRIVE®
- Support of MOVITRAC® for auxiliary drives

## NEW:
## Configuring applications easily and quickly with CCU

Configurable Control Units (CCU) offer standardized single or multi-axis application modules, which provide their module functions to a higher-level controller via fieldbus interface or digital inputs and outputs. Configuring the application modules on the machine is really simple. They are configured using a PC program (Application Configurator) that queries all the relevant data. In this way, sources of errors are minimized significantly and startup can be carried out quickly. Using a special control mode, startup can even be carried out without higher-level PLC.

**Overview of application modules:**
- Standardized functionality via process data interface, immediately runnable
- No programming required
- Integrated diagnostics ensures fast and straightforward startup

**The following application modules are available:**

Single-axis functionality:
- Cam positioning
- Bus positioning
- Universal module (speed, positioning, modulo, remaining distance)

Synchronized movement and auxiliary axes
- Energy-saving storage/retrieval system
- SyncCrane

# **CLASSIC** – Drive technology: Gearmotors and frequency inverters

The SEW-EURODRIVE modular concept offers millions of combinations and, as a result, provides any user the perfect prerequisite for choosing the drive that optimally suits the specific machine or system and for operating it according to the specific conditions:

– Individually depending on the required speed and torque range
– According to the space and type of mounting
– Adjusted to the ambient conditions

## The easy and safe way towards the future: Gearmotors and frequency inverters in a modular system

To solve your drive task, our gearmotors are available in numerous sizes and reduction ratios, either in axially parallel design or with angle-shaped power flow.
Torque and permissible overhung loads are incomparably high in relation to the structural volume of the motor. This was made possible by the compact and extremely rigid housing with its low weight and optimum magnetic flux. The sealing surfaces are not subject to any load pressure as the force flows through the single-piece housing. Our gearmotors are especially short since the motor shaft is part of the first gear unit stage. Your benefit: minimum space required in the plant construction.

In addition, our modular system represents an exemplary reliability, a high overload capacity and a long service life. These features are the result of our serial production proficiency and uncompromising high-quality work. Oil seals, flexible surface gaskets and optimized housing design prevent leaks and increase service life.

Our drives enable maximum flexibility in combination with our drive electronics. The drive electronics perfectly matches the mechanics and optimally blends into the systems offered by SEW-EURODRIVE. Just like the mechanical components, the entire drive electronics is developed, produced and assembled at SEW-EURODRIVE.

# Standard gear units / standard gearmotors

## Helical gear units / helical gearmotors (R): The perfect space-performance ratio

With six single-stage and fourteen two- and three-stage sizes covering a power range of 50 to 18,000 Nm, the helical gearmotors from SEW-EURODRIVE always provide for the perfect ratio of space and performance. The tried and proven modular system together with our stringent quality criteria make it possible for SEW-EURODRIVE to supply torques and gear ratios that are incomparably closely spaced and diverse. This exceptional design diversity sets new standards in this field of drive engineering.

All our gear units and gearmotors offer a finely tuned performance range and therefore provide excellent economic prerequisites for every application.

Available designs:
- Single-stage or multi-stage
- Foot- or flange-mounted
- Foot- and flange-mounted
- Flange-mounted with extended bearing hub

**RX series (single-stage)**

For high output speeds, the exclusively single-stage gear units RX57 to RX107 offer compact solutions for your system design.

| **Technical data** | | |
|---|---|---|
| Gear unit reduction ratio | [i] | 1.30 ... 8.65 |
| Output torque | [Nm] | 36 ... 830 |
| Motor power range | [kW] | 0.12 ... 45 |

## R series (two- and three-stage)

The complete program of helical gearmotors provides the optimum size and power solution for every drive task. And for operators with a ”weight-watching“ issue, our multi-stage gear units provide a particularly special solution. Thanks to their die-cast aluminum design, the models R07, R17 and R27 are three particularly efficient lightweights – ideal as satellite drives and for use in light machine constructions. Reduced backlash helical gear units are also available for particularly precise requirements.

| Technical data | | |
|---|---|---|
| Gear unit reduction ratio | [i] | 3.21 ... 289.74 |
| Multi-stage gear unit reduction ratio | [i] | 90 ... 27001 |
| Output torque | [Nm] | 31 ... 18000 |
| Motor power range | [kW] | 0.09 ... 160 |

## RM series

RM gearmotors with extended output bearing hub are a special type of helical gear unit. They are specifically designed for agitating applications and can be used in applications subject to high overhung and axial loads as well as flexural torque. The data below applies to standard helical gearmotors.

| Technical data | | |
|---|---|---|
| Gear unit reduction ratio | [i] | 4.29 ... 289.74 |
| Multi-stage gear unit reduction ratio | [i] | 134 ... 27001 |
| Output torque | [Nm] | 270 ... 18000 |
| Motor power range | [kW] | 0.12 ... 160 |

# Standard gear units / standard gearmotors

## Parallel shaft helical gear units and gearmotors

**F series (two- and three-stage)**

Our extra-slim parallel shaft helical gearmotors are the perfect solution when space is limited. The many different sizes and designs ensure that the gearmotors can be used in a wide variety of applications even under the most unfavorable conditions. Parallel shaft helical gearmotors are typically used in conveyor and materials processing applications. They are available as foot-, flange- or shaft-mounted versions. Reduced backlash parallel shaft helical gear units are also available on request for precise positioning tasks.

Available designs:
- Foot- or flange-mounted
- B5 or B14 flange-mounted
- Solid or hollow shaft
- Hollow shaft with keyed connection, shrink disk, splined hollow shaft or TorqLOC®

| **Technical data** | | |
|---|---|---|
| Gear unit reduction ratio | [i] | 3.77 ... 281.71 |
| Multi-stage gear unit reduction ratio | [i] | 87 ... 31434 |
| Output torque | [Nm] | 87 ... 18000 (also in reduced backlash version) |
| Motor power range | [kW] | 0.12 ... 200 |

## Helical-bevel gear units and gearmotors

**K series (three-stage)**

Our helical-bevel gear units provide a high degree of efficiency of over 96 % in both torque directions and at all input speeds. High-endurance gearing enables high-torque, wear-free drive. The remarkably high level of efficiency makes the helical-bevel gearmotors energy-saving angular gear drives. As they also have a long maintenance-free service life, they can be used with AC asynchronous motors, asynchronous and synchronous servomotors in every application. A reduced backlash version is available for precise positioning tasks.

Available designs:
- Foot- or flange-mounted
- B5 or B14 flange-mounted
- Solid or hollow shaft
- Hollow shaft with keyed connection, shrink disk, splined hollow shaft or TorqLOC®

| **Technical data** | | |
|---|---|---|
| Gear unit reduction ratio | [i] | 3.98 ... 197.37 |
| Multi-stage gear unit reduction ratio | [i] | 94 ... 32625 |
| Output torque | [Nm] | 125 ... 50000 (also in reduced backlash version) |
| Motor power range | [kW] | 0.12 ... 200 |

## Helical-worm gear units and gearmotors

**S series**

Our helical-worm gear units are helical gear/worm combinations that are significantly more efficient than straightforward worm gear units. Due to their excellent economic efficiency, these drives can be used in every branch of industry – tailored individually to torque and speed requirements. The gear ratios afforded by the worm gear stage and the low noise levels during operation make these gearmotors ideal low-cost solutions for simple applications.

Available designs:
- Foot- or flange-mounted
- B5 or B14 flange-mounted
- Solid or hollow shaft
- Hollow shaft with keyed connection, shrink disks, splining or TorqLOC®

| **Technical data** | | |
|---|---|---|
| Gear unit reduction ratio | [i] | 6.80 ... 288.00 |
| Multi-stage gear unit reduction ratio | [i] | 110 ... 33818 |
| Output torque | [Nm] | 43 ... 4000 |
| Motor power range | [kW] | 0.12 ... 22 |

## SPIROPLAN® right-angle gearmotors

**W series**

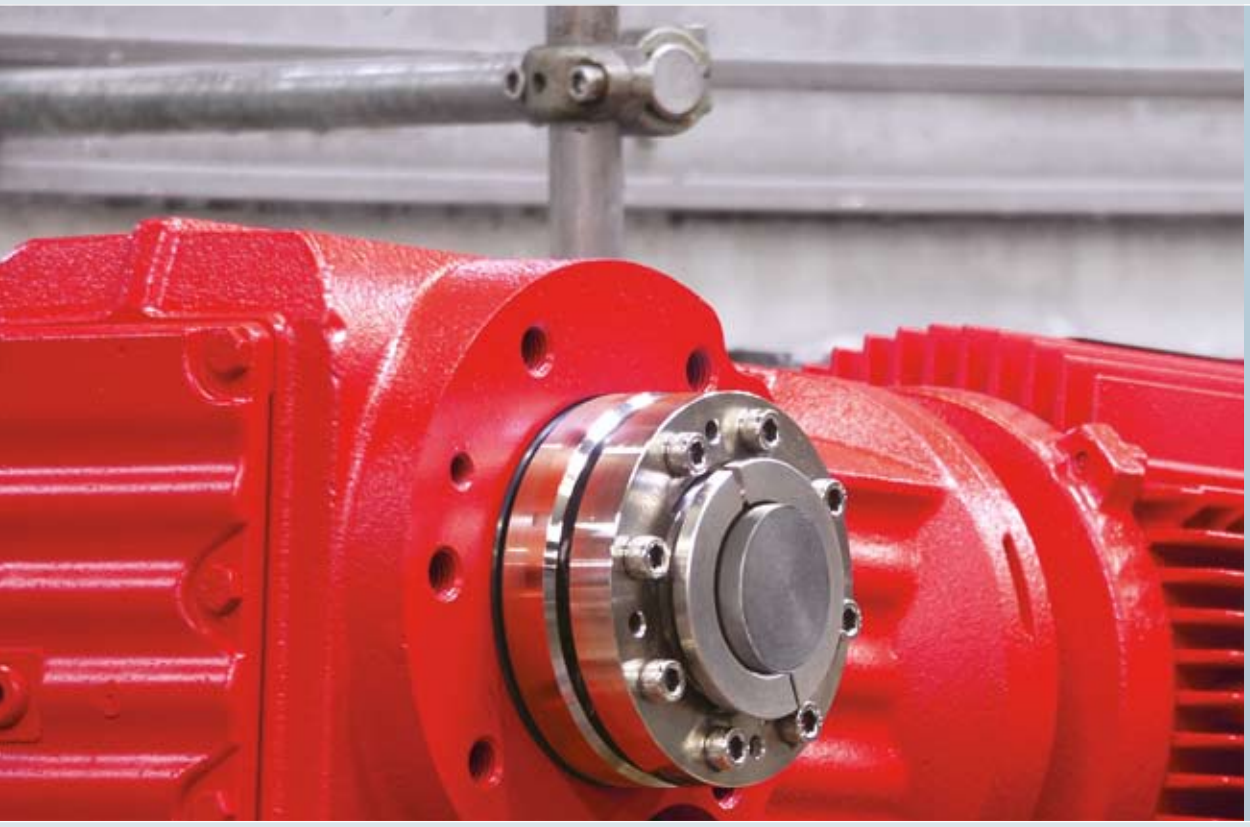
W series gearmotors are robust, single-stage right-angle gearmotors with SPIROPLAN® gearing. They distinguish themselves from helical-worm gear units by the material combination used in the gearing (steel/steel), the special tooth meshing ratios and the aluminum housing. SPIROPLAN® right-angle gearmotors are wear-free, very quiet-running and lightweight. Due to their extremely short design and aluminum housing, these gearmotors enable compact and lightweight drive solutions. The wear-free gearing and lubrication that lasts the entire service life of the gearmotor permit long maintenance-free operation. Oil filling is independent of the mounting position, which allows SPIROPLAN® right-angle gearmotors to be installed in any mounting position without altering the quantity of oil. The identical hole distances in the foot and face as well as the identical shaft centers between the foot and face make for a wide range of mounting options. Available designs:
- Foot- or flange-mounted
- B5 or B14 flange-mounted
- With solid or hollow shaft

| **Technical data** | | |
|---|---|---|
| Gear unit reduction ratio | [i] | 3.20 ... 75.00 |
| Output torque | [Nm] | 12 ... 180 |
| Motor power range | [kW] | 0.09 ... 3.0 |
| | | |

# Accessories and options

## TorqLOC® hollow shaft mounting system

Optional for parallel shaft helical, helical-bevel and helical-worm gear units. The TorqLOC® hollow shaft mounting system is used for achieving a non-positive connection between the customer's shaft and the hollow shaft in the gear unit. This means the TorqLOC® hollow shaft mounting system is an alternative to the existing hollow shaft with shrink disk, hollow shaft with key and the splined hollow shaft. The TorqLOC® hollow shaft mounting system provides the advantages of easy installation and de-installation, and saving costs.

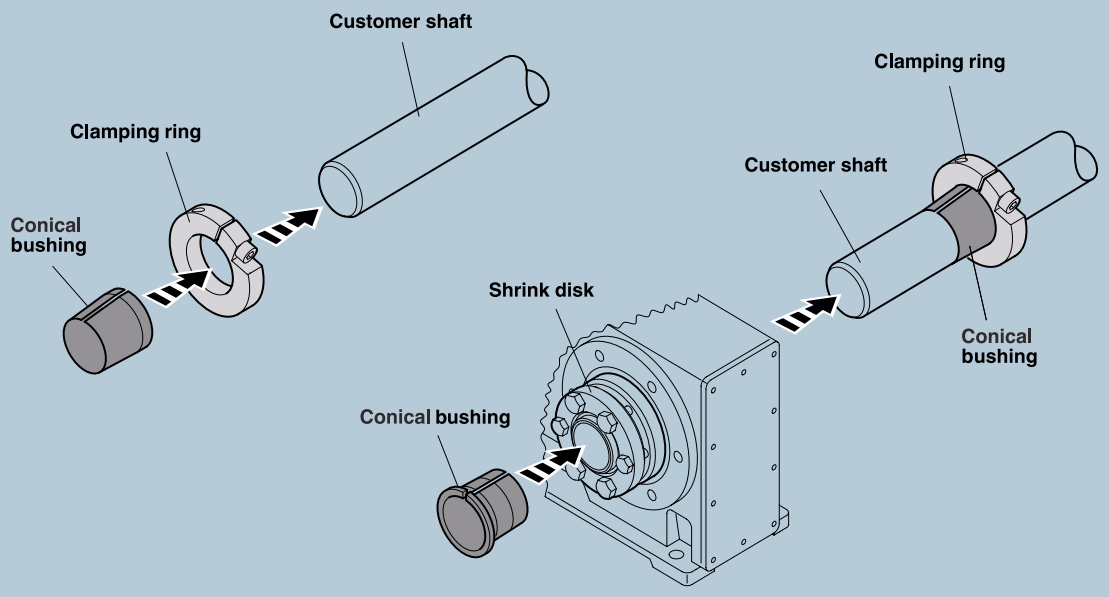


**Simple**
The new design of the TorqLOC® hollow shaft mounting system makes for simple assembly and significantly improves removal of the drive even after lengthy periods of operation. SEW-EURODRIVE will deliver the drive with the matching bushing. The operator will install the stop ring on the customer shaft and the drive can be simply mounted and fixed.

**Economical**
The TorqLOC® hollow shaft mounting system makes it possible to use drawn, unprocessed material all the way to quality level h11 for customer shafts reducing costs even further! No additional machining of the customer shaft is required.

**Flexible**
A well thought-out product down to the smallest detail: Up to four different nominal diameters can be adapted with one gear unit size.

**Awards**
The trade journal "Plant Engineering" has awarded the prize "Product of the Year 2002." The award recognizes innovative products that will result in improvements on the production level. SEW-EURODRIVE received the "Silver Award" for its TorqLOC® in the category "Power Transmission". The "Silver Award" was presented at the National Plant Engineering Show in Chicago in early March 2003.



# Drives for electrified monorail systems

Drives for electrified monorail systems are an variable and efficient means of transport used in many industries. The decisive factors for the performance, conveying speed and load carrying capacity of these drives are the transport material and the application. Drives for electrified monorail systems from SEW-EURODRIVE are therefore divided into light-load and heavy-load.

**Light load range, drives of the HW30 / HS40 series**

Light load drives are quiet and comply with C1 guideline standards (VDI guideline 3643). They work with a reliable disengageable coupling and provide the following advantages:

- Low-maintenance for a high level of availability and productivity
- Smooth running for operation without vibration
- Low-noise for use in manual work stations
- Compact for space-saving installation

**Technical data**

| Type | Maximum torque [Nm] | Permitted wheel load [N] | Force application x [mm] | Speed with carrying wheel Ø 125 mm [m/min] | Gear ratio | Shaft d x l [mm] |
|---|---|---|---|---|---|---|
| HW 30 | 70 | 5600 | 13 | 7.3 ... 67 | 8.2 ... 75 | 20 x 35<br>25 x 35 |
| HS 40 | 130 | 6500 | 13 | 2.7 ... 75 | 7.28 ... 201 | 20 x 35<br>25 x 35 |

## Heavy load range, drives of the HS / HK series

The heavy load range in particular has seen a clear trend toward increasing permitted work loads. SEW-EURODRIVE has expanded the HK series due to the improved efficiency of helical-bevel gear units over helical-worm gear units. Drives for electrified monorail systems with helical-bevel gear units (HK series) can now be used for wheel loads up to 40,000 N. Power consumption is reduced, particularly when the MOVITRANS® system for contactless energy transfer is also used. As a result, systems operate with greater economic efficiency.

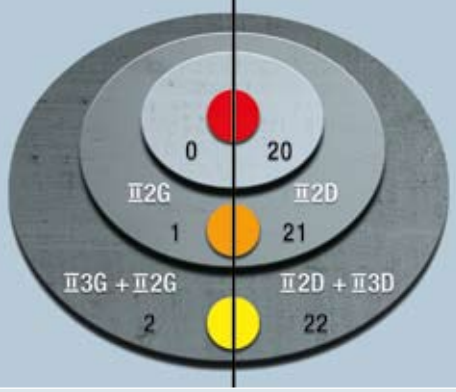
### Technical data

| Type | Maximum torque [Nm] | Permitted wheel load [N] | Force application x [mm] | Speed with carrying wheel Ø 200 mm [m/min] | Ø 250 mm [m/min] | Ø 300 mm [m/min] | Gear ratio | Shaft d x l [mm] |
|---|---|---|---|---|---|---|---|---|
| HS 41 | 185 | 10000 | 13 | 4.4 ... 120 | – | – | 7.28 ... 201 | 25 x 35 |
| HS 50 | 300 | 15000 | 18<br>28 | 4.4 ... 120 | 5.4 ... 151 | – | 7.28 ... 201 | 30 x 60<br>35 x 70 |
| HS 60 | 600 | 25000 | 28 | 4.0 ... 116 | 5.1 ... 145 | 6.1 ... 175 | 7.56 ... 217.41 | 45 x 90 |
| HK 30 | 200 | 10000 | 13 | 8.3 ... 68 | – | – | 13.1 ... 106.38 | 25 x 35 |
| HK 40 | 400 | 18500 | 18<br>28 | 6.7 ... 72 | 8.3 ... 90 | – | 12.2 ... 131.87 | 30 x 60<br>35 x 70 |
| HK 50 | 600 | 25000 | 28 | 6.1 ... 66 | 7.6 ... 83 | 9.1 ... 100 | 13.25 ... 145.14 | 45 x 90 |
| HK 60 | 820 | 40000 | 32 | 6.1 ... 66 | 7.6 ... 83 | 9.1 ... 100 | 13.22 ... 144.79 | 55 x 110 |

# Explosion-proof drives

## Explosion protection in compliance with ATEX

Directive 94/9/EC or ATEX lays down new regulations for explosion protection in all types of devices for the European market. This directive applies to gearmotors and motors. Since July 1, 2003, Directive 94/9/EC has applied without restrictions to the use of gearmotors and motors within the European Union. Other European countries, such as Switzerland, have since come into line with this regulation. SEW-EURODRIVE offers gearmotors and motors for operation in potentially explosive atmosphere only in accordance with the relevant ATEX regulation. This also applies to options and accessories in explosion-proof design.

| | Gas | Dust |
|---|---|---|
| Zone structure |  | |



SEW-EURODRIVE offers no products for zones 0 and 20

For further information on the explosion-proof servo drive technology from SEW-EURODRIVE, refer to pages 98 and 99.

## Explosion-proof drives

Operating systems and machines in areas with potentially explosive air / gas or air / dust mixtures requires special measures. Appropriate regulations and standards regulate the use of tools and fixtures in danger zones. They also prescribe the quality prerequisites that must be met by drive manufacturers.

**Technical data**

| Category / zone | Type | Power range [kW] |
|---|---|---|
| II3D / II3GD | II3D / II3GD R..D../II3... Helical gearmotors<br>F..D../II3... Parallel shaft helical gearmotors<br>K..D../II3... Helical-bevel gearmotors | 0.12 ... 75 |
| | W..D../II3... SPIROPLAN® gearmotors | 0.12 ... 0.75 |
| | S..D../II3... Helical-worm gearmotors | 0.12 ... 22 |
| II2D | II2D R..D../II2D Helical gearmotors<br>F..D../II2D Parallel shaft helical gearmotors<br>K..D../II2D Helical-bevel gearmotors | 0.37 ... 22 |
| | S..D../II2D Helical-worm gearmotors | 0.37 ... 0.75 |
| | W..D../II2D SPIROPLAN® gearmotors | 0.37 ... 22 |
| II2G | II2G R..D../II2G Helical gearmotors<br>F..D../II2G Parallel shaft helical gearmotors<br>K..DG/II2D Helical-bevel gearmotors | 0.15 ... 16 |
| | W..D../II2G SPIROPLAN® gearmotors | 0.15 ... 0.75 |
| | S..D../II2G Helical-worm gearmotors | 0.15 ... 16 |
| II2G_T4 | II2G_T4 R..D../II2G_T4 Helical gearmotors<br>F..D../II2G_T4 Parallel shaft helical gearmotors<br>K..D../II2G_T4 Helical-bevel gearmotors | 0.15 ... 1.5 |
| | W..D../II2G_T4 SPIROPLAN® gearmotors | 0.15 ... 0.55 |
| | S..D../II2G_T4 Helical-worm gearmotors | 0.15 ... 1.5 |

# Explosion-proof AC asynchronous motors in combination with frequency inverters from SEW-EURODRIVE

It is important to observe and comply with guidelines particularly in areas containing potentially-explosive air/gas and gas/dust mixtures. Thanks to many years of experience and competence in this area, SEW-EURODRIVE ensures that the relevant guidelines are observed. Furthermore, the company's expertise is continually being expanded to include new and further developments. This can be seen, for example, in the explosion-proof AC asynchronous motors in category 2 (94/9/EC) in combination with frequency inverters from SEW-EURODRIVE.

Overview of the advantages this combination offers compared to an AC asynchronous motor in explosion protection "d" (EN 60079-1; flameproof enclosure):

- High efficiency
- Lighter weight
- Shortest possible delivery times, high availability
- Certified for operation with frequency inverters from SEW-EURODRIVE
- Suitable for pump and fan drives
- Supplied by one source, from a manufacturer that offers both components

**ATEX**

This basic type of approval was implemented for all 4-pole motors of category 2 from SEW-EURODRIVE and certificates of all eDT and eDV motors are now available. These new approvals for the motors were performed according to the new European standards applicable to explosion protection:
Gas (EN 60079-0; EN 60079-7)
and dust (EN 61241-0; EN 61241-1).
These motors meet the requirements for equipment intended for use in potentially explosive areas of category 2 as defined in directive 94/9/EC (ATEX 95). A device for direct temperature monitoring in combination with the defined operating parameters of the frequency inverter offers the best possible protection against excessive heating caused by overload.

**Technical data**

**eDT/eDV motors in 15 sizes**

| $P_{supply}$ [kW] | $M_{supply}$ [Nm] | $M_{FI}$ [Nm] | $I_{rated\text{-}FI}$ for 400 V / 50 Hz [A] |
|---|---|---|---|
| 0.37… 16.0 | 2.6 … 103.9 | 2.2 … 85.3 | 1.04… 26.8 |

Compared to the rated supply torque, the permitted load value for operation with a frequency inverter was reduced to the shown values to ensure thermally safe operation; current values for 400 V / 50 Hz voltage in star connection; the current values for delta connection 230 V / 50 Hz (or 400 V / 87 Hz) must be converted with factor $\sqrt{3}$.

Everybody is talking about $CO_2$ and saving costs. But by far not in every plant. As a leading drive technology specialist, we provide energy-efficient solutions: effiDRIVE®. Not only the environment will benefit from the combination of highly efficient components and the relevant consulting for the proper solution but also your energy cost management – profitable on a sustained basis. This is what we call Drive 360° – Seeing the big picture: from problem-solving competence to system availability, low operating costs to energy efficiency up to the overall system that handles all your tasks.

**www.sew-eurodrive.com**

SEW EURODRIVE

# Aseptic gearmotors

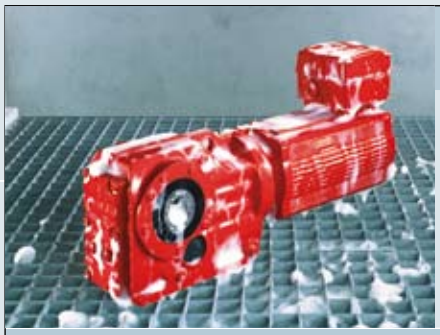
Particularly high requirements are placed on hygiene in the beverage and food industry as well as in the chemical and pharmaceutical industry. The necessary cleaning processes and the use of aggressive cleaning and disinfectant agents can considerably affect the drive solutions in such environments.

**DAS series**

Solutions for dry hygienic areas:
Aseptic gearmotors of the DAS series for drive solutions without fans and smooth surfaces:
- Motors with degree of protection IP66 (brakemotors IP65)
- Motor corrosion protection: KS internal treatment
- OS2 to OS4 surface protection (see also page 50)
- Motor protection thermistor in thermal class F, TH thermostat relay as option
- IS plug connector

**Technical data**

| Type | Power [kW] in duty cycle | | | |
|---|---|---|---|---|
| | S1 = Continuous duty | S3 = Intermittent duty | | |
| | | 60 % | 40 % | 25 % |
| DAS80K4 | 0.25 | 0.3 | 0.37 | 0.55 |
| DAS80N4 | 0.37 | 0.45 | 0.55 | 0.75 |
| DAS90S4 | 0.55 | 0.75 | 0.9 | 1.1 |
| DAS90L4 | 0.75 | 0.95 | 1.1 | 1.5 |
| DAS100M4 | 1.1 | 1.35 | 1.7 | 2.2 |
| DAS100L4 | 1.5 | 1.85 | 2.3 | 3.0 |



**ASEPTIC$^{plus}$ drive package**

Standard motors are not the first choice for hygienic production areas because they usually come equipped with cooling fins and fans where dirt can accumulate and germs and bacteria can be distributed by air swirls.

SEW-EURODRIVE offers the perfect solution also for such areas of application: DAS series aseptic motors with ASEPTIC$^{plus}$ drive package.

**Solutions for hygienic production areas:**

- Motors with degree of protection IP69K (brakemotors IP65)
- OS4 surface protection
- Contour recesses with sprayed-on rubber
- Double oil seals (if technically feasible) at output made of Viton (FKM)
- Stainless steel breather valve
- Pressure compensation membrane
- Cable entry with screw plugs made of stainless steel
- Gear unit output shaft made of stainless steel as solid shaft, hollow shaft with key or TorqLOC® for gear unit types: R17-97, F37-97, K37-97, S37-97 and W30
- All retaining parts at the output shaft, such as screws, keys, shrink disk, etc., made of steel

# KS corrosion protection and OS surface protection for all standard motors and gear units

SEW-EURODRIVE offers corrosion and surface protection for operating motors and gear units under special ambient conditions. The combination of these protection measures ensures the optimum protection for motors and gear units.

**KS corrosion protection**

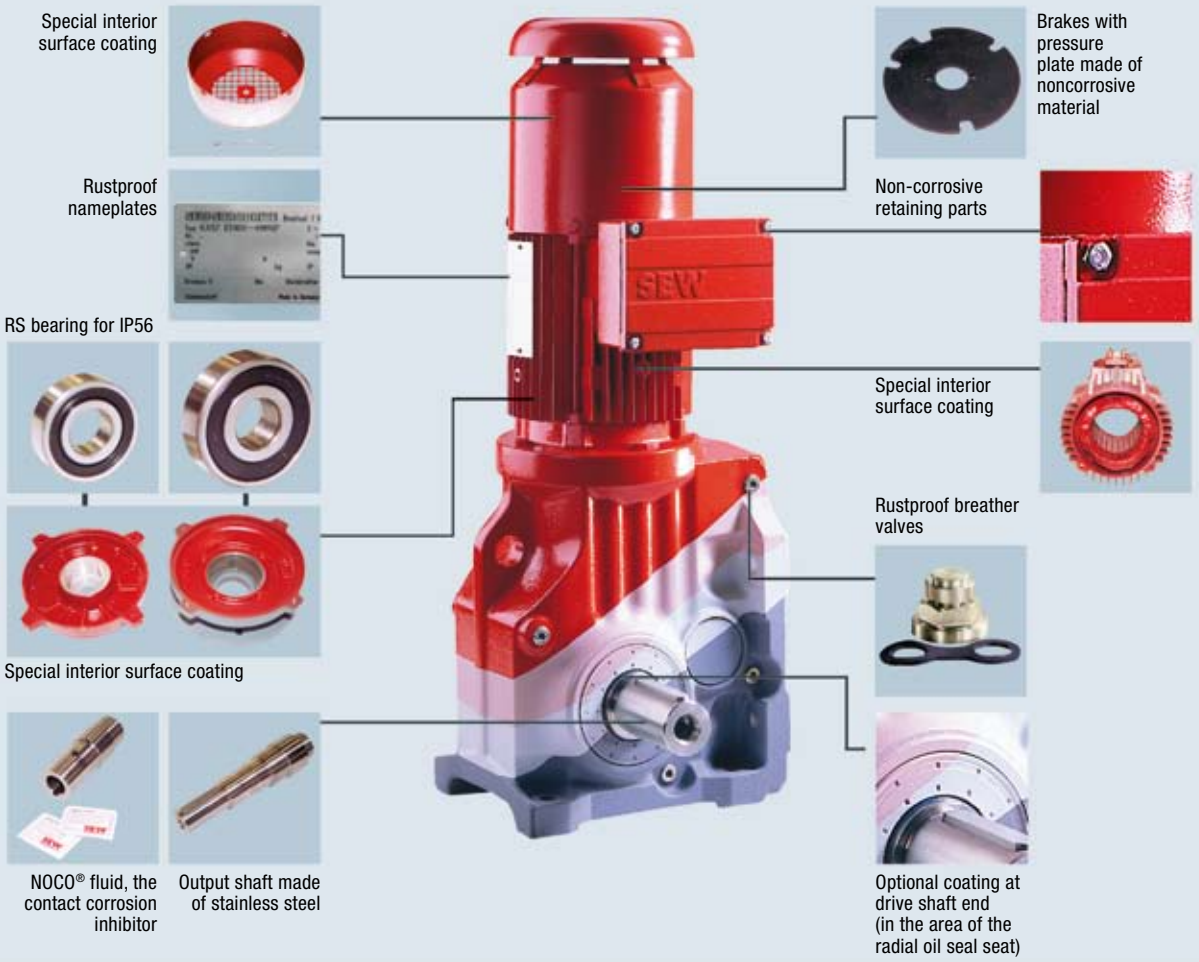
KS corrosion protection for motors comprises the following measures:

- All retaining screws that are loosened during operation are made of stainless steel.
- The nameplates are made of stainless steel. Various motor parts are coated with a top coat.
- Flange contact surfaces and shaft ends are treated with a temporary anti-corrosion agent.
- Additional measures for brakemotors.

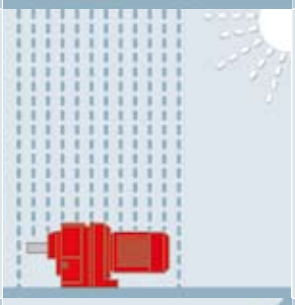
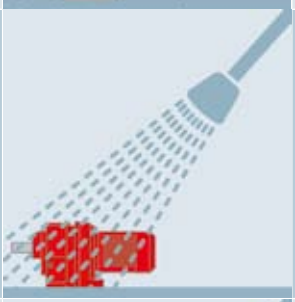
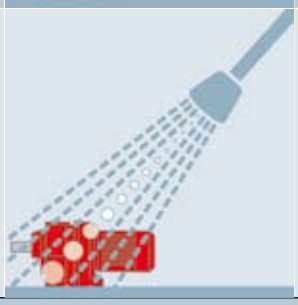
**OS surface protection**

In addition to standard surface protection, motors and gear units also have the option of surface protection OS1, OS2, OS3 or OS4 making the gearmotors well equipped for operation under various ambient conditions.

## Measures for internal treatment and standard parts



## Surface protection

| Surface protection | | Ambient conditions/sample applications |
|---|---|---|
| **Standard** | | For machines and systems in buildings and rooms indoors with neutral atmospheres.<br>– C1 (negligible)*<br>**Sample applications**<br>– Machines and systems in the automobile industry<br>– Conveyor systems in logistics areas<br>– Conveyor belts at airports |
| **OS1** | | For environments with condensation, and atmospheres with low humidity or contamination level, such as outdoors applications under roof or with protection.<br>– C2 (low)*<br>**Sample applications**<br>– Systems in saw mills<br>– Hall gates<br>– Agitators and mixers |
| **OS2** |  | For environments with high humidity or moderate atmospheric contamination, such as outdoors applications subject to direct weathering.<br>– C3 (moderate)*<br>**Sample applications**<br>– Applications in amusement parks<br>– Funiculars and chair-lifts<br>– Applications in gravel plants<br>– Systems in nuclear power plants |
| **OS3** |  | 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.<br>– C4 (high)*<br>**Sample applications**<br>– Sewage treatment plants<br>– Port cranes<br>– Mining applications |
| **OS4** |  | For environments with permanent humidity and severe atmospheric or chemical contamination. Regular acidic or caustic wet cleaning also with chemical cleaning agents.<br>– C5-I (very high)*<br>**Sample applications**<br>– Drives in malting plants<br>– Wet areas in the beverage industry<br>– Conveyor belts in the food industry |

| Surface protection | | Ambient conditions/sample applications |
|---|---|---|
| **DAS series aseptic motors**<br>OS2-OS4 as option | | For dry or humid hygienic areas with moderate atmospheric contamination.<br>Also suitable for particularly dusty environments.<br>– C3 (moderate)*<br>**Sample applications**<br>– Applications in clean rooms<br>– Machines in the cosmetic and pharmaceutical industry<br>– Systems for processing cereal and flour (without Ex protection)<br>– Conveyor belts in cement plants |
| **DAS series aseptic motors with ASEPTIC$^{plus}$ drive package**<br>OS4 | | For hygienic areas in the food and beverage industry with permanent humidity and regular acidic and wet cleaning with chemical cleaning agents and cleaning with compressive stress.<br>– C5-I (very high)*<br>**Sample applications**<br>– Hygienic and aseptic conveyors in the beverage industry<br>– Systems in cheese dairies and butcher shops<br>– “Splash zones” in the food industry |
| **High Protection treatment**<br>HP200 | | For hygienic areas in the food and beverage industry with regular acidic and caustic wet cleaning.<br>Non-stick properties support the cleaning process even in inaccessible areas.<br>**Sample applications**<br>– Hygienic and aseptic conveyors in the beverage industry<br>– Systems in cheese dairies and butcher shops<br>– “Splash zones” in the food industry |
| **Stainless steel gearmotor** | | For hygienic areas in the food and beverage industry with permanent humidity and extreme acidic andcaustic wet cleaning using chemical cleaning agents.<br>**Sample applications**<br>– Hygienic and aseptic applications of all kind<br>– Systems in cheese dairies and butcher shops<br>– Food processing machines for the North American market |

* According to corrosivity categories of DIN EN ISO 12944-2

# NEW: The DR motor – one series for the whole world

Already in 2002, SEW-EURODRIVE was the first company in the world to succeed in using die-cast copper technology in industrial high-volume series production. Now the next level of development has been reached based on the proven motor series: The new modular system for AC motors: one single series for millions of drive combinations worldwide.

Today, the whole range of DR motor options and variants is available for all efficiency levels independent of the required energy-efficiency class. DR motors comply with all international standards and meet the new parts of the IEC motor standard already today.

The modular DR motor system comprises the three energy-efficient motor variants (IE1, IE2, and IE3) and offers an ideally matched brake concept (up to three different brake sizes for each motor size) as well as encoders integrated in the motor.

| Premium Efficiency | IE3 |
|---|---|
| | **Europe, Australia, New Zealand, USA and Canada**<br>– Extremely high levels of efficiency<br>– DRP type AC motors (energy-efficient motors):<br>Motor size 90 and larger: 0.75 ... 160 kW<br>– Copper or aluminum die-cast rotor cage |
| **High Efficiency** | **IE2** |
| | **Europe, Australia, New Zealand, USA, Canada, Brazil, Korea, China**<br>– High levels of efficiency<br>– DRE type AC motors (energy-efficient motors):<br>Motor size 80 and larger: 0.75 ... 200 kW<br>– Copper or aluminum die-cast rotor cage |
| **Standard Efficiency** | **IE1** |
| | **Europe (until 2011), Asia, Africa, Central and South America (without Brazil)**<br>– Improved levels of efficiency<br>– DRS type AC motors (standard motor):<br>Motor size 71 and larger: 0.37 ... 200 kW<br>– Copper or aluminum die-cast rotor cage |

**The motor variants DRS, DRE and DRP of the DR series surpass the requirements of IEC 60034-30 and are categorized as IE1, IE2 and IE3 respectively.**

# One motor – worldwide: for all voltages and efficiency classes

SEW-EURODRIVE designed and developed the AC motors with all the worldwide requirements for energy efficiency classes in mind. The DR motor was approved and certified without any problems in all the relevant countries.

DR motors from SEW-EURODRIVE are used worldwide. By combining all the different design requirements, time is saved due to optimized processes such as for motor selection, ordering, and logistics.

**The DR motor from SEW-EURODRIVE stands for**
- **Security of investment**
- **Efficiency and high performance**
- **Versatile areas of application**
- **Customization**
- **Individual brake concepts**
- **Integrated encoders**

**in an amazingly space-saving and compact design**

| | Europe | USA | Canada | Brazil | Australia / New Zealand | Korea | Other, e.g. China |
|---|---|---|---|---|---|---|---|
| **Line voltage (3 x ...)** | 400 V | 480 V | 480 V<br>575 V | 220 V<br>380 V<br>440 V | 400 V<br>415 V | 220 V<br>380 V<br>440 V | 380 V |
| **Line voltage tolerance** | ± 10 % | ± 10 % | ± 10 % | ± 10 % | ± 5 % | | |
| **Line frequency** | 50 Hz | 60 Hz | 60 Hz | 60 Hz | 50 Hz | 60 Hz | 50 Hz |
| Energy efficiency laws/regulations* | | | | | | | |
| **In effect** | **Since 1999** | **Since 1997** | **Since 1997** | **Since 2002** | **Since 2006** | **Since 2008** | **Since 2008** |
| **Compulsory** | | – High (IE2) | – High (IE2) | – EFF2 (IE1) | – EFF1 (IE2) | – High (IE2) | – EFF2 (IE1) |
| **Voluntary** | – EFF3<br>– EFF2<br>– EFF1 | – Premium (IE3) | – Premium (IE3) | – EFF1 (IE2) | – Premium (IE3) | – Premium (IE3) | – EFF1 (IE2)<br>– Premium (IE3) |
| **Comment** | | Various exceptions | Various exceptions | | | – From 45 kW<br>– Special identification | – From 0.55 kW<br>– Special identification |
| **In the future** | **2011/06/16** | **2010/12/19** | **2011/01/01** | **2009/12/08** | **approx. 2013** | **2010/01/01** | **2012/07/01** |
| **Compulsory** | – IE2 | – Premium (IE3) | – Premium (IE3)<br>– High (IE2) from 150 kW | – EFF1 (IE2) | – Premium (IE3) | – High (IE2) | – EFF1 (IE2) |
| **Voluntary** | – IE3 | | | – Premium (IE3) | | – Premium (IE3) | – Premium (IE3) |
| **Comment** | 2015/01/01 > 7.5 kW compulsory IE3<br>2017/01/01 > 0.75 kW compulsory IE3<br>Exceptions | Reduced exceptions | Reduced exceptions | | | – From 45 kW<br>– Special identification | – From 0.55 kW<br>– Special identification |
| **Use of DR motor** | Yes | Yes | Yes | Yes (for 440 V) | Yes (until 2013) | In preparation | In preparation |

*as of Sep 1, 2009

# Modular system: Standard AC motors and energy efficient motors of energy efficiency classes IE

| | DRS series | DRE series | DRP series |
|---|---|---|---|
| | The **DRS** motor in the modular DR motor system is a motor that meets the **standard efficiency level**. The motors are marked with IE1 according to IEC 60034 T30. | The **DRE** motor in the modular DR motor system is a motor that meets **High Efficency** requirements. The motors are marked with IE2 according to IEC 60034 T30. | The **DRP** motor in the modular DR motor system is a motor that meets **Premium Efficency** requirements. The motors are marked with IE3 according to IEC 60034 T30. |
| **Technical data** | | | |
| Sizes | 71 … 225<br>315 | 80 … 225<br>315 | 90 … 225<br>315 |
| Lengths | K, S, M, MC, L, LC | | |
| Power 4-pole [kW] | 0.37 … 55<br>110 … 200 | 0.75 … 45<br>110 … 200 | 0.75 … 37<br>90 … 160 |
| Frequenzy [Hz] | 50, 60 und 50/60 | | |
| Efficiency logo | International: IE1 | International: IE2,<br>North America[1]: CSA, ee | International: IE3,<br>North America[1]: CSA, ee |

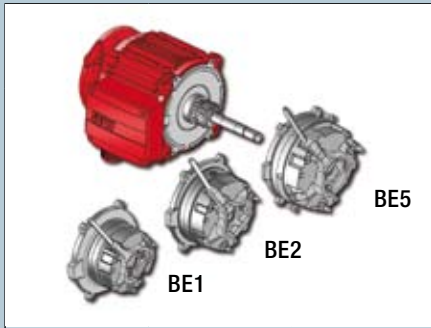
[1] North America in preparation

## Modular brake system

The BE brake is based on the extremely successful BM(G) brake, but was further developed in many aspects. The brake size has so far been unalterably linked to the motor size. ”Less“ brake is only possible by reducing the braking torque with a modified brake spring.

The new combination options of DR motors with BE brakes are no longer subject to this unalterability. The DR motor can be combined with two or three different BE brake sizes.

## The brake of your choice – extract from the brake combination options:




**Brake combinations**

Depending on the braking torque or braking work required, the DR motor can be combined with the ideal BE brake. Brake mounting to motors size 90 and larger offers another special feature. The brake itself is mounted on a friction plate, which only has to be attached to the endshield. Without opening the motor, the unit can now be demounted and replaced – also by a larger or smaller brake.

**Technical data**

| Motor type | Bake type | $W_{tot}$ [$10^6$ J] | Braking torque grading [Nm] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| … | … | … | … | | | | | | | |
| DR.90 | BE1 | 120 | 5 | 7 | 10 | | | | | |
| | BE2 | 165 | | 7 | 10 | 14 | 20 | | | |
| | BE5 | 260 | | | | 14 | 20 | 28 | 40 | |
| DR.100 | BE2 | 165 | | | 10 | 14 | 20 | | | |
| | BE5 | 260 | | | | 14 | 20 | 28 | 40 | 55 |
| … | … | … | | | | | | | | |

## Built-in encoders

**Built-in encoders**

The new built-in encoders are unique in the modular DR motor system. Instead of an external encoder mounted to the fan guard of the non-drive end, the encoder can now be installed between the endshield and the fan. This means that any extra length caused by mounted encoders is avoided.

| **Technical data** | | | | | |
|---|---|---|---|---|---|
| **Built-in encoders** | | EI7C, EI76, EI72, EI71 | | | |
| **Signal type** | | HTL (push-pull) sin/cos | | | |
| **Periods per revolution** | A, B | 24 | 6 | 2 | 1 |
| | C | 0 | 0 | 0 | 0 |
| **DR motor sizes** | | 71… 132 | | | |
| **Connection** | | Terminal strip in the terminal box or 8-pin M12 connector | | | |

## Integrated functional safety

The modular DR motor system from SEW-EURODRIVE offers various components that are installed or mounted for functional safety.

| **Integrated function safety for the modular DR motor system** | | | |
|---|---|---|---|
| FS | Safety-assessed encoders | Up to PL d according to EN ISO 13849-1 | ES7S / EG7S<br>AS7W / AG7W<br>AS7Y / AG7Y |
| | Safety-assessed brake | Up to PL c according to EN ISO 13849-1 | BE |
| | | Up to PL e according to EN ISO 13849-1 | BF<br>BT |
| | MOVIMOT®, gearmotor with integrated frequency inverter | Up to PL d according to EN ISO 13849-1 | MM..D |

# Additional features

The additional features of the DR motor and DR brakemotor are diverse and extensive. To provide a better overview, they were combined in groups.

| Other options | Description | |
|---|---|---|
| **Mechanical attachments** | All versions that can be mounted to the DR motor using additional elements: | |
| | BE.. | Brake with brake size, scaled in steps of 10 Nm |
| | HF, HR | Manual brake release, lockable or automatic disengaging |
| | /RS | Backstop instead of a brake |
| | /MSW | MOVI-SWITCH®, integrated switching and protection function |
| | /MM.. | MOVIMOT®, integrated frequency inverter |
| **Temperature sensor, temperature detection** | All versions that are offered with additional elements in the winding: | |
| | /TF | 3 temperature sensors (positive coefficient thermistor or PTC resistor) connected in series |
| | /TH | 3 thermostats (bimetallic switches) in series |
| | /KY | 1 temperature sensor KTY84-130 |
| | /PT | 1 or 3 temperature sensors PT100 |
| **Ventilation** | All versions in conjunction with cooling/ventilation on the DR motor: | |
| | /V | Forced cooling fan, IP66, AC voltage range or DC |
| | /Z | Additional flywheel mass (flywheel fan) |
| | /AL | Metal fan |
| | /U | Non-ventilated (only without fan) |
| | /OL | Non-ventilated (closed B side) |
| | /LF | Air filter |
| | /C | Protective cover |
| **Bearings** | All DR315 motors in conjunction with the bearing function: | |
| | /NS | Lubrication device |
| | /ERF | Reinforced bearing for high overhung loads (only with NS) |
| | /NIB | Insulated bearing (B-side) |
| **Connection** | All designs in conjunction with connection alternatives: | |
| | /IS | Integrated plug connector |
| | /AS.. etc. | Installed plug connectors of all kinds |
| | /KCC | Terminal strip with cage clamps |
| | /KC1 | C1-compliant connection of electrified monorail system (VDI RL 3643) |
| **Encoder** | All designs in conjunction with mounted encoders of various electrical interfaces: | |
| | /ES7. | Mount-on encoder DR71 ... 132 |
| | /EG7. | Mount-on encoder DR160 ... 225 |
| | /XV.. | Mounting or encoder adapter of encoders not included in the SEW portfolio |
| **Sensor** | All designs in conjunction with condition monitoring: | |
| | /DUB | Brake monitoring for function and/or wear |
| | /DUV | Vibration monitoring |
| **Other** | Other designs: | |
| | /DH | Condensation drain hole |
| | /2W | Second shaft end on the motor/brakemotor |
| | /RI | Reinforced winding insulation for frequency inverter operation > AC 500 V |

# DRL / DRM / DRK series AC motors

| **DRL motor** | |
|---|---|
| The **DRL** motor in the modular DR motor system is a motor that meets the standard efficiency level. The motors are marked with IE1 according to IEC 60034 T30. This motor is suited for **high dynamic loads** in addition to the high overload capacity of DR motors. This means the DRL motor fulfills all properties of an asynchronous servomotor. | |
| D1: Standard pinion shaft end: approx. 200 % $M_N$<br>D2: Reinforced pinion shaft end: approx. 300 % $M_N$<br>D3: IEC shaft end: approx. 350 % $M_N$ (max. $M_{brake}$) | |
| **Technical data** | |
| **Dynamic 1**<br>**Dynamic 2**<br>**Dynamic 3** | ~ 200 % $M_{dyn}$ / $M_N$<br>~ 300 % $M_{dyn}$ / $M_N$<br>~ 350 % $M_{dyn}$ / $M_N$ |
| **Torques $M_N$ [Nm]** | 2.5 … 350 |
| **Sizes**<br>**Lengths** | 71 … 225<br>S, M, MC, L, LC |
| **Speed classes [rpm]** | 1200, 1700, 2300, 3000 |

| **DRK motor** | |
|---|---|
| The **DRK** motor in the modular DR motor system is a **single-phase motor** that can be operated on a single-phase power supply (instead on the usual three-phase power supply). The DRK motor comes equipped with operating capacitor CB. | |
| **Technical data** | |
| **Sizes**<br>**Lengths** | 71 … 100<br>S, M, L |
| **Power 4-pole [kW]**<br>**Frequency [Hz]** | 0.25 …. 1.5<br>50 |

| DRM motor | |
|---|---|
| The **DRM** motor in the modular DR motor system is a 12-pole motor that allows for thermally safe operation on a 3-phase mains supply, even if the rotor is blocked. The usual product designation **"torque motor"** is also maintained for the DRM motor. Every torque motor is available with 2 rated torques. Rating 2 can be three times the torque of rating 1 but either only in S3/15 % cdf or in S1 continuous duty with forced cooling fan only. | |
| **Technical data** | |
| **Sizes**<br>**Lengths** | 71 … 160<br>S, M, L |
| **Rating 1**<br>**Rating 2** | S1<br>S3/15 % or S1 with forced cooling fan |
| **Rating 1 [Nm]**<br>**Rating 2 [Nm]** | 0.4 … 3<br>1.2 … 9 |

# MOVITRAC® LTE-B frequency inverter

The MOVITRAC® LTE-B frequency inverter is the optimal combination of price, performance and range of applications. Therefore, it is the perfect choice for implementing simple applications. Designed and developed for controlling the speed of asynchronous motors, this frequency inverter is available in three sizes covering a power range of 0.37 to 11 kW. They represent an especially efficient way of realizing the tasks in materials handling applications, for example, in small, modular conveyor lines as well as in pump and fan applications.

## MOVITRAC® LTE-B

The standard design for installation in the control cabinet is available in degree of protection IP20. MOVITRAC® LTE-B is also available in IP55 / NEMA 12k making it suitable for special ambient conditions. These frequency inverters operate reliably and flexibly even when exposed to dust or water.

| **Technical data** | |
|---|---|
| Power supply connection | Power range [kW] |
| 115 V / 1-phase | 0.37 ... 1.1 |
| 230 V / 1-phase | 0.37 ... 2.2 |
| 230 V / 3-phase | 0.37 ... 4.0 |
| 400 V / 3-phase | 0.75 ... 7.5 (IP20 up to 11 kW available) |
| **Features** | |
| 40 configurable parameters | |
| Degree of protection: IP20 / NEMA 1 (control cabinet) | |
| Degree of protection IP55 / NEMA 12k housing (field applications) | |
| Integrated control panel for simple operation | |
| Pull-out help card | |

| **Options** | |
|---|---|
| LT BG-B | External control panel for control cabinet installation IP54 |
| DFx../UOH… | Connection to fieldbuses via SEW gateways |
| LT BP-B | Parameter module for data transfer |
| BW... | Brake resistors |
| NF LT... | Line filter |
| ND LT... | Line choke |
| HD LT... | Output choke |

# MOVITRAC® B frequency inverter: Compact and versatile

When choosing a suitable application-specific frequency inverter, “unit modularity” and “smaller dimensions” are among the most important criteria. SEW-EURODRIVE offers an economical and compact solution: MOVITRAC® B, the new generation of frequency inverters. The versatile unit concept and extensive expansion options allow for selecting exactly those inverter functions that match the individual requirements of the specific application.

**MOVITRAC® B**

Compact and inexpensive frequency inverter for a power range of 0.25 ... 75 kW

1-phase and 3-phase mains connection for AC 200 – 240 V and 3-phase mains connection for AC 380 – 500 V.

| **Technical data** | |
|---|---|
| Power supply connection | Power range [kW] |
| 230 V / 1-phase | 0.25 ... 2.2 |
| 230 V / 3-phase | 0.25 ... 30 |
| 400/500 V / 3-phase | 0.25 ... 75 |

| **Options** | |
|---|---|
| FBG11B | Easy to use plug-in keypad |
| UBP11A | Parameter module |
| DBG60B | Plain text keypad |
| FSC11B | Communication module for connecting MOVITRAC® B via SBus or RS-485 and for diagnostics and parameter setting via PC |
| FIO11B | Analog module with setpoint input, analog output and RS-485 interface |
| FIO21B | Digital module with 7 binary inputs and SBus connection |
| MBG11A | Speed control module |
| UFI11A | Fieldbus gateways for INTERBUS |
| DFP21B / DFE24B / DFE32B / DFE33B / DFD11B | Fieldbus gateways integrated or in separate housings: PROFIBUS DP-V1 / EtherCAT® / PROFINET IO/ EtherNet/IP and Modbus TCP / DeviceNet (CANopen integrated in the basic unit) |
| UWS11A / UWS21B / USB11A | Interface adapter |
| MOVI-PLC® | Compact controller, programmable in IEC 61331 with powerful libraries |
| Technology version for application modules | |
| MOVISAFE®:<br>Integrated functional safety | Safe Torque Off (STO) up to cat. 3 and PL d according to EN ISO 13849-1 for standard design.<br>3 AC 230V/400 V units from 0.55 to 75 KW (optional 230 V up to 2.2 kW and 400 V up to 4 kW) |

# MOVIDRIVE® B:
# The latest drive inverter generation

With MOVIDRIVE® B, SEW-EURODRIVE offers an inverter technology that was developed with a clear focus on innovation and performance. With the high functionality, the broad power range, the high overload capacity and the modular concept, MOVIDRIVE® B contributes to increased efficiency and flexibility in plants around the world.

MOVIDRIVE® B inverters control many drive systems: asynchronous AC drives or synchronous servo drives. MOVIDRIVE® B is equipped with the extended intelligent IPOS$^{plus®}$ control as standard.

All the MOVIDRIVE® B power ratings are especially compact and require less installation space in the control cabinet. In addition, the elaborate connection technology facilitates the installation of the cables and accessories.

**MOVIDRIVE® B**

High-performance inverter for dynamic drives in the power range from 0.55 ... 315 kW. Great diversity of applications due to extensive expansion options with technology and communication options. 3-phase mains connection for AC 230 V and AC 400 ... 500 V.

| **Technical data** | |
|---|---|
| Power supply connection | Power range [kW] |
| 200/240 V / 3-phase | 1.5 ... 37 |
| 400/500 V / 3-phase | 0.55 ... 315 |
| Standard design | The units are equipped with the integrated IPOS$^{plus®}$ positioning and sequence control system as standard and can be expanded by the available options. The standard design is identified by the digits “00” at the end of the type designation. |
| MOVISAFE®:<br>Integrated functional safety | Standard design Safe Torque Off (STO) up to category 3 and PL d according to EN ISO 13849-1 |
| Application version with application modules | In addition to the features of the standard version, these units include the electronic cam and internal synchronous operation technology functions. You can use all the application modules available in the MOVITOOLS® MotionStudio software package with the application versions. The application version is indicated by “0T” following the type designation.<br><br>SEW offers various standardized control programs specifically for ”positioning“, ”winding“ and ”controlling“ applications. These programs are called application modules. The application modules are part of the MOVITOOLS® MotionStudio operating software and can be used with units in application version.<br><br>**Your benefits at a glance:**<br>– Wide range of functions and user-friendly user interface<br>– You only have to enter the parameters needed for the application<br>– User-friendly application programs guide you through the process of setting parameters, so there is no need for complicated programming<br>– No lengthy training, therefore quick project planning and startup<br>– Control of all movement functions is performed directly in MOVIDRIVE®<br>– Decentralized concepts can be implemented |

# Options for MOVIDRIVE® B

| Type designation | |
|---|---|
| **Keypads DBG60B** | Standard keypad for parameterization, data management, startup, and diagnostics |
| **Encoder interfaces**<br>**DEH11B** | – For connecting motor encoders or distance encoders:<br>TTL, RS422, sin/cos, and HIPERFACE® encoders |
| **DER11B** | – For connecting motor encoders: Resolver<br>– For connecting distance encoders: TTL, RS422, sin/cos and HIPERFACE® encoders |
| **DEH21B** | – For connecting motor encoders: TTL, RS422, sin/cos, and HIPERFACE® encoders<br>– For connecting distance encoders: SSI absolute encoders |
| **DIP11B** | – For connecting distance encoders: SSI absolute encoders<br>– Adding binary inputs and outputs: 8x inputs, 8x outputs |
| **Fieldbus connections**<br>**– DFE32B / DFE33B**<br>**– DFE24B**<br>**– DFP21B**<br>**– DFC11B / DFD11B**<br>**– DFI11B / DFI21B**<br>**– DFS11B / DFS21B** | <br>– PROFINET IO / Modbus TCP + EtherNet/IP<br>– EtherCAT®<br>– PROFIBUS DPV1<br>– CANopen / DeviceNet<br>– INTERBUS / INTERBUS-LWL<br>– PROFIsafe via PROFIBUS / PROFIsafe via PROFINET |
| **MOVISAFE® safety monitor**<br>**– DCS31B**<br>**– DCS21B + DFS12B**<br>**– DCS21B + DFS22B** | Safe movement/positioning monitoring, safe inputs and outputs up to PL e according to EN ISO 13849-1 and<br>– Safe logic processing<br>– Communication via PROFIsafe/PROFIBUS<br>– Communication via PROFIsafe/PROFINET |
| **Additional inputs and outputs**<br>**– DIO11B** | 8x binary inputs and 8x binary outputs; 1x analog differentiation; 2x analog outputs |
| **MOVI-PLC® controller**<br>**– DHP11B**<br>**– DHE41B**<br>**– DHF41B**<br>**– DHR41B** | <br>– MOVI-PLC® basic<br>– MOVI-PLC® advanced, ETHERNET interface<br>– MOVI-PLC® advanced, ETHERNET / PROFIBUS / DeviceNet interface<br>– MOVI-PLC® advanced, ETHERNET / PROFINET/ Modbus TCP / EtherNet/IP interface |
| **Others**<br>**– DRS11B**<br>**– USB11B**<br>**– UWS21B** | <br>– Synchronous operation card<br>– Interface adapter for connection to PC using USB interface<br>– Interface adapter for connection via RS232 interface |

## Accessories and options for MOVITRAC® B and MOVIDRIVE® B

| Accessories and options | |
|---|---|
| **MOVITOOLS® MotionStudio operating software** | The MOVITOOLS® MotionStudio program package allows you to conveniently startup, parameterize and diagnose MOVITRAC® B frequency inverters and MOVIDRIVE® B inverters. |
| **MDR60A regenerative power supply** | The MDR60A regenerative power supply can be used to supply several units with power via a central power supply connection. In regenerative operation, the power is fed back into the supplying power supply. Using MDR60A saves energy and installation work. |
| **Braking resistor type BW** | BW series braking resistors are available for operating MOVITRAC® B frequency inverters and MOVIDRIVE® B inverters as generators. With integrated temperature sensor, the resistor can be protected without external monitoring. |
| **Line choke type ND** | ND series line chokes increase inverter overvoltage protection. This is an important characteristic in rough industrial power supply systems, especially if the inverter is installed near a supply transformer. |
| **NF...type line filter** | NF type line filters are available for EMC-compliant installation as specified by EN 61800-3. They suppress interference emissions on the line side of inverters. These line filters ensure that limit value class C1 is maintained on the supply end. |
| **Output choke type HD** | HD series output chokes suppress interference emitted from unshielded motor cables. They enable the motor to meet limit value class C1 requirements in accordance with EN 61800-3 in EMC-compliant installations. Output chokes provide an alternative to shielded motor cables in EMC-compliant installations. |
| **Output filter type HF** | HF series output filters are sine filters that smooth out inverter output voltage. Output filters are used for group drives to suppress discharge currents in motor cables and for long motor cables to prevent voltage peaks. |

# effiDRIVE® – Energy efficiency of frequency and drive inverters

**The optimal drive solution for simple speed control up to dynamic positioning applications:**

| | Process adjustment | Energy-saving | DC link coupling | Power regeneration | Thermally controlled fans |
|---|---|---|---|---|---|
| MOVITRAC® B<br>– Compact design with a complete range of functions<br>– Economic choice for standard tasks | ✔ | ✔ | ✔ | ✔ | ✔ |
| MOVIDRIVE®<br>– Large range of basic functions and a broad spectrum of options<br>– Economic choice for sophisticated applications | ✔ | ✔ | ✔ | ✔ | ✔ |
| MOVITRAC® LTE-B<br>– Adjusted scope of functions for simple applications | ✔ | ✔ | | | |

**Process adaption**

- Infinitely variable control of speed and torque allows almost every process to be adapted to the actual demand, making it more energy-efficient. Depending on the application, of up to 70 % of energy can be saved.
- Further saving potential can be tapped in drive tasks with cyclical acceleration and deceleration by implementing energy-efficient motion sequences. In this way, maximum acceleration, speed and deceleration are not always necessary.

**Energy-saving function**

- The energy-saving function of MOVITRAC® B and MOVIDRVE® B offers advantages when the application has to be operated in the part-load range and dynamic properties are not a main requirement when load changes occur.
- The dynamic adjustment of the magnetization current enables the motor to be operated with optimum efficiency in every operating point. The energy consumption is reduced by up to 30 % depending on the application.
- The energy-saving function ensures optimum efficiency of the drive especially in conjunction with an energy-efficient motor.

| DC link coupling |
| --- |
| – By connecting the DC links of several inverters, regenerative energy of one drive can be used directly as energy in another drive.<br>– This measure can reduce energy consumption from the supply system if the drive sequences are segmented and suitable travel profiles have been selected.<br>– MOVI-PLC®: Operated in storage and retrieval systems, the decentralized controller ensures the control of travel profiles and in this way provides for optimal energy coupling. |
| **Regenerative power unit** |
| – A regenerative power unit feeds back the regenerative energy of a drive into the supply system.<br>– The released braking energy is not dissipated via braking resistors but fed back into the supply system, which saves energy.<br>– Power regeneration is especially suited for hoists and storage and retrieval units. |
| **Thermally controlled fan** |
| The fans are only activated when waste heat is actually generated. In this way the energy consumption can be reduced and the service life of the fan is increased. |

# MOVIGEAR® – The mechatronic drive system

The housing has been optimized specifically for system applications and can easily be integrated in today's conveyor systems. It also allows for new developments from an entirely new perspective. This technology masters high breakaway and acceleration torque after longer system idling 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 economic and technically successful concept of decentralized drive systems. In many industries, such as the automotive, food and beverage industries, airport logistics or general transport logistics, the demands on materials handling systems are becoming both more complex and more specific. At the same time, less installation space is available for meeting these demands. As a result, SEW-EURODRIVE decided to research and develop an optimum application solution to suit these criteria.
The result is the mechatronic drive system MOVIGEAR®. It has an advantageous, compact design and is ideal for ensuring that conveyor systems are structured as efficiently as possible.

**University of Applied Sciences of Kaiserslautern**
Department of Applied Engineering Sciences

**Verified by an independent entity:**
**Energy saving potential of up to 50 %**

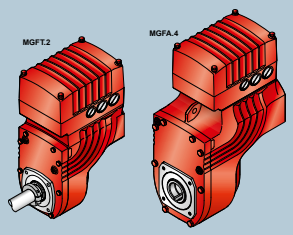
"A comparison of the test results shows a significant efficiency advantage of the MOVIGEAR® drives … over the entire load range."

## MOVIGEAR®: Mechatronic drive system comprising motor, gear unit, and electronics

A systematic development approach was taken right from the design phase. MOVIGEAR® is distinguished by its high level of system efficiency, a significant factor in reducing energy costs. The integration and coordination of all the drive components lead to a long service life and high system availability.

MOVIGEAR® is an intelligent system with its own control concept. Its high-quality networking helps reduce startup time and supports monitoring and maintenance tasks. When combined with a functional user software, drive tasks can be solved as quickly and easily as possible.

**MOVIGEAR® drive units**




**MGFA.4 MGFT.2** (examples):
The figure shows MOVIGEAR® MGFT.2 with TorqLOC® hollow shaft mounting system and MOVIGEAR® MGFA.4 with hollow shaft and key

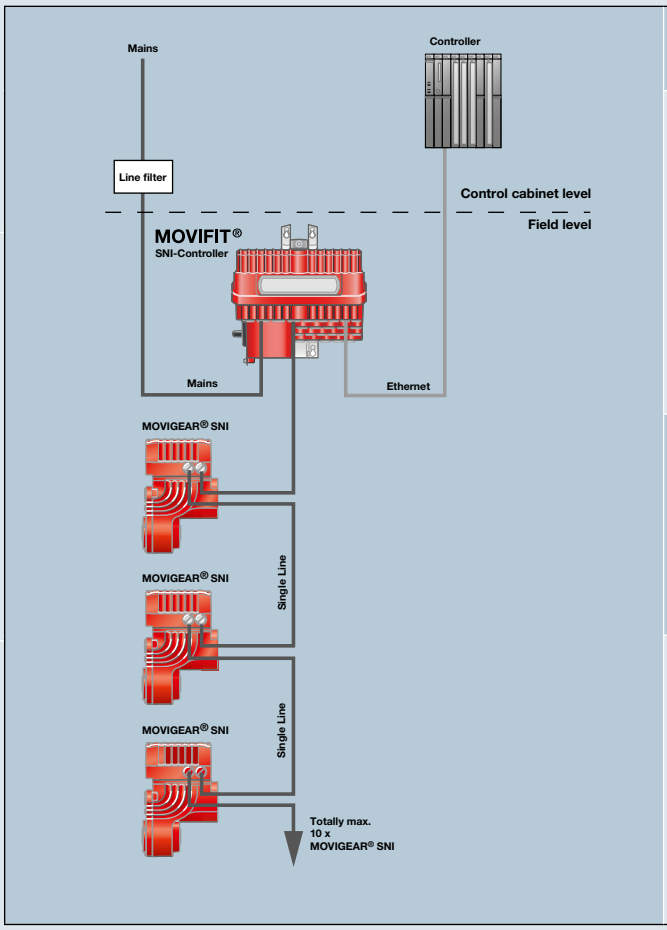
MOVIGEAR® is available in two sizes and two mechanical variants:

- MOVIGEAR® sizes
  - MGF.2 (torque class: 200 Nm)
  - MGF.4 (torque class: 400 Nm)
- MOVIGEAR® variants
  - MOVIGEAR® with hollow shaft and key
  - MOVIGEAR® with TorqLOC® hollow shaft mounting system

**Properties and advantages**

- Compact design: Motor, gear unit, and electronics combined in one mechatronic drive system
- SNI principle (Single Line Network Installation): A single line is required for power supply and communication
- Simplified system planning and design
- Reduced number of variants
- Lower storage costs
- High degree of protection
- Hygienic design surface for applications in hygienic areas
- No swirls of air, dirt and germs
- 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 life cycle costs and operating costs of the conveyor system

## Installation topology with an SNI controller



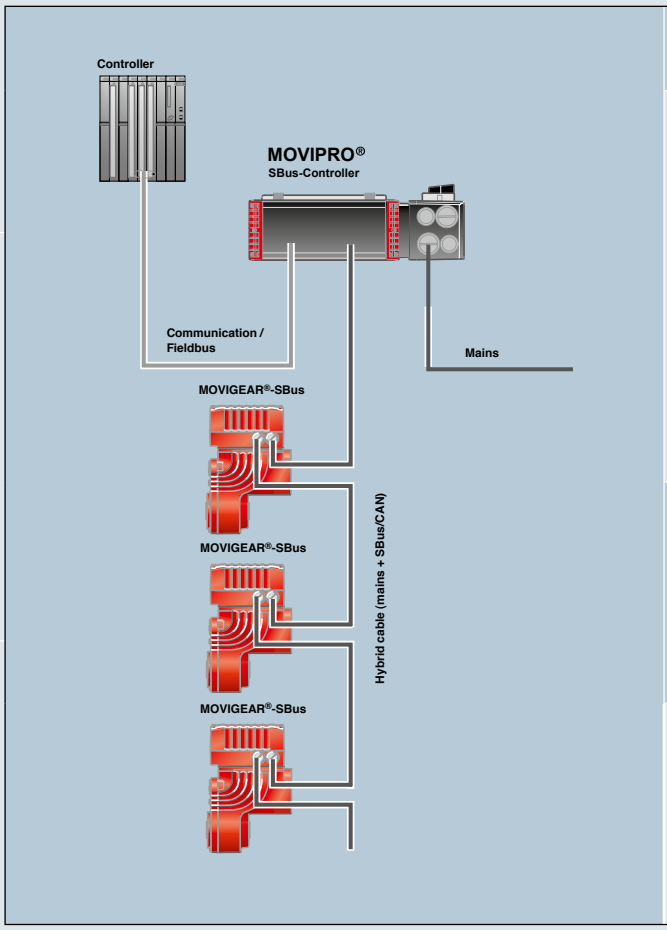

**MOVIGEAR® SNI**
Single Line Network Installation

**Properties:**
- Single control
- Reduction in the number of components
- Bus lines do not have to be routed in the field
- No risk of hidden faults in the bus cabling
- Reduced startup times
- Shorter project runtimes / lower project costs
- MOVISAFE® integrated functional safety: Safe Torque Off (STO) up to PL e according to EN ISO 13849-1

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

**Application examples:**
- Belt conveyors
- Pallet conveyors
- Roller and wheel conveyors
- Screw conveyors
- Container and packaging unit transports
- Chain and drag-chain conveyors

# Installation topology with an SEW system bus controller




**MOVIGEAR® SEW system bus**

High performance and fast bus communication via CAN

**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
- MOVISAFE® integrated functional safety: Safe Torque Off (STO) up to PL e according to EN ISO 13849-1

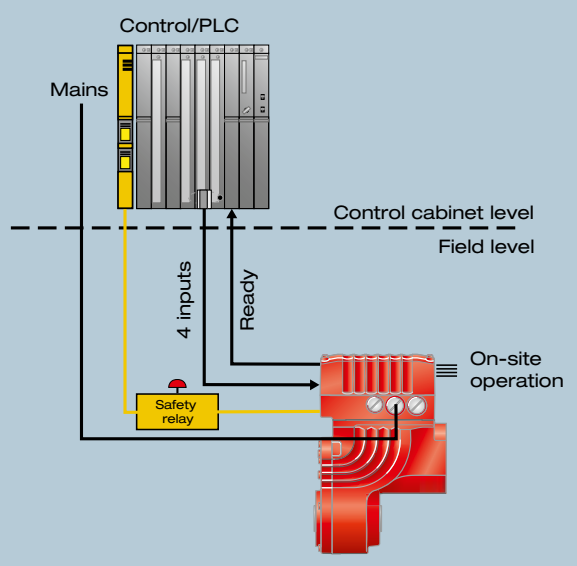
**Application options:**

- As 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 application due to large control range of 1:2000

**Application examples:**

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

## NEW: Installation topology with MOVIGEAR® binary



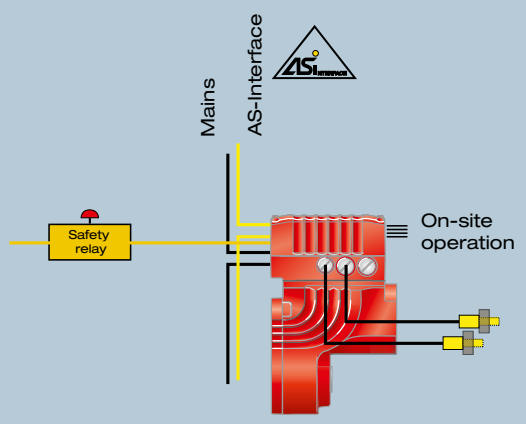

**MOVIGEAR® binary**
Stand-alone operation

**Features:**
- Simple startup without a PC using DIP switches and potentiometer
- Constant speeds and ramps can be configured
- Control of binary inputs and evaluation of signal relay via PLC
- On-site/manual operation via binary inputs
- Interface for diagnostics and parameter setting
- MOVISAFE® integrated functional safety: Safe Torque Off (STO) up to PL e according to EN ISO 13849-1

**Applications:**
- Basic stand-alone and individual applications
- For applications that require a soft start-up behavior
- Applications with two constant speeds
- For applications with high breakaway torques
- Applications with functional safety

**Areas of application:**
- Simple conveyors
- Rotary tables
- Drives for infrequent speed variations
- Stirrers and mixers
- Crushers and shredders
- Presses

# NEW: Installation topology with MOVIGEAR® AS-Interface




**MOVIGEAR® AS-Interface**

Basic, economical fieldbus interface

**Features:**

- Constant speeds and ramps can be configured
- Control via standard AS-Interface specifications
- Connection of external sensors on the actuator
- Voltage supply for connected sensor technology
- On-site/manual operation via binary inputs
- Interface for diagnostics and parameter setting
- MOVISAFE® integrated functional safety: Safe Torque Off (STO) up to PL e according to EN ISO 13849-1

**Applications:**

- Basic fieldbus interface
- For applications that require a soft start-up behavior
- Signal feedback from connected sensor technology
- For applications with expansive space requirements
- Applications with functional safety

**Areas of application:**

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

# **CLASSIC** – Servo drive systems

## Dynamic, versatile, and effective

Servo drive systems from SEW-EURODRIVE excel by their dynamic performance, high flexibility, and cost-efficiency. Their design features enable optimum drive solutions for all applications that require an even balance of power and precision.

No matter whether you need a servomotor, servo gearmotor, servo electric cylinder, or servo linear drive – the product portfolio of SEW-EURODRIVE for servo applications provides versatility and dynamics.

# MOVIAXIS® multi-axis servo inverters

MOVIAXIS® consists of axis modules, master modules, supply modules and optional modules and a comprehensive range of accessories.

**MOVIAXIS® offers:**

**Flexibility:**
- Through product scalability (hardware and software)
- Through communication and networking options
- Through drive functionality and automation options
- In engineering, startup, configuration and diagnostics using MOVITOOLS® MotionStudio

**Versatility:**
- Power range from 10 kW rated supply power up to 187 kW peak power
- From supply units with high overload capacity to sinusoidal regenerative power supply units
- Safety technology can be integrated
- Robust housing design and simple mounting
- Support of all common encoder systems

**Solutions:**
- With motion control functions from simple, graphically selectable technology functions to powerful 32 bit control systems
- With widely applicable motor/gear unit range
- With tiered motion control from simple positioning to support of customer-specific kinematics

## Master modules

Master modules are the “brain” of each axis system. Depending on the variant, the entire axis system is addressed by a non-SEW controller or by a MOVI-PLC® controller from SEW-EURODRIVE.

**The MOVIAXIS® master module is available in three variants:**
– Fieldbus gateway with data memory
– MOVI-PLC® basic motion network controller*
– MOVI-PLC® advanced motion network controller

## Axis modules

Axis modules either communicate directly with an external controller via integrated system buses and fieldbus option cards, or are controlled centrally via a master module of one of the three variants.

**Features:**
– Maximum overload of 250 %** for maximum 1 s
  (max. 250 A; the overload time increases for lower overloads)
– Fast touch probe inputs
– Integrated DC 24 V brake control
– Comprehensive motion control and technology functions
– Multi-encoder interface in the basic unit
– Double 7-segment display for clear messages
– Auto reload of all axis parameters when replacing the unit (in conjunction with master module)
– Integrated functional safety technology
  - MXA80: Without integrated function safety technology
  - MXA81: Safe Torque Off (STO) up to cat. 3 according to EN 954-1 and PL d to EN ISO 13849-1
  - MXA82: Safe Torque Off (STO) up to cat. 4 according to EN 954-1 and PL e to EN ISO 13849-1

**Rated currents 8 kHz / 4 kHz PWM:**
– 2/2, 4/4, 8/8, 12/12, 16/16, 24/32, 32/42, 48/64, 64/85, 100/133

## Supply modules

The supply modules provide the connected axes with power. They have a high overload capacity and regulate the regenerated power according to the unit variant.

**Features:**
– 10 kW, 25 kW, 50 kW, 75 kW
– Maximum overload of up to 250 % of the rated power for maximum 1 s (max. 187 kW)
– Minimized charging currents for line-friendly harmonic behavior and high effective current percentage
– Automatic addressing of all connected CAN axes for successful startup
– With integrated braking resistor and energy storage (MXP81)
– Sinusoidal regenerative power supply 50, 75 kW (MXR)

* On request  ** Basis 8 kHz rated current values

# effiDRIVE® – Saving energy with servo drive technology

**Perfect combination**
SEW-EURODRIVE servo drives operate more energy-efficiently than conventional drive solutions as they use high-quality permanent magnets, planetary gear units, and drive systems with energy feedback. The energy saving potential can be even further increased by combining the drives with the new components from effiDRIVE®, for example the MXR supply and regenerative modules for MOVIAXIS®.

**Individual consultation**
Extensive customer consultation is a central point of the modular effiDRIVE® energy-saving concept for servo applications. SEW-EURODRIVE offers extensive consultation and industry expertise for the project planning of new systems and for retrofitting existing applications.

**Advantages:**
- Universal modularity
- Can be flexibly used and combined
- Large energy-saving potential
- Fully compatible with all SEW-EURODRIVE servo components
- Compact and powerful
- Grid-compatible cos $\varphi = 1$

### MXR supply and regenerative modules

The MXR supply and regenerative modules have been developed for complete regeneration of braking energy. It provides a constant, controlled DC link voltage and drive performance regardless of variations in the supply input voltage. Power is taken from the supply system with cos $\varphi = 1$ as standard. It also feeds back excess energy into the supply system sinusoidally, avoiding line harmonics almost completely. Sensitive electronic components operated on the same supply system are subject to significantly less interference. The MXR offers diverse additional service and operation features, such as information about effective power or an integrated load counter.

### MXC storage modules

The optional MXC storage modules were developed for storing energy temporarily. They can be connected to all MXP supply modules. Braking energy is “moved” temporarily and utilized again during the next accelerating process. In this way, the average amount of energy drawn from the supply system is minimized and heating of the control cabinet is reduced or prevented. Costs for cooling and climate control measures are reduced and precious installation space is saved.

### MXP81 compact supply modules

For machines with particularly compact design and fast cycle times, the compact supply modules meet demands for minimum installation effort, small housing dimensions, and energy buffering to prevent or reduce losses and heat dissipation. A braking resistor is integrated in these supply modules in addition to the storage module. Amounts of energy that exceed the storage capacity are dissipated automatically.

**Operating conditions and power levels of the energy-saving modules**

| | Very dynamic applications with fast cycle times | Dynamic application | Lower dynamics |
|---|---|---|---|
| Lower axis output/ smaller loads | **MXP81** | **MXC / MXP81** | **MXR** |
| Large servo axes/ medium loads | | **MXC** | **MXC / MXR** |
| (Continuously operated) power axes/heavy loads | **MXR** | | **MXR** |

# Synchronous servomotors

## CMP series

Precision, dynamics, and power – this is what the compact CMP servomotors stand for. The particularly compact design lets you operate the servomotors in applications with very limited space. The low-inertia rotor of the CMP minimizes the amount of energy required for motor acceleration. The powerful rotor of the CMPZ control even extremely loads stiffly, reliably, and accurately. The highly dynamic servomotors round off the torque range of CMP servomotors from SEW-EURODRIVE. Standstill torques from 0.5 Nm to 47 Nm are covered by six CMP motor sizes and a total of 26 motor steps. The latest in winding and magnet technology gives the CMP servomotors a low mass moment of inertia despite their more powerful performance.

**Technical data**

| Type | Rated speed [rpm] | $M_0$ [Nm] | $M_{pK}$ [Nm] | $J_{mot}$ [kgcm²] | |
|---|---|---|---|---|---|
| | | | | CMP | CMPZ |
| CMP40S | 3000 / 4500 / 6000 | 0.5 | 1.9 | 0.10 | - |
| CMP40M | | 0.8 | 3.8 | 0.15 | - |
| CMP50S | | 1.3 | 5.2 | 0.42 | - |
| CMP50M | | 2.4 | 10.3 | 0.67 | - |
| CMP50L | | 3.3 | 15.4 | 0.92 | - |
| CMP63S | | 2.9 | 11.1 | 1.15 | - |
| CMP63M | | 5.3 | 21.4 | 1.92 | - |
| CMP63L | | 7.1 | 30.4 | 2.69 | - |

The motors CMP40, 50 and 63 are also available in ATEX design II 3 GD. (ATEX version for CMP71-100 in preparation).

For more information, refer to pages 98/99

| Technical data | | | | | |
|---|---|---|---|---|---|
| **Type** | **Rated speed [rpm]** | **$M_0$ [Nm]** | **$M_{pK}$ [Nm]** | **$J_{mot}$ [kgcm²]** | |
| | | | | **CMP** | **CMPZ** |
| CMP71S / CMPZ71S | 2000 / 3000 / 4500 / 6000 | 6.4 | 19.2 | 3.1 | 9.32 |
| CMP71M / CMPZ71M | | 9.4 | 30.8 | 4.1 | 10.37 |
| CMP71L / CMPZ71L | | 13.1 | 46.9 | 6.1 | 12.47 |
| CMP80S / CMPZ80S | | 13.4 | 42.1 | 8.8 | 27.18 |
| CMP80M / CMPZ80M | | 18.7 | 62.6 | 11.9 | 30.3 |
| CMP80L / CMPZ80L | | 27.5 | 107 | 18.1 | 36.51 |
| CMP100S / CMPZ100S | 2000 / 3000 / 4500 | 25.5 | 68.3 | 19.59 | 79.76 |
| CMP100M / CMPZ100M | | 31 | 108 | 26.49 | 86.66 |
| CMP100L / CMPZ100L | | 47 | 178.8 | 40.24 | 100.41 |

CMP71-100: You find more information and advantages on pages 30/31 in the “Drive 360° – Seeing the big picture” section

| **Integrated functional safety** for the modular CMP motor system | | | |
|---|---|---|---|
| FS | Safety-rated encoders | Up to PL d according to EN ISO 13849-1 | AK0H |

## DS/CM series

Synchronous servomotors are used in highly dynamic applications. The CM motor series, which is available in three sizes, each with three lengths, covers a static torque range of 5 to 68 Nm. Equipped with high-energy NdFeB magnets, this motor offers high overload behavior of 400 % standstill current as standard. The CM servomotor owes its compact design with high power density to the magnetic circuit layout. The DS series with its three lengths covers the 1 to 4 Nm static torque range. The acceleration torque of all motor sizes is three to four times the static torque. The motors feature thermal motor protection and resolver feedback for motor control as standard.

**Technical data**

| Static torque [Nm] | Rated speed [rpm] | Mass inertia [kgcm²] | |
|---|---|---|---|
| | | $J_{mot}$ | $J_{bmot}$ |
| 5 ... 68 | 2000 | 0.48 ... 189 | 0.83 ... 204 |
| 1 ... 68 | 3000 | | |
| 1 ... 68 | 4500 | | |
| 1 ... 21 | 6000 | | |

## CMD series

The compact CMD servomotors are characterized by their particularly short length and their use as direct drives. This makes them the ideal choice for applications with extremely limited installation space and for directly driven servo applications. Thanks to the innovative design with latest winding and magnet technology, the types with convection cooling and without housing provide a torque range from 0.3 Nm up to 32.0 Nm standstill torque with up to six times the overload capacity. All motors come equipped with standard thermal motor protection and resolver feedback as standard.
The options include scalable HIPERFACE® encoders with electronic nameplate and 24 V holding brake.

**Technical data**

| Type | Rated speed [rpm] | $M_0$ [Nm] | $M_{pK}$ [Nm] | J [kgcm²] | $n_{max}$ [rpm] |
|---|---|---|---|---|---|
| CMDV 55S | 4500 | 0.3 | 1.2 | 0.09 | 8000 |
| CMDV 55M | | 0.45 | 2.2 | 0.15 | |
| CMDV 55L | | 0.9 | 5.9 | 0.27 | |
| CMDV 70S | 1200 / 3000 | 0.7 | 3.0 | 0.26 | 6000 |
| CMDV 70M | | 1.1 | 5.3 | 0.45 | |
| CMDV 70L | | 2.2 | 11.4 | 0.83 | |
| CMDV 93K | 800 / 1200 / 3000 | 1.5 | 4.4 | 0.73 | 4000 |
| CMDV 93S | | 2.5 | 10.3 | 1.35 | |
| CMDV 93M | | 4.4 | 21.1 | 2.55 | |
| CMDV 93L | | 6.9 | 38.0 | 3.74 | |
| CMDV 138K | 600 / 1200 / 2000 | 4.3 | 7.6 | 4.10 | 2500 |
| CMDV 138S | | 8.8 | 19.0 | 7.09 | |
| CMDV 138M | | 15.7 | 49.0 | 12.85 | |
| CMDV 138L | | 20.2 | 70.0 | 18.61 | |
| CMDV 162K | 400 / 800 / 1200 | 6.0 | 11.0 | 7.50 | 1800 |
| CMDV 162S | | 13.5 | 27.0 | 12.90 | |
| CMDV 162M | | 22.0 | 57.0 | 23.60 | |
| CMDV 162L | | 32.0 | 104.0 | 34.60 | |

CMDV = Solid shaft type of the CMD servomotor
$n_{max}$ = Maximum speed

# Synchronous linear servomotors

## SL2 series

The new SL2 synchronous linear motors from SEW-EURODRIVE are the perfect solution for use in highly dynamic and flexible processing machines, handling technology and pick-and place applications. Generating linear motion and force directly does not require any mechanical transmission elements that are subject to wear, such as spindles, ball bearings or toothed belts. An optimum force-density ratio is achieved by using the latest winding technology and a laminated iron core.
The SL2 synchronous linear motor with convection cooling is practically maintenance-free and offers maximum high control quality, speed and accuracy. SL2 synchronous linear motors are available in three models for speed classes 1, 3 and 6 m/s: SL2 Basic, SL2 Advance System and SL2 Power System. For longer travel distances, secondaries are available in different lengths and can be easily lined up in rows. The performance of the SL2 Power System can be additionally increased by adding a forced cooling fan.

**Technical data**

| Product designs | Rated power range [N] | Rated speed classes [m/s] |
|---|---|---|
| SL2 Basic | 125 ... 6000 | 1 / 3 / 6 |
| SL2 Advance System | | |
| SL2 Power System | | |

# Accessories and options for linear servomotors



## AL1H length-measuring system

SL2 Advance System and SL2 Power System linear servomotors can be equipped with the optional AL1H absolute length-measuring system. AL1H consists of a linear sensor, which is attached to the motor cooling unit along with the encoder components, and a measuring tape, which is routed along the travel distance. The AL1H length measuring system is dirtresistant and permits high speeds and accele ration. Encoder components that are ready for use allow AL1H to be assembled easily and cost effectively.

## SL2 Advance System and SL2 Power System

- Motor design with matching plug connectors
- EMC-compliant connector housing design
- Plug connectors seal the plug on the cable end with a lamellar seal and ensure strain relief in accordance with EN 61884
- Extensive accessories for inverter-specific cable prefabrication
- Feedback cable with connection option for AL1H
- D-sub EMC connector with pin contacts on the encoder end
- 9 and 15 pole connectors matching the inverter

# Electric cylinders

## CMS series electric cylinders

Electric cylinders of the CMS series are equipped with permanent magnet rotors and operate very precise, powerful and fast. Combined with drive electronics from SEW-EURODRIVE, they form economical, energy-efficient drive solutions that ensure a high level of process reliability in system operation and are easy to integrate into existing automation systems, such as welding plants and robotic systems.

With the new CMS63S and CMS63M design concept, SEW-EURODRIVE offers the first electric cylinder with low-maintenance oil bath lubrication worldwide. The tried-and-tested lubrication system of the SEW gearmotors has been adopted for linear technology. This ensures special properties, such as homogenous heating and a higher efficiency, over the entire service life.

| **Electrical data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Type** | **CMS50S** | | | **CMS50M** | | | **CMS63S** | |
| Max. torque [Nm] | 5.2 | | | 5.2 [4] | | | 11.1 | |
| Standstill torque [Nm] | 1.3 | | | 2.4 | | | 2.9 | |
| **Mechanical data** | | | | | | | | |
| **Type** | KGT [1] | | | | | | | PGT [2] |
| Rated speed [$n_N$] | 3000 rpm<br>4500 rpm<br>6000 rpm | | | | | | | |
| Spindle pitch [mm] | 5 | | | | | | 6 | 5 |
| Spindle diameter [mm] | 15 | | | | | | 25 | 20 |
| Max. continuous thrust [3] [N] | 1300 | | | 2200 | | | 2400 | 2800 |
| Peak thrust [4] [N] | 5300 | | | | | | 10000 | |
| Nominal stroke [mm] | 70 | 150 | 300 | 70 | 150 | 300 | 100/200/400/600 | 100/200 |
| Maximum velocity (mm/s) | 375 | | 210 | 375 | | 210 | 450 | 375 |

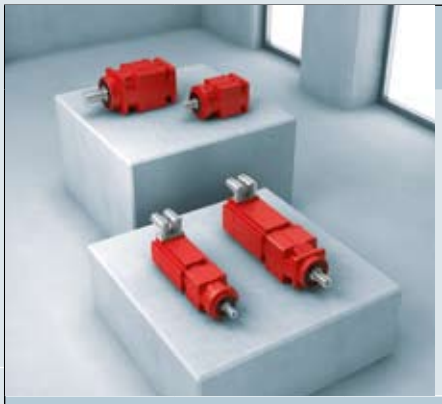
[1] Ball screw
[2] Planetary roller screw
[3] Depending on the mean travel velocity
[4] Maximum permitted torque

| **Electrical data** | | | | | |
|---|---|---|---|---|---|
| **Type** | **CMS63M** | | **CMS71L** | | |
| Max. torque [Nm] | 11.1 [4] | | 31.4 | | |
| Standstill torque [Nm] | 5.3 | | 9.5 | | |
| **Mechanical data** | | | | | |
| **Type** | KGT [1] | PGT [2] | KGT [1] | | PGT [2] |
| Rated speed [$n_N$] | 3000 rpm<br>4500 rpm<br>6000 rpm | | 2000 rpm<br>3500 rpm<br>4500 rpm | | |
| Spindle pitch [mm] | 6 | 5 | 10 | 6 | 5 |
| Spindle diameter [mm] | 25 | 20 | 32 | | 24 |
| Max. continuous thrust [3] [N] | 4100 | 5200 | 3600 | 6700 | 7200 |
| Peak thrust [4] [N] | 10000 | | 17000 | 15000 | 20000 |
| Nominal stroke [mm] | 100/200/400/600 | 100/200 | 200 | 350 | 200 |
| Maximum velocity (mm/s) | 450 | 375 | 500 | 200 | 250 |

[1] Ball screw
[2] Planetary roller screw
[3] Depending on the mean travel velocity
[4] Maximum permitted torque

# Servo gear units

## Planetary servo gear units



### PS.C series

The low backlash PSC planetary servo gear units are designed for torque classes from 30 to 305 Nm. They were designed to unite greatest possible flexibility and cost-efficiency because not every application demands machines with maximum performance. These planetary servo gear units form the basis for versatile, dynamic, and above all cost optimized drive solutions. PS.C planetary servo gear units are available in the following designs:

- PSC: B5 output, solid shaft
- PSKC: B5 output, solid shaft with key
- PSCZ: B14 output, solid shaft
- PSKCZ: B14 output, solid shaft with key

**Technical data**

| Size 1-stage | Size 2-stage | Torque class [Nm] | Gear ratios 1-stage [i] [1] | Gear ratios 2-stage [i] [2] |
|---|---|---|---|---|
| 221 | 222 | 30 | 3 / 5 / 7 / 10 | 15 / 21 / 25 / 30 / 35 / 49 / 50 / 70 / 100 |
| 321 | 322 | 65 | | |
| 521 | 522 | 160 | | |
| 621 | 622 | 320 | 5 / 7 / 10 | 25 / 35 / 49 / 50 / 70 / 100 |

[1] Circumferential backlash: Less than 10´ for all designs
[2] Circumferential backlash: Less than 15´ for all designs

## PS.F series

The low backlash PS.F planetary servo gear units are designed for torque classes from 25 to 3000 Nm. The permitted acceleration torque ratings are significantly higher than these values.

Three output variants are available:
- PSF: B5 output, solid shaft
- PSKF: B5 output, solid shaft with key
- PSBF: B5 output, flange block shaft according to EN ISO 9409

### Technical data

| Type | Size 1-stage | Size 2-stage | Torque class [Nm] | Gear ratios [4] 1-stage [i] | Gear ratios [4] 2-stage [i] | Circumferential backlash 1-stage [i] | Circumferential backlash 2-stage [i] |
|---|---|---|---|---|---|---|---|
| PSF | 121 | 122 | 25 | 3 [4] / 4 [4] / 5 / 7 / 10 | 15 [5] / 16 [4] / 20 / 25 / 28 / 35 / 40 / 49 / 70 / 100 | 8 [6] / 4 [7] / 2 [8] | 10 / 6 / 3 |
| PSF / PSBF | 221 | 222 | 55 | | | 6 / 3 / 1 | 8 / 4 / 2 |
| PSF / PSBF | 321 | 322 | 110 | | | | |
| PSF / PSBF | 521 | 522 | 300 | | | | |
| PSF / PSBF | 621 | 622 | 600 | 4 / 5 / 7 / 10 | | 4 / 2 / 1 | 6 / 3 / 1 |
| PSF / PSBF | 721 | 722 | 1000 | | | | |
| PSF / PSBF | 821 | 822 | 1750 | | | | |
| PSF | 921 | 922 | 3000 | | | | |

[3] Further gear ratios on request
[4] PSF only
[5] Only PSBF 320/520
[6] Standard
[7] Reduced
[8] Minimized

## Helical-bevel servo gear units

**BS.F series**

The low backlash BS.F helical-bevel servo gear units are designed for torque classes from 40 to 1500 Nm. The permitted acceleration torque ratings are significantly higher than these values. These helical-bevel servo gear units are available in five output variants as standard:

- BSF: Solid shaft
- BSKF: Solid shaft with key
- BSBF: Flange block shaft (EN ISO 9409)
- BSHF: Hollow shaft with shrink disk
- BSAF: Hollow shaft with keyway (shaft mounted gear unit)

All variants come equipped with a B5 mounting flange, or with torque arm on swing base as an option. This means the drive units can be optimally integrated into the specific application. The input stage with helical gearing and a hypoid bevel gear output stage result in gear ratio ranges that cover those of single-stage helical-bevel and hypoid gear units as well as those of single-stage helical-worm gear units with at the same time a high level of transmission quality. The circumferential backlash remains constantly low over the entire gear unit service life.

**Technical data**

| Size | Torque class [Nm] | Gear ratios | Circumferential backlash ['] |
|---|---|---|---|
| 202 | 40 | 3 / 4 / 6 / 8 / 10 / 15 / 20 / 25 | 6 [9] / 3 [10] |
| 302 | 80 | 3 / 4 / 6 / 8 / 10 / 15 / 20 / 25 / 30 | |
| 402 | 160 | | |
| 502 | 320 | 3 / 4 / 6 / 8 / 10 / 12 / 15 / 20 / 25 / 30 / 35 | |
| 602 | 640 | 3 / 4 / 6 / 8 / 10 / 12 / 15 / 20 / 25 / 30 / 35 / 40 | |
| 802 | 1500 | | |

[9] Standard [10] Reduced

## Options

| Options for servo gear units and servo gearmotors | |
|---|---|
| Direct motor mounting | Positive direct mounting (without clamping adapter) of CMP, CM and DS series SEW servomotors |
| Motor adapters | EPH motor adapters for PS.F and PS.C planetary servo gear units, ECH motor adapters for PS.C planetary servo gear units, and EBH motor adapters for BS.F helical-bevel servo gear units. |
| Reduced backlash | Optional for planetary servo gear units PS.F and helical-bevel servo gear units BS.F with significantly reduced circumferential backlash |
| Minimized circumferential backlash | Optional for planetary servo gear units PS.F with reduced circumferential backlash |

For every motion in your machines and systems and for every industry: As a leading drive technology specialist, we always supply the right drive. This includes not only gear units, motors or drive electronics, but also the matching controller and a comprehensive service portfolio. This is what we call Drive 360° – Seeing the big picture: From system availability to problem-solving competence, from low operating costs over energy efficiency to the complete system that handles all your tasks.

**www.sew-eurodrive.com**

SEW EURODRIVE

# Explosion-proof servo drive technology

Many areas of industry are subject to the European Directive 1999/92/EC (ATEX 137). This directive and the standards and regulations based on it must be observed in the chemical industry, the timber industry, or the food and beverage industry, for example. Some less obvious sectors such as the printing industry and the pharmaceutical industry are also affected by this directive.

Safe drives are required for sectors where potentially explosive air/gas or air/dust mixtures develop or can develop only occasionally (zone 1/zone 21), or rarely or briefly (zone 2/zone 22). Especially for these tasks and in order to be able to use servo drive technology in these areas as well, SEW-EURODRIVE has qualified servo gear units and servomotors according to the 94/9/EC Directive.

# Overview of safe servo solutions

**Category**
**II 2 G/D c, k T4 120 °C X**
**with degree of protection IP65**
Gear units of the (reduced backlash) R, RX, F, K, S and W37 series

**Category**
**II 2 G/D c, k T3 150 °C X**
**with degree of protection IP65**
- Low-backlash PF.F servo gear units
- Low-backlash BS.F right-angle servo gear units
- For adapter or direct mounting with CMP synchronous servomotors in conjunction with SEW-EURODRIVE frequency inverters. Available for G/D with resolver; for D also with absolute encoder and holding brake

**Categories**
**II 3 G Ex nA II T3 X**
**II 3 D Ex tD A 22 IP6X T 150 °C X**
Synchronous CMP servomotors of the 40, 50 and 63 series in conjunction with frequency inverters from SEW-EURODRIVE.



| Technical data | | | | |
|---|---|---|---|---|
| | **Ex identification** | **Circumferential backlash classes** | **$M_{amax}$ [Nm]** | **$M_{apk}$ [Nm]** |
| PSF* | II2D c, k T3 / 150 °C X | Standard/ | 18 – 3000 | 27 – 4200 |
| PSKF* | II2GD c, k T3 / 150 °C X | Reduced circumferential backlash | | |
| BSF | II2D c, k T3 / 150 °C X | | 40 – 1310 | 51 – 1910 |
| BSAF | II2GD c, k T3 / 150 °C X | | | |
| BSKF | | | | |
| BSBF | | | | |
| R, F, K gear units | II2D c, k T4 / 120 °C X | | 31 – 8000 | 46 – 9090 |
| | II2GD c, k T4 / 120 °C X | | | |
| S and W gear units | II2D c, k T4 / 120 °C X | Standard | 43 – 480 | 60 – 655 |
| | II2GD c, k T4 / 120 °C X | | | |

*PSF/PSKF 121-522: Max. $_{nepk}$ 6000 rpm.

For more information on products from SEW-EURODRIVE for potentially explosive atmospheres, please refer to page 44.

# System solutions with servo gearmotors

All designs and sizes of the helical, parallel shaft helical, helical-bevel and helical-worm gear units can now also be mounted to the DS, CM and CMP synchronous servomotors and to the CT/CV/DRL asynchronous servomotors from SEW-EURODRIVE. The /R option, i.e. reduced circumferential backlash in conjunction with high efficiency ratings and a high endurance gearing, provides for servo-typical advantages for these gear units, such as a high positioning accuracy.

The MOVIDRIVE® inverters, the powerful MOVIAXIS® series and their diverse options provide for functional, scalable and intelligent systems that ensure the maximum utilization of all components. The standard gear units of the 7-series excel by their efficiency, power density and wide range of variants. The synchronous servomotors offer precision, dynamics and torque in a particularly compact design. The combination of these gear units and motors sets global standards.

## Helical servo gearmotors

The variety of sizes meets virtually any requirement. The RX57 to RX107 single stage gear units offer space-saving solutions for a high output speed. If every kilogram counts, you may benefit from a solution with multi-stage gear units: Due to their die-cast aluminum design, the R07, R17 and R27 models are three particularly efficient lightweights – ideal as satellite drives and for use in light machine constructions.

### Technical data

| | Synchronous servo gearmotors CMP | | DS/CM | | Asynchronous servo gearmotors CT/CV/DRL | |
|---|---|---|---|---|---|---|
| | RX57 ... RX77 | R07 ... R107 | RX57 ... RX107 | R17 ... R107 | RX57 ... RX107 | R17 ... R167 |
| Gear ratios [i] | 1.3 ... 7.63 | 3.21 ... 216.54 | 1.3 ... 8.23 | 3.37 ... 216.28 | 1.3 ... 8.23 | 3.37 ... 255.71 |
| Output torque [Nm] | 63 ... 830 | 31 ... 4300 | 63 ... 830 | 45 ... 4300 | 63 ... 830 | 45 ... 18000 |
| Circumferential backlash (/R option) [$arc_{min}$] | – | 5 ... 14 | – | 5 ... 14 | – | 5 ... 14 |

## Parallel shaft helical servo gearmotors

A standard drive that not only excels by its power but also by its design characteristics. Parallel shaft helical gearmotors by SEW-EURODRIVE are typically used in materials handling and process engineering applications where they reliably implement all kinds of drive solutions.

### Technical data

| | Synchronous servo gearmotors CMP | DS/CM | Asynchronous servo gearmotors CT/CV/DRL |
|---|---|---|---|
| | F27 … F107 | F27 ... F107 | F27 ... F157 |
| Gear ratios [i] | 3.77 ... 276.77 | 3.77 ... 276.77 | 3.77 ... 276.77 |
| Output torque [Nm] | 87 ... 7680 | 87 ... 7680 | 87 ... 18000 |
| Circumferential backlash (/R option) [$arc_{min}$] | 5 ... 12 | 5 ... 12 | 5 ... 12 |

## Helical-bevel servo gearmotors

The helical-bevel gear units from SEW-EURODRIVE provide a high degree of efficiency of approx. 95 % in both directions of torque and at any input speed in the long-term. The gearing is designed for high endurance and therefore makes for a high-torque, wear-free drive. The remarkably high efficiency of our helical-bevel gearmotors makes them energy-efficient angular drives. As they also have a long maintenance-free service life, they can be used with AC asynchronous motors, asynchronous and synchronous servomotors in every application.

**Technical data**

| | Synchronous servo gearmotors CMP | Synchronous servo gearmotors DS/CM | Asynchronous servo gearmotors CT/CV/DRL |
|---|---|---|---|
| | K37 … K107 | K37 ... K107 | K37 ... K187 |
| Gear ratios [i] | 3.98 ... 174.19 | 3.98 ... 176.05 | 3.98 ... 179.86 |
| Output torque [Nm] | 125 ... 8000 | 125 ... 8000 | 125 ... 50000 |
| Circumferential backlash (/R option) [$arc_{min}$] | 5 ... 13 | 5 ... 13 | 5 ... 13 |

## Helical-worm servo gearmotors

They are particularly space saving when installed as angular drive. Their good dampening properties are yet another advantage of the simple, mechanical design. Torque shocks are reduced as the power transmission to the drive shaft is linear. The noise of this type is very low, even when operating at full capacity. The helical-worm gearmotors by SEW-EURODRIVE can therefore even be used for stage lifts.

**Technical data**

| | Synchronous servo gearmotors CMP | Synchronous servo gearmotors DS/CM | Asynchronous servo gearmotors CT/CV/DRL |
|---|---|---|---|
| | S37 ... S67 | S37 ... S67 | S37 ... S67 |
| Gear ratios [i] | 6.80 ... 75.06 | 6.80 ... 75.06 | 6.80 ... 75.06 |
| Output torque [Nm] | 43 ... 480 | 43 ... 480 | 43 ... 480 |

## SPIROPLAN® servo gearmotors

SPIROPLAN® servo gearmotors with directly mounted CMP synchronous servomotors operate at a high level of efficiency while being low-noise at the same time. They offer a great variety of mounting positions to allow for greatest possible flexibility for the customer. The SPIROPLAN® right-angle gear units W37/W47 achieve great velocities at extremely low gear ratios. The wear-free gear components minimize friction losses and optimize the mechanical efficiency. The gearing results in an extremely low-noise performance. The low purchasing and life cycle costs make these drives ideally suited for simple conveyor applications.

Gear unit versions:

- Foot/flange-mounted designs
- B5 flange
- B14 flange
- Solid shaft/hollow shaft
- Direct mounting of servo gear unit
- With adapter

**Technical data**

| | **Synchronous servo gearmotors CMP** |
|---|---|
| | W37 ... W47 |
| Gear ratios [i] | 3.2 ... 74.98 |
| Output torque [Nm] | 70 ... 180 |

# Cables and connection options

SEW-EURODRIVE offers prefabricated plug connector and encoder cable options for all motors and gearmotors. These options are designed in such a way that they optimally support the drive, can be easily connected and are connected reliably with the relevant motor.

## Cable connections for CMP servomotors

| Motor type | Power connector | Drive electronics |
|---|---|---|
| CMP 40-63 | Motor: SM1 | MOVIDRIVE® inverter |
| | Brakemotor: SB1 | |
| CMP 71-100 | Motor: SM1, SMB | MOVIDRIVE® inverter |
| | Brakemotor: SB1, SBB | |
| CMP 40-63 | Motor: SM1 | MOVIAXIS® servo inverter |
| | Brakemotor: SB1 | |
| CMP 71-100 | Motor: SM1, SMB | MOVIAXIS® servo inverter |
| | Brakemotor: SB1, SBB | |

| Motor type | Encoder connector | Drive electronics |
|---|---|---|
| CMP 40-100 | RH1M resolver | MOVIDRIVE® inverter |
| CMP 40-63 | HIPERFACE® AK0H, EK0H, AS1H, ES1H | MOVIDRIVE® inverter |
| CMP 71-100 | HIPERFACE® AK0H, EK1H, AK1H | MOVIDRIVE® inverter |
| CMP 40-100 | RH1M resolver | MOVIAXIS® servo inverter |
| CMP 40-63 | HIPERFACE® AK0H, EK0H, AS1H, ES1H | MOVIAXIS® servo inverter |
| CMP 71-100 | HIPERFACE® AK0H, EK1H, AK1H | MOVIAXIS® servo inverter |

## Cable connections for DR series AC motors

| Direct connection | | | |
|---|---|---|---|
| **Motor type** | **Encoder type** | **Encoder connection** | **Inverter connection** |
| DR71 – DR132 | EI7S, EI76, EI72, EI71 | Conductor end sleeves | Conductor end sleeves |
| | | M12 plug connector | MOVIDRIVE® inverter |
| | ES7S, ES7R, AS7W, AS7Y | Conductor end sleeves | D-Sub plug connector |
| | | Connection cover | MOVIDRIVE® inverter |
| DR160 – DR225 | EG7S, EG7R, AG7W, AG7Y | Conductor end sleeves | |
| | | Connection cover | |
| DR315 | EH7S | M23 plug connector | |
| | AH7Y | Conductor end sleeves | |

| Connection via intermediate sockets | | | |
|---|---|---|---|
| **Motor type** | **Encoder type** | **Encoder connection** | **Adapter plug** |
| DR71 – DR132 | ES7S, ES7R, AS7W | Conductor end sleeves | M23 plug connector (adapter) |
| | | Connection cover | |
| DR160 – DR225 | EG7S, EG7R, AG7W, | Conductor end sleeves | |
| | | Connection cover | |

| Intermediate socket | | |
|---|---|---|
| M23 plug connector (connector) | Extension | M23 plug connector (adapter) |

| Intermediate socket | | Inverter connection |
|---|---|---|
| M23 plug connector (connector) | Extension | D-Sub plug connector<br>MOVIDRIVE® inverter |

# **CLASSIC** –
Drive systems for decentralized installation

In many industries and applications, implementing economical automation concepts means utilizing decentralized systems throughout. Long rows of control cabinets with complex wiring, expansive space requirements and long distances between control cabinet and motors are too rigid and not very economical. Only the combination of flexible, versatile, economic and target-oriented modules will provide an efficient solution. This is the reason why system operators opting for decentralized drive systems from SEW-EURODRIVE are always ahead of the game. Be it in the automotive or food and beverage industry, or in transport and cargo logistics.



## Decentralized implementation of economical automation concepts

All decentralized components from SEW-EURODRIVE fulfill the three most important criteria for use in automation applications: They are modular, flexible and economical.

This renders additional central switching and protection units and electronic control devices obsolete; the required control cabinet space is reduced significantly. Costs for the previously expensive and time-consuming wiring of motors, sensors and actuators are also reduced substantially. Decentralized drive systems can be used with any conventional bus system and provide for quick, efficient and flexible installations.

# Decentralized drives

## MOVIMOT® gearmotor with integrated frequency inverter

MOVIMOT®, the gearmotor with integrated frequency inverter, is a reliable combination of gearmotor and digital frequency inverter in the 0.37 to 4.0 kW power range. Despite the integrated frequency inverter, MOVIMOT® requires only a minimum of additional space when compared to standard gearmotors and can, of course, be supplied in all standard versions and mounting positions, with and without a brake, for supply voltages of 380 to 500 V and 200 to 240 V.

**NEW: MOVIMOT® D can be combined with the new DR motor series for different efficiency levels as standard.**

**Technical data**

| Speed range [rpm] | Voltage [V] | Connection | Power [kW] | Torque [Nm] |
|---|---|---|---|---|
| 280 ... 1400 (1700) | 3 x 380 ... 500 | ⅄ | 0.37 ... 4.0 | 2.52 ... 27.3 |
| 290 ... 2900 | 3 x 380 ... 500 | △ | 0.55 ... 4.0 | 1.81 ... 13.2 |
| 280 ... 1700 | 3 x 200 ... 240 | ⅄ ⅄ | 0.37 ... 2.2 | 2.08 ... 12.4 |

| | |
|---|---|
| Enclosure | IP54, optional IP55, IP65 or IP66 |
| Ambient temperature | -30 °C/-20 °C to +40 °C (depending on the motor design) |
| Control via binary signals | Entry for cw/stop, ccw/stop, setpoint switch mode isolated signal relays 2 fixed setpoints, 1 ramp for acceleration and deceleration |
| Control via fieldbus communication | In combination with fieldbus interfaces, with and without minicontroller<br>PROFIBUS, PROFIsafe, INTERBUS, INTERBUS LWL, DeviceNet, CANopen, AS-Interface |
| Use in stand-alone applications | In combination with the options:<br>MLU..1A: Local 24 $V_{DC}$ supply<br>MLG.1A: Local supply with 24 $V_{DC}$ supply<br>MBG11A: Speed control module for setpoint frequency specification and display<br>MWA21A: Setpoint converter for interfacing of analog setpoints<br>(0... 10 V, 0 ... 20 mA, 4 ... 20 mA) and RS-485 |
| Use in decentralized installations | In combination with field distributors:<br>MF.../Z.3.<br>MF.../Z.6.<br>MF.../.../Z.7.<br>MF.../.../Z.8.<br>as well as the corresponding hybrid cables |
| Diagnostics | 3-color LED signals operating status and fault status via diagnostics interface, serial interface RS485 and option MDG11A or PC |
| MOVISAFE®: Integrated functional safety | SafetyDrive package (optional) enables Safe Torque Off (STOP) up to category 3 and PL d according to EN ISO 13849-1 |
| Approval | IEC or c UL us |

**MOVI-SWITCH® gearmotor with integrated switching and protection function**

MOVI-SWITCH® is a particularly efficient solution when it comes to decentralization at power levels up to 3 kW. The switching and protection functions integrated into the motor terminal box mean that this compact and sturdy gearmotor does not require any additional cables, so that MOVI-SWITCH® does not require any additional control cabinet space.

All AC motors and brakemotors can be combined in the MOVI-SWITCH® program with all matching gear units from the SEW-EURODRIVE modular system.

**Technical data**

| **Number of poles** | **Power range [kW]** |
|---|---|
| 4 | 0.37 ... 3.0 |
| 2 | 0.55 ... 3.0 |
| 6 | 0.25 ... 1.5 |

| Type | MSW-1E | MSW-2S |
|---|---|---|
| Switching function | On/Off one direction of rotation | On/Off two directions of rotation |
| Switch element | Contactless star bridge switch | Switch element with contact |
| Direction of rotation | CW or CCW depending on phase sequence | CW and CCW, independent of phase sequence |
| Control | – Binary control signals RUN / OK<br>– Connection via 1x M12-plug connector<br>– Optionally with external AS-Interface | – Binary control signals CW / CCW / OK<br>– Connection via 2x M12-plug connectors<br>– Alternatively with integrated AS-Interface |
| Brake management | Standard with brake rectifier BGW | – integrated brake control system<br>– Electrical manual brake release with optional BGM-rectifier |
| Motor protection | Direct temperature monitoring with integrated analysis | |
| Degree of protection | IP54, optional IP55, IP65 or IP66 | |
| Ambient temperature | –25 °C … + 40 °C (… + 60 °C) | |

# Fieldbus interfaces, field distributor and cable systems

The fieldbus interfaces support the communication with the most frequently used fieldbus systems, PROFIBUS, PROFIsafe, INTERBUS, CANopen, DeviceNet and AS-Interface. The fieldbus interfaces are based on a module terminal box with connecting terminals and a plug-in fieldbus module. These interfaces can be attached directly to the drive, or they can be mounted separately.

The variable speed MOVIMOT® drive is connected to the bus using terminals; additional sensors, actuators or MOVI-SWITCH® gearmotors without closed-loop control can be connected to the bus either by using terminals or M12 plug connectors. Fault diagnosis can easily be conducted via the bus in the event of a malfunction thanks to diagnostic interfaces and LED signals.

**Field distributors rationalize the connection of drives** with the power supply system, the DC 24 V control voltage and the fieldbus. The units are based on the bus interfaces technology with additional connection technology for supply system distribution.

Decentralized installation is made easy by installation of the field distributor close to the motor. The modular plug-in system makes for easy troubleshooting and maintenance, especially in the event of a problem or for servicing purposes.

**The hybrid cables have been developed in-house** and are combination cables which carry the power supply, control voltage and communication strands within one cable sheath. They also guarantee optimum EMC shielding and impedance.
The hybrid cable for connecting MOVIMOT® units to field distributors is 3 m (10 ft.) long. It combines the communications interface as well as supply and control voltage connections in one cable and is supplied as a prefabricated cable with plug-in connection.

MOVIMOT® drives fitted with hybrid cables can be connected to the field distributor in a matter of seconds – ready to operate. For servicing, the plug can be disconnected without any danger, even by personnel without technical training. The drive can be replaced and the new drive re-connected quickly. The system is ideal for all applications requiring high levels of operating availability.

| MF.. fieldbus interface | MQ.. fieldbus interface |
|---|---|
| – Connection of MOVIMOT® and MOVI-SWITCH® drives to a standardized fieldbus system<br>– Reading sensor signals<br>– Controlling actuators via digital input and output terminals<br>– Degree of protection: IP65<br>– Option package:<br>- Degree of protection: IP66/IP67<br>- Stainless steel cable glands<br>- Pressure compensation fitting<br>- M12 metal plug for fieldbus modules with M12 plug connectors | |
| | Additionally integrated controller with the following functions:<br>– Programmable via IPOS$^{plus®}$<br>– Simple positioning with EI76 incremental encoder<br>– Integrated I/O preprocessing and timing elements<br>– Protocol modification |



| Options for MF../MQ.. fieldbus interfaces | |
|---|---|
| **MFG11A keypad** | MFG11A keypad The MFG11A keypad is plugged onto any MFZ.. connection module instead of a fieldbus interface for manual control of a MOVIMOT® drive. |
| **DBG60B keypad** | The DBG60B keypad enables control of the MOVIMOT® drives in manual mode. Furthermore, the process data words can be displayed in monitor mode. The DBG60B keypad is connected directly to the diagnostic interface of the MF../MQ.. fieldbus interface. |

# MOVIFIT® decentralized drive controller provides for new perspectives

Decentralized MOVIFIT® drive controllers meet the three most important criteria of decentralized drive systems: they are modular, flexible, and economical. Three unit types are available, which combine the known advantages of decentralized installation technology from SEW-EURODRIVE with modern, application-oriented drive and communication functions.

Innovative connection technology allows for quick installation and startup as well as ease of diagnostics and maintenance, for example when replacing the electronics. MOVIFIT® is suited for versatile applications and supports new strategies for optimized system topologies.

Industry-specific unit variants, such as MOVIFIT® with Hygienic$^{Plus}$ option, are available as standard for operation in particular ambient conditions as they occur in the beverage industry, for example.

| | |
|---|---|
| | **Function levels of MOVIFIT® decentralized drive controllers**<br>The function level indicates the functions included in the software for MOVIFIT® units regarding<br>– operation<br>– system control<br>– diagnostics |
| **Classic – Simple functions** | – Control as fieldbus gateway via MOVILINK®<br>– Simple handling and functionality, can be compared with control of SEW field distributors (Z.3, Z.6, etc.) |
| **Technology**<br>Free programming<br>(MOVI-PLC®/MOVITOOLS® MotionStudio) | Programming takes place according to IEC 61131 (e.g. in LD, FBD, IL, ST, AS)<br>– MOVITOOLS® MotionStudio with PLC Editor, Application Builder, etc.<br>– Multi-stage library concept (application and program module of the MOVI-PLC® controller series) |
| **System**<br>Drive-oriented conveyor functions<br>(MOVIVISION®) | Central data storage and management<br>– Central parameter and diagnostics system with the configurable MOVIVISION® system software<br>– Configurable, drive-oriented conveyor functions<br>– Simple, intuitive operation for system operators |
| **Communication** | – Function levels Classic and Technology support all common bus systems: PROFIBUS, PROFINET, PROFIsafe, DeviceNet, EtherNet/IP and Modbus/TCP<br>– Function level System supports the PROFIBUS bus system |

# MOVIFIT®: Variants and features

MOVIFIT® drive controllers have a modular structure, are available in three unit variants, and offer decentralzed installation technology with modern, application-oriented drive and communication functions.

## MOVIFIT® MC

- Up to three MOVIMOT® to be connected via hybrid cable
- Voltage range 3 x 380 – 500 V
- Integrated power distribution and line protection
- Integrated communication interface
- MOVISAFE®: Integrated functional safety
  - Safe Torque Off (STO) up to cat. 3 and PL d according to EN ISO 13849-1
  - Optional safe PROFIsafe bus system
- Maintenance switch
- 12 digital inputs + 4 digital inputs/outputs
- CAN/SBus interface for external components
- Simple and fast parameter setting via DIP switches or fieldbus

## MOVIFIT® SC

- Electronic (contactless) motor starter
  - Connection of two motors (dual motor starter) ➞ one direction of rotation
  - Connection of one motor (reversing starter) ➞ two directions of rotation
- Power range
  - with connection of two motors ➞ 2 x 0.37 to 2.2 kW
  - with connection of one motor ➞ 1 x 0.37 to 4.0 kW
- Adjustable soft startup time
- Voltage range 3 x 380 – 500 V
- Increased safety by switching of three phases
- Integrated energy distribution
- Integrated brake management for SEW three-wire brakes
- Optional maintenance switch
- Integrated communication interface
- Digital inputs/outputs
  - 6 DI + 2 DI/O with Classic function level
  - 12 DI + 4 DI/O with function level Technology or System
- CAN/SBus interface for external components
- Simple and fast parameter setting via DIP switches
- Expanded parameter setting via fieldbus or diagnostics interface

**MOVIFIT® FC**

- Configurable (open-loop) frequency inverter
- Power range from 0.37 to 4 kW (in two sizes)
- Voltage range 3 x 380 – 500 V
- Integrated energy distribution
- Integrated brake management for SEW three-wire brakes and additional brake control output for non-SEW brakes
- Optional internal braking resistor (integrated in ABOX)
- Optional external braking resistor
- Optional maintenance switch
- Integrated communication interface
- User-programmable integrated controller (IEC 61131)
- Digital inputs/outputs
  - 6 DI + 2 DI/O with function level Classic
  - 12 DI + 4 DI/O with function level Technology or System for complex applications
- CAN/SBus interface for external components
- MOVISAFE®: Integrated functional safety
  - Safe Torque Off (STO) up to cat. 3 and PL d according to EN ISO 13849-1
  - Optional safe PROFIsafe bus system
- Simple and fast startup via DIP switches
- Expanded parameter setting via fieldbus or diagnostics interface

# NEW: MOVIPRO® SDC/ADC
# Compact power for decentralized applications

Each conveyor application requires a customized drive concept according to the required load capacity and the transport velocity, or the respectively available space and special ambient conditions.

MOVIPRO® can be used for both, horizontal and vertical materials handling applications:

- Integration of all the functions
- Decentralized installation up to 15 kW
- Proven technology platform
- Consistent drive concept

**Areas of application:**
- Scissor lift tables
- Hoist stations
- Conveyor trolleys
- Rotary distributors
- Rotary tables
- Telescope fork of SRUs

MOVIPRO® shows its constructional benefits especially when applications demand reliability and exact positioning. Being modularized, standardized and equipped with freely parameterizable software components, the decentralized MOVIPRO® drive, positioning or application controller simplifies the integration of numerous functions and reduces the complexity of the respective machine or plant.

| | |
|---|---|
| **Setting parameters with MOVIPRO® SDC** | With the MOVIPRO® SDC type, users access standardized application modules and in this way can easily and conveniently implement speed and position control. |
| **Free programming with MOVIPRO® ADC** | Free programmability according to IEC 61131-3 and PLCopen of the MOVIPRO® ADC type lets users flexibly implement system-specific or complex functions, such as controlling specific applications or locally coordinating several actuators and sensors. |



## Device-independent features of the MOVIPRO® series:

| | |
|---|---|
| **Integrated functionalities** | – Power range 2.2 to 15 kW<br>- Size 0: 2.2 kW<br>- Size 1: 4 kW, 7.5 kW<br>- Size 2: 11 kW, 15 kW / no-fan up to 11 kW<br>– Speed control and positioning<br>– Optional encoder feedback for motor and track<br>– Integrated brake control with various brake voltages<br>– Fieldbus interfaces: PROFIBUS, PROFINET, PROFIsafe, EtherNet/IP, Modbus/TCP, DeviceNet<br>– MOVISAFE®: Functional safety<br>- Safe Torque Off (STO) up to cat. 3 and PL d according to EN ISO 13849-1<br>- Optional safe PROFIsafe bus system<br>- Optional safe brake control<br>– Integrated 12 DI + 4 DIO<br>– Pluggable interfaces for energy, motor and encoder<br>– Local memory for parameters<br>– Degree of protection IP54<br>– Optional maintenance switch<br>– Optional, separable connection unit for linear power bus |
| **Flexibility** | – Communication via all common bus systems provides for regional independency<br>– State-of-the-art connection technology based on plug connectors ensures fault-free installation and ease of maintenance<br>– Parameterizable inverter supports a wide range of motors from standard DRS to premium efficiency DRP and CMP motors |
| **Uniformity** | – Uniform plant concept for the entire materials handling technology<br>- Installation topology (power, bus)<br>- Operation, parameterization, diagnostics |

# MOVITRANS® contactless energy transfer

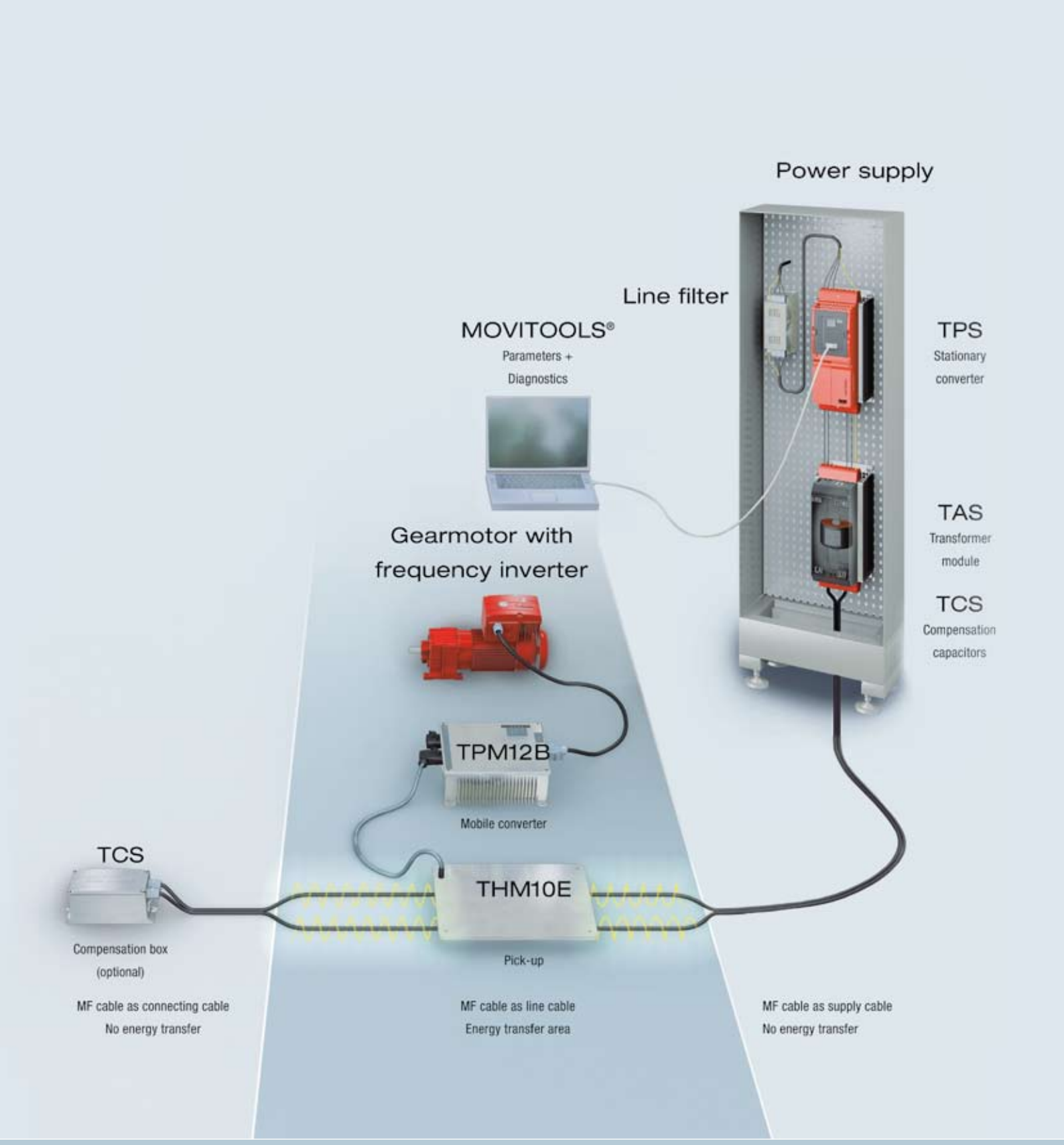
MOVITRANS®, the contactless energy transfer system from SEW-EURODRIVE, works on the principle of inductive energy transfer. Electrical energy is transferred from a conductor in a fixed installation to one or more mobile devices in a contactless manner. The electromagnetic connection is made via an air gap and is not subject to wear making it maintenance-free. Another advantage: this type of power supply is emission-free and resistant to external influences.

**MOVITRANS® system components**

MOVITRANS® is the perfect supply system for all mobile applications and has been tested according to BGV B11. MOVITRANS® is the perfect solution if you want to cover long travel distances at high speeds and if maintenance-free operation is required. It is also suited for applications subject to additional environmental pollution and applications in wet and damp environments.

| **Stationary components – Technical data** | |
|---|---|
| TPS stationary converter | – Power: 4.0 kW or 16.0 kW<br>– $V_{mains}$: 380 V ... 500 V ± 10%<br>– Degree of protection: IP20 |
| TAS transformer module | – Power: 4.0 kW or 16.0 kW<br>– Output current: 60 A or 85 A<br>– Degree of protection: IP10 |
| TCS compensation capacitors | – Capacitance values: 2 µF, 4 µF, 8 µF, 16 µF or 32 µF<br>– Output current: 60 A or 85 A<br>– Degree of protection: IP00 |

| Mobile components – Technical data | |
|---|---|
| TPM12B mobile converter | – Rated output power<br>- when connecting 4x THM10C: max. 3.6 kW<br>- when connecting 2x THM10E: max. 3.0 kW<br>– Output voltage: DC 500 V<br>– Additional output voltage: 24 V, max. 2 A<br>– Degree of protection: IP65 |
| THM10E pick-up | – Power: 1.5 kW<br>– Degree of protection: IP65 |
| THM10C pick-up | – Rated power: 0.8 kW<br>– Peak power: 0.9 kW<br>– Degree of protection: IP65 |
| TVS connection distributor | – Degree of protection: IP65<br>– Output current: 60 A or 85 A |
| TCS compensation box | – Degree of protection: IP65<br>– Output current: 60 A or 85 A<br>– Compensates a distance of 25 to 30 m |




MOVITRANS® with flat pick-up
(THM10E)

THM10C
Pick-up

TVS

MF cable as line cable
Energy transfer area

Connection distributor

TPM12B
Mobile converter

MOVITOOLS®

TPS
Stationary converter

TAS
Transformer module

TCS
Compensation capacitors

Gearmotor with frequency inverter

Parameters + Diagnostics

Power supply

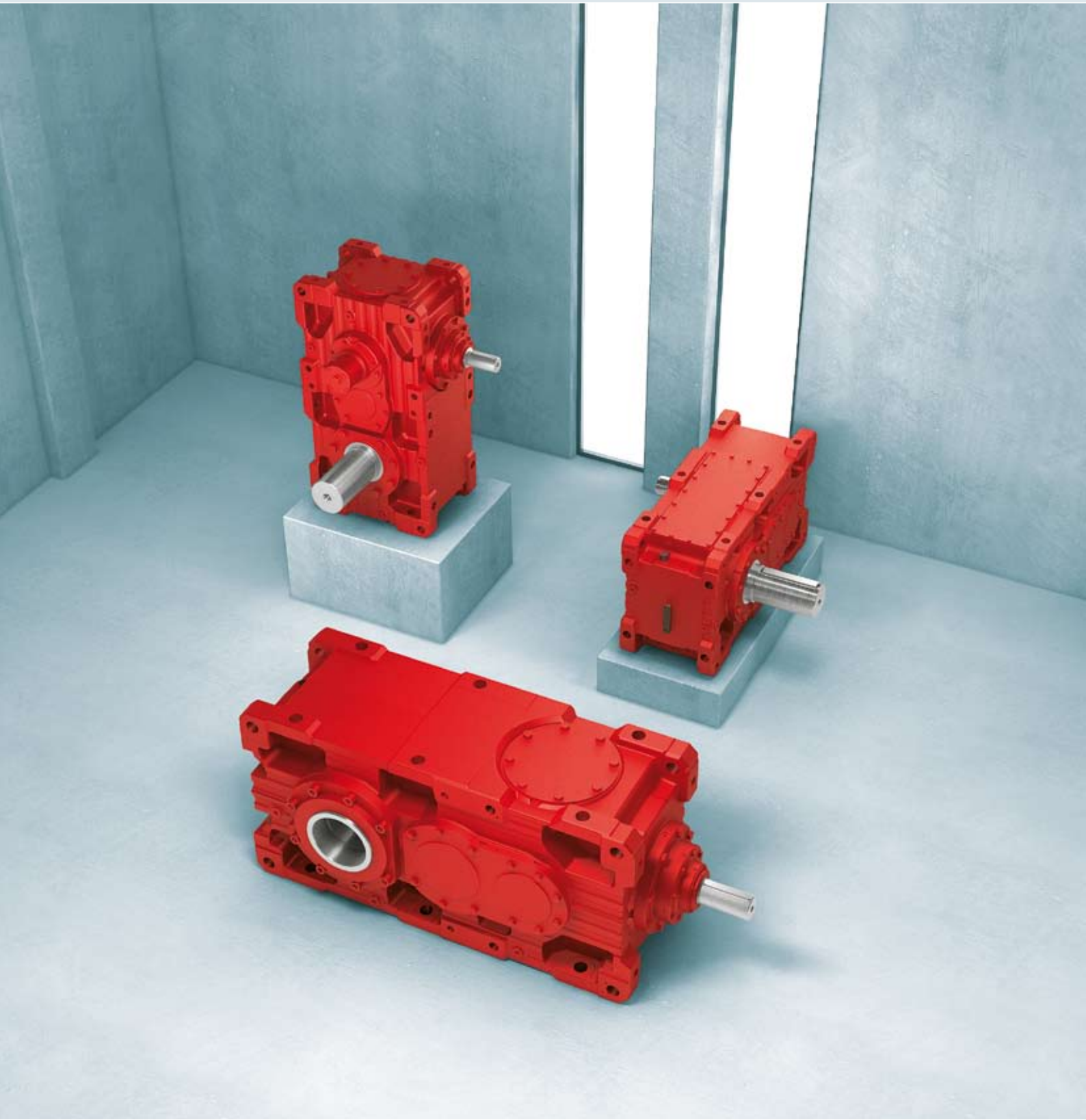
MF cable as supply cable
No energy transfer



MOVITRANS® with U-shaped pick-up (THM10C)

TIS
Installation components for line cable support

# **CLASSIC** – Industrial gear units



## All services made by SEW-EURODRIVE

SEW-EURODRIVE offers the right industrial gear units when you need especially large torque ratings to carry out especially large movements. The modular concept will once again provide optimum adaptation of industrial gear units to meet a wide range of different applications. SEW-EURODRIVE is your competent partner for all areas, from process planning, through project planning all the way to startup. These services are supported by our renowned, worldwide service network in order to guarentee the reliable completion of all process stages.

## Power for every application

SEW-EURODRIVE offers five series of industrial gear units with impressive data and performance. Output torques up to 680 kNm are no problem. Whether series or customized gear units, SEW-EURODRIVE industrial gear units can handle all types of applications in such industries as systems engineering, mining, shipbuilding and the energy, timber, mineral and processing industries.

# Helical and bevel-helical gear units

## X series

Robust and universal gear unit series which can be optimally adjusted to the task due to finely stepped torque ratings. The universal modular system concept sets new standards with respect to availability and offers a broad range of application options, e.g. for materials handling systems, ball mills, and agitators. Application gear units, such as for bucket elevators, complete the range.

**Technical data**

| Gear unit version | Stages | Reduction ratios | Rated torque $M_{N2}$ [kNm] |
|---|---|---|---|
| Helical gear unit X.F..: | 2, 3 and 4 stages | 6 ... 400 | 58 ... 475 |
| Bevel-helical gear unit X.K..: | 2, 3 and 4 stages | 6 ... 400 | 58 ... 475 |
| Bevel-helical gear unit X.T..: | 3 and 4 stages | 12 ... 400 | 58 ... 475 |

## MC series

MC series industrial gear units are particularly compact helical and bevel-helical gear units. The 6 sizes available in the MC series cover the 6 to 48 kNm torque range. Their parallel shaft design offers plenty of flexibility in system design and requires remarkably little space. MC gear units can be used in applications such as materials handling, transporting heavy loads, mixing, crane drives and shredders. Based on this series, a version with increased bearing distance and reinforced output shaft is available.

**Technical data**

| Gear unit version | Stages | Reduction ratios | Rated torque $M_{N2}$ [kNm] |
|---|---|---|---|
| Helical gear unit MC.P..: | 2 and 3 stages | 7.1 ... 112 | 6 ... 48 |
| Bevel-helical gear unit MC.R..: | 2 and 3 stages | 7.1 ... 112 | 6 ... 48 |

## ML series

ML series helical and bevel-helical gear units are the ideal platform for customized applications with a variety of options for connecting a wide range of modules. The flexibility and variability of these gear units are hard to beat. An increased center distance is available, for example for hoist applications. ML series gear units are available in 5 sizes, covering the 180 to 680 kNm torque range. ML gear units can be used in applications such as mining and crane construction.

**Technical data**

| Gear unit version | Stages | Reduction ratios | Rated torque $M_{N2}$ [kNm] |
|---|---|---|---|
| Helical gear unit ML.P..: | 2, 3 and 4 stages | 6 ... 315 | 180 ... 680 |
| Bevel-helical gear unit ML.R..: | 3, 4 and 5 stages | 14 ... 1250 | 180 ... 680 |

# Planetary gear units

## P series

Up to now, it was almost impossible to order planetary gearmotors in this power class from a catalog. Our P series products are a significant step closer to achieving this ideal situation. The gearmotor is mounted directly in front of the planetary gear unit. Couplings, intermediate flanges and adapter flanges that take up space and increase costs are a thing of the past. P series units are available in 9 sizes, covering the 24 to 359 kNm torque range. P gearmotors can be used anywhere you need to move heavy weights at a low speed.

**Technical data**

| Gear unit version | Stages | Reduction ratios | Rated torque $M_{N2}$ [kNm] |
|---|---|---|---|
| Helical planetary gear unit (motor) P.RF..: | 4 and 5 stages | 100 ... 4000 | 24 ... 359 |
| Bevel-helical planetary gear unit (motor) P.KF..: | 5 stages | 140 ... 4000 | 24 ... 359 |

## P.MC.. series

This series is characterized by the maintenance-free and fully oil-covered bearings, combined with the high power density of the planetary output stages. They are mainly used for high gear ratios and low output speeds. Individual optional features, such as special sealing systems and lubricants, torque arms and swing bases complete the range, which is mainly used for slat conveyors, bucket-wheel reclaimers and jibs.

**Technical data**

| Gear unit version | Stages | Reduction ratios | Rated torque $M_{N2}$ [kNm] |
|---|---|---|---|
| Planetary helical/helical-bevel gear units P1.MC..: | 3 and 4 stages | 31.5 ... 500 | 24 ... 185 |
| Planetary helical/helical-bevel gear units P2.MC..: | 4 and 5 stages | 140 ... 4000 | 69 ... 359 |

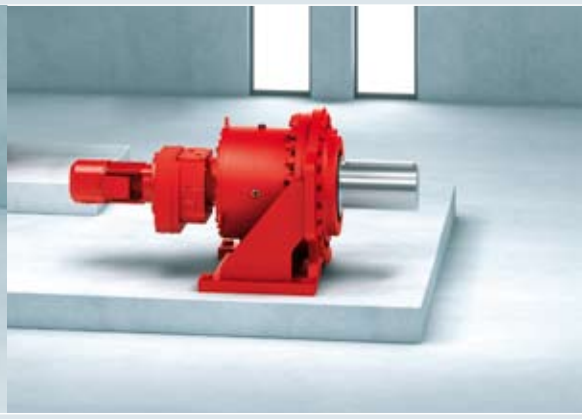
# Explosion-proof industrial gear units

## Explosion-proof industrial gear units of the MC, X series and P, P.MC.. planetary gear units. Explosion protection according to ATEX

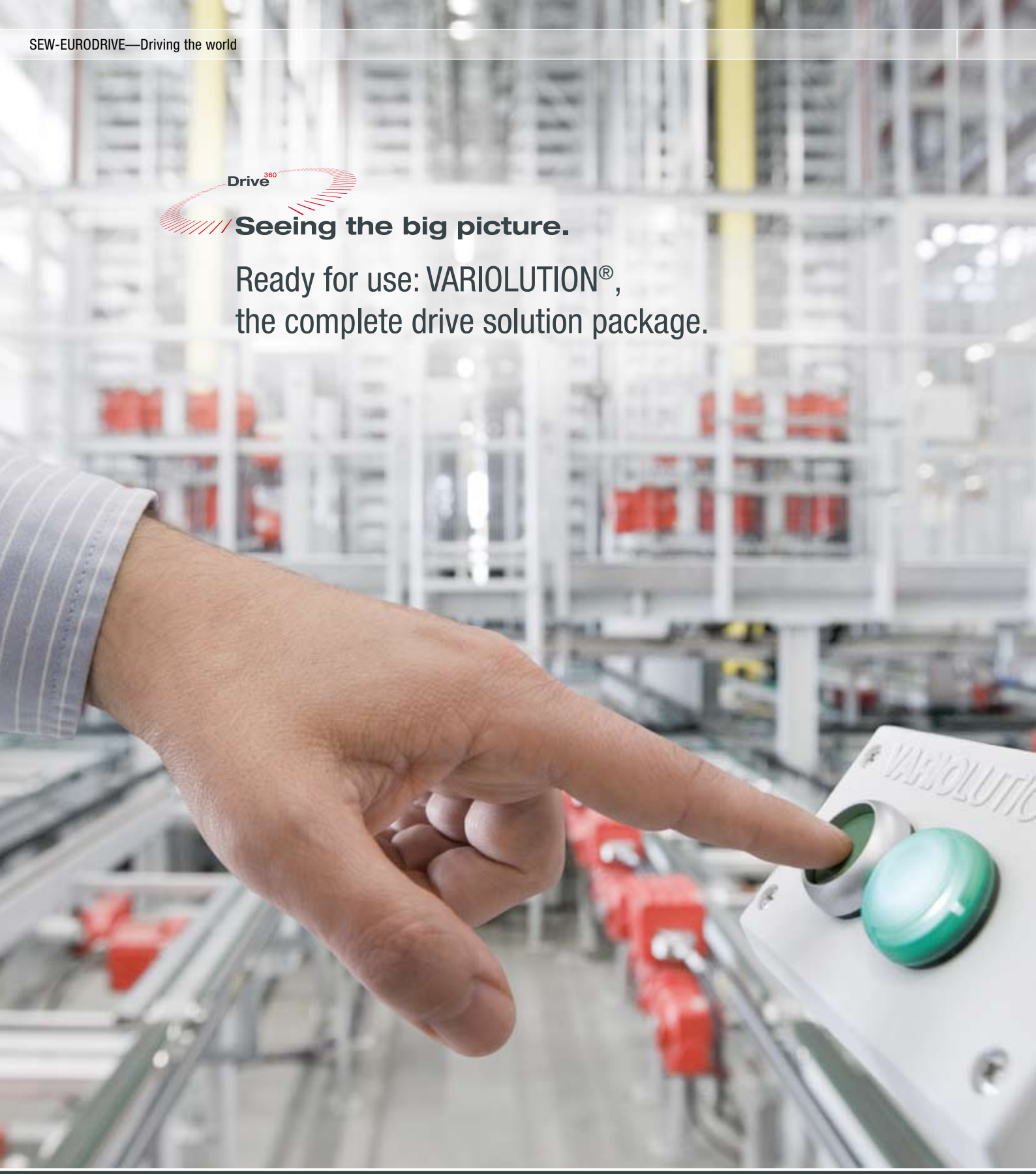
**Validity**

The new directive 94/9/EC or ATEX 95 specifies new regulations for explosion protection in all types of devices for the European market. This directive is therefore also valid for industrial gear units of the MC series and planetary gear units. As of July 1, 2003, the directive 94/9/EC has been applying without restrictions to the use of industrial gear units of the X, MC series and planetary gearmotors within the European Union. Other European countries, such as Switzerland, have fallen in with this regulation since.

Special measures are required for the operation of systems and machinery in areas with potentially explosive air/gas or air/dust mixtures. If mixture formation cannot be prevented, specially protected gear units have to be used. Applicable standards and regulations govern the use of equipment within existing hazard zones. They also regulate the quality requirements that have to be met by the drive manufacturer.



The explosion-proof industrial gear units of the X, MC series and the planetary gear units of SEW-EURODRIVE meet the construction requirements for group II, category 2G or 3G (potentially explosive gas atmospheres) and 2D or 3D (potentially explosive dust atmospheres). The gear units are suitable for use in zones 1 and 21 or zones 2 and 22.




Stagnation means regression. This is particularly true for your production line. As a leading drive technology specialist, we have therefore developed VARIOLUTION® packages to provide drive solutions that perfectly match the requirements of your specific industry – with warranty of proper functioning. This is what we call Drive 360° – Seeing the big picture: from problem-solving competence to system availability, low operating costs to energy efficiency up to the overall system that handles all your tasks.

**www.sew-eurodrive.com**

SEW EURODRIVE

# Other system components and services

## SEW-EURODRIVE – your partner for drive engineering

SEW-EURODRIVE not only offers powerful and flexible drive technology, VARIOLUTION® packages and MAXOLUTION® system solutions but also the matching system accessories, such as

- Control technology
- Remote maintenance
- Operator terminals
- Project planning tools and
- Startup software
- DriveBenefits
- CDS® – Complete Drive Service
- And many more

The result are individual application solutions in coordination with system designers and system operators that ensure the required functionality and efficiency in all project phases: from project planning through startup all the way up to operation and production reliability as well as maintenance and service.

# Control technology

Functionality and cost-effectiveness are the biggest challenges also for the automation of machines. This is because electrical drive technology is the core of the machine and therefore significantly influences the economic characteristics of a machine, such as investment and startup costs, production capacity or possible follow-up costs for maintenance and service. The more flexible and adaptable the components, the more efficiently can drive solutions be integrated into automation concepts.

# Controlling motion

SEW-EURODRIVE not only offers drives and drive technology but also a universal, scalable and powerful controller and software program to control motions efficiently and individually:

**Integrative hardware**
The controllers are available as option cards for simple integration
– into MOVIDRIVE® B drive inverters and MOVITRAC® B frequency inverters,
– into the master module of the modular MOVIAXIS® multi-axis servo inverter, and
– into the decentralized MOVIFIT® drive controller,
– or as compact controller on a support rail.
All inverters from SEW-EURODRIVE can be connected via system bus.

**Scalable hardware**
The controllers are available in three performance classes:
– DHP11B basic control card
– DHx21B standard control card
– DHx41B advanced control card
– An I/O system for interface expansion and the ORA11B modem for remote maintenance as optional accessories complete the hardware.

**Powerful software**
Enables the controllers to easily access the entire drive functionality. Adapted to the drive electronics, the software provides scalable functionalities, such as simple single-axis function, universal program modules, or application solutions for multiple axes. The integrated standard modules of a PLC additionally provide full logic control.

**Free programming of applications with MOVI-PLC®**
The MOVI-PLC® motion controller is the first choice when it comes to the free programming of applications. Users can choose between parameterizable function modules that can be easily programmed in accordance with IEC 61131, and program modules that combine comprehensive drive functions.

**Configuring applications with CCU**
The solution for easily configurable applications is the configurable control unit (CCU). It comprises standardized application modules that can be run immediately. The functions are designed to match the specific application – without any programming. Integrated diagnostics make for fast and straightforward startup.

Control technology from SEW-EURODRIVE offers the ideal conditions for the flexible and profitable decentralized automation of self-sufficient machine concepts.

# Control technology – Overview of hardware

## "Basic" performance class controller

**DHP11B basic control card**
- In unit versions T0, T1, T2 / installation in MOVIDRIVE® B, MOVITRAC® B, MOVIAXIS® master module*

**Features:**
- Motion control in the lower power range
- Motion control libraries and program modules for decentralized motion control functionality
- Motion control for up to 12 axes via SBus
- IO system via SBus
- Engineering via RS485

**Technical data:**
- PROFIBUS slave DP-V1
- 2 CAN interfaces, 1 of which is electrically isolated
- 1 x RS-485 interface
- 8 digital IOs
- Status display for PLC and fieldbus
- 512 KB program memory + 128 KB data memory
- 16 KB retain variables + 8 KB system variables (retain)
- Free-wheeling task and 1 cyclic task (1 ms, 5 ms, 10 ms, 100 ms)
- Optional second RS485 interface (electrically isolated)

## "Standard" performance class controller

**DHx21B standard control card**
- DHx21B with EtherNet interface
- DHx21B with additional PROFIBUS and DeviceNet slave interface
- DHx21B additionally with PROFINET / EtherNet/IP / Modbus TCP/IP slave interface

**Features:**
- Motion control for response times > 10 ms
- Single-axis motion control libraries and program modules
- Motion control for up to 16 axes via SBus
- MOVI-PLC® IO system via SBus
- SD card for simple unit replacement and recipe management
- Fast engineering via USB and EtherNet

**Technical data:**
- 1 x EtherNet (10/100 BaseT) for engineering or TCP/IP and UDP via IEC 61131-3
- 2 x CAN interfaces, 1 of which is electrically isolated
- 2 x RS485, 1 of which is electrically isolated
- USB device
- DHF21B: PROFIBUS slave DP-V1, DeviceNet slave
- DHR21B: PROFINET slave, EtherNet/IP slave, Modbus TCP/IP slave
- 8 digital IOs
- Status display for PLC and fieldbus
- Real-time clock
- 2 MB program memory + 4 MB data memory
- 32 KB retain variables + 24 KB system variables (retain)
- Free-running task (min. 10 ms), 1 cyclic task (10 to 10000 ms)
- PC-readable memory card for firmware and application program

## “Advanced” performance class controller

**DHx41B advanced control card**

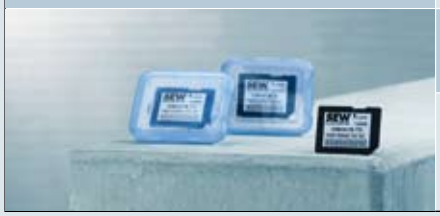
– DHE41B with EtherNet interface
– DHF41B with additional PROFIBUS and DeviceNet slave interface
– DHR41B additionally with PROFINET / EtherNet/IP / Modbus TCP/IP slave interface
– For installation in MOVIDRIVE® B, MOVITRAC® B*, MOVIAXIS® master module*

**Features:**

– Motion control for very short response times
– Technology for motion control libraries and program modules such as electronic gear unit, electronic cam, and robotics with extensive kinematic transformations
– Motion control for up to 64 axes via SBus, or high-performance with SBUS$^{PLUS}$
– MOVI-PLC® IO system via SBus, or high-performance with SBUS$^{PLUS}$
– SD card for simple unit replacement and recipe management
– Fast engineering via USB and EtherNet

**Technical data:**

– 1 x EtherNet (10/100 BaseT) for engineering or TCP/IP and UDP via IEC 61131-3
– 1 x EtherNet as SBUS$^{PLUS}$ (EtherCAT®) master
– 2 x CAN interfaces, 1 of which is electrically isolated
– 2 x RS485, 1 of which is electrically isolated
– USB device
– DHF41B: PROFIBUS slave DP-V1, DeviceNet slave (DHF41B)
– DHR41B: PROFINET slave, EtherNet/IP slave, Modbus TCP/IP slave
– 8 digital IOs
– Status display for PLC and fieldbus
– 6 MB program memory + 8 MB data memory
– 32 KB retain variables + 24 KB system variables (retain)
– Free-running task (min. 10 ms), 1 cyclic task (10 to 10000 ms)
– PC-readable memory card for firmware and application program



## Memory card OMH41B

For the performance classes “standard” and “advanced” in conjunction with the freely programmable MOVI-PLC® motion controller, technology level T0..T25 depending on the required motion control functionality.

* can only be installed at the factory, DHF41B not in MOVITRAC® B

## Control technology, hardware (continued)

**Compact control UOH../DHx**

All controllers are also available in compact control design with red housing for IP20 control cabinet installation and for support rail mounting.

**MOVIFIT® MTx**

MOVIFIT® technology function level
- Integrated control card basic
- For decentralized field installation up to IP69
- As freely programmable motion controller with libraries and program modules specifically for conveying technology applications.
- As parameterizable configurable control unit (CCU) with special application modules for conveying technology, such as cam or simple positioning.

**MOVIPRO®-SDC/-ADC**

- Integrated “advanced” control card
- For compact power in decentralized field installations up to IP54
- As freely programming motion controller with libraries and program modules specifically for materials handling applications
- As configurable control unit (CCU) with specific application modules for conveyor applications and for applications with cam positioning, bus positioning, modulo positioning, or remaining distance positioning.

# Accessories

## I/O System

The I/O system expands the digital and analog interfaces of controllers. Up to 32 modules can be connected per bus coupler in enclosure IP20 via the system bus. When using the fast SBUS$^{PLUS}$ system bus, all inputs/outputs are transmitted in millisecond cycles. This is the ideal solution for high-performance servo applications.
Automatic access to a wide range of inputs and outputs:
– I/O system
– Directly to the I/Os integrated in the controller
– I/O of the controlled inverters

**Advantages:**

– Powerful connection to the controllers via the system bus of the machine module
– Performance can be scaled using scalable SBus or SBUS$^{PLUS}$ system bus interface
– Optimally integrated into the programming software PLC Editor of MOVITOOLS® MotionStudio
– A variety of combination options makes for the implementation of flexible and individual machine solutions
– The compact design and the modular structure reduce control cabinet space requirements to a minimum
– Quick and easy installation or replacement in case of startup or service

## ORA11B / Remote maintenance

Remote maintenance also provides a convenient engineering access. SEW-EURODRIVE provides several solutions depending on the plant topology. The simplest solution merely requires an analog phone line. Signals are converted for Ethernet via the ORA11B modem and the “advanced” performance class can be easily accessed. This provides the ideal solution if the controller automates an entire machine “stand-alone”. Alternatively, the controllers can be addressed via a higher-level central PLC.

**Technical data**

| | |
|---|---|
| Power supply | 0 – 60 $V_{DC}$ / 3 – 5 W |
| Functions | – Analog modem with dial-up line up to 56 kBit/s<br>– Router with dial-in / dial-out / callback / DHCP server and client<br>– Switch with 4 ports, 10 / 100 MBit/s, full and half-duplex |
| Configuration | Web interface (local / remote) |
| Features | 2 binary I/Os, SMS message functionality |

## Controlling motion: Free programming of applications with the MOVI-PLC® motion controller

The MOVI-PLC® motion controller is used for complex automation tasks. As the software is freely programmable, you can implement flexible drive solutions for a variety of applications. The MOVI-PLC® controller can be easily integrated into any drive solution. Engineering of the MOVI-PLC® and inverters can be carried out using the MOVITOOLS® MotionStudio engineering software, for example. This software not only provides the programming environment for MOVI-PLC® but also all the tools required for starting up and diagnosing units from SEW-EURODRIVE.

Users can employ function blocks or program modules, depending on the task. In this way users can access all the drive functions. Programming is made easy as it complies with the IEC 61131 standard. Complex drive tasks can be implemented quickly. Connecting the inverters via the fast, clock-synchronous system bus allows for reducing response times. This means performance of the drive system is enhanced, particularly when coordinating multiple axes. Conventional PLC tasks can also be implemented efficiently on MOVI-PLC® due to the known programming languages FBD, LD, IL, CFC, structured text, and the modular IO system.

**Function blocks:** Versatile combinations and flexible use

Directly accessing those function blocks (according to PLCopen) that enable a specific drive function offers users greatest flexibility. The function blocks are clearly arranged in libraries according to their functions and inverter type. With some experience, users can flexibly combine these function blocks to create the optimal program.

**Program modules:** Optimum connection and efficient use

The program modules comprise comprehensive drive functions. These can be simple functions such as positioning, referencing or speed control, technology functions for controlling a cam or synchronous operation, or functions for multi-axis interpolations of kinematics. Once these program modules have been integrated, users merely have to concentrate on programming the most important processes of the respective application. The program modules provide the entire drive functionality via an interface. This makes the program modules ideal for PLC programmers who want to reduce the programming effort of the drive functionality.

# Controlling motion: Configuring applications with CCU

The Configurable Control Unit (CCU) offers standardized single or multi-axis application modules, which provide their module functionality to a higher-level controller via fieldbus interface or digital inputs and outputs. Configuring the application modules on the machine is really simple: a PC program with a wizard queries all the relevant data. In this way error sources are minimized significantly, and startup can be carried out quickly. Using a special control mode, startup can even be carried out without higher-level PLC.

**Application modules:** Standardized and immediately runnable

Application modules provide the higher-level controller with a standardized functionality via a process data interface. Simple graphical parameterization is used to adapt the functionality to the specific application – without any programming. Integrated diagnostics make for fast and straightforward startup. The following application modules are available:

**Single-axis functionality:**
- Cam positioning
- Bus positioning
- Universal module (speed, positioning, modulo, remaining distance)

**Multi-axis functionality**
- Energy-efficient storage and retrieval unit: a special algorithm allows for saving up to 20 % of energy without regeneration
- SyncCrane: simple control of crane bridges and lifters. A special algorithm enables time and jerk optimized travel even with distance encoders

# DOP operator terminals for visualization and diagnostics

Modern drive inverters and controllers are increasingly taking on control functions. In particular, drive tasks, such as positioning, synchronous operation and the coordinated movement of several drives in relation to one another, are being performed with high levels of accuracy. As more and more functions are integrated, the demands on operation, visualization and diagnostics also increase.

The DOP (Drive Operator Panel) series operator terminals meet these requirements and provide additional and new functions, such as recipe management, dual driver function, pass-through mode, or integrated web server. Operator terminals let you implement optimal visualization and operation of the system in a simple, reliable manner at any time and any place.

They make for constant optimization of the production process and let you adjust individual parameters immediately, such as speed, target positions, stop marks, and ramps. These are optimal requirements for the economic efficiency and reliability of the plant.

## HMI Builder

Operator terminals are programmed using the HMI Builder operating software. This software operates on a WYSIWYG basis. During programming the user can see how the operators will see the visualization later. The HMI Builder provides an object library with a large selection of static and dynamic objects. These objects are represented by simple and illustrative symbols. Users simply select and edit objects to create their own personalized screen display.

**DOP series, B series**

left: DOP11B types 10 to 60
right: DOP M70 mobile terminal

| Unit type | Display & LEDs | Membrane keypad | Interfaces | Memory |
|---|---|---|---|---|
| **DOP11B-10** | – 160 x 32 pixels<br>or 4 x 20 / 2 x 20 character text<br>– 6 LEDs | IP66 membrane keypad with<br>– navigation keys<br>– num. keypad<br>– 6 function keys | RS-232, RS-422/RS-485, ETHERNET optional | 500 kByte |
| **DOP11B-15** | – 240 x 64 pixels<br>or 8 x 40 / 4 x 20 character text<br>– 6 LEDs | IP66 membrane keypad with<br>– navigation keys<br>– num. keypad<br>– 6 function keys | RS-232, RS-422/RS-485, ETHERNET optional | 500 kByte |
| **DOP11B-20** | – 240 x 64 pixels<br>or 8 x 40 / 4 x 20 character text<br>– 6 LEDs | IP66 membrane keypad with<br>– navigation keys<br>– num. keypad<br>– 8 function keys | RS-232, RS-422/RS-485, ETHERNET 10/100 Mbit, USB | 12 MB |
| **DOP11B-25** | – 5,7“, 320 x 240 pixels<br>(16 gray scale) | – Touch display in IP66 | RS-232, RS-422/RS-485, ETHERNET 10/100 Mbit, USB | 12 MB |
| **DOP11B-30** | – 5,7“, 320 x 240 pixels<br>(64k colors) | – Touch display in IP66 | RS-232, RS-422/RS-485, ETHERNET 10/100 Mbit, USB | 12 MB |
| **DOP11B-40** | – 5,7“, 320 x 240 pixels<br>(64k colors)<br>– 16 LEDs | IP66 membrane keypad with<br>– navigation keys<br>– num. keypad<br>– 16 function keys | RS-232, RS-422/RS-485, ETHERNET 10/100 Mbit, USB | 12 MB |
| **DOP11B-50** | – 10,4“, 800 x 600 pixels<br>(64k colors) | – Touch display in IP66 | RS-232, RS-422/RS-485, ETHERNET 10/100 Mbit, USB | 12 MB |
| **DOP11B-60** | – 15“, 1024 x 768 pixels<br>(64k colors) | – Touch display in IP66 | RS-232, RS-422/RS-485, ETHERNET 10/100 Mbit, USB | 12 MB |

| | | | | |
|---|---|---|---|---|
| **Mobile operator panel DOP M70** | – 6,5“, 640 x 480 pixels<br>(64k colors) | – Touch display and<br>– membrane keypad (IP65) / 8 function keys | RS-232, ETHERNET 10/100 Mbit, USB | 12 MB |

**DOP operator terminal functionality ranges from 160 x 32 pixels of built-in units (e.g. for 2 lines with 20 characters each) up to a 1024 x 768 pixel touchscreen. The range also includes a hand-held terminal with additional safety functions, such as emergency stop and confirmation button, to ensure safe and convenient operation also directly on the machine.**

# MOVITOOLS® MotionStudio: Perfect automation – All tools in one modular software system

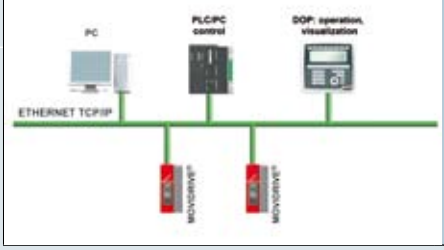
The more functions drive technology offers, the more important it is to have an effective tool for operating drives and visualizing processes. The MOVITOOLS® MotionStudio engineering software from SEW-EURODRIVE is such a tool. With MOVITOOLS® MotionStudio, you can parameterize, program and diagnose all inverter series from SEW-EURODRIVE.

**MOVITOOLS® MotionStudio**

A software package for consistent engineering:
Startup, control, diagnostics, communication and visualization.

**Characteristics:**

- Convenient drive startup and parameter setting
- Drive diagnostics using the built-in oscilloscope function
- Creation of application and user programs in high-level language C, Assembler or IEC 61131-3.
- Display of the status of connected units
- Diagnostics of the fieldbus communication via a bus monitor
- Control technology functions
- Complete application modules for various applications
- Electronic nameplates of the SEW-EURODRIVE gearmotors for automatic motor adaptation




MOVITOOLS® MotionStudio supports engineering via:
- EtherNet TCP/IP, PROFINET IO, EtherNet/IP, MODBUS TCP
- EtherCAT®
- PROFIBUS DPV1, CAN, DeviceNet

and the universal **TCI Tool Calling Interface**

| Tool | Functionality |
|---|---|
| | **Startup**<br>– Configuration and startup: For adapting the inverter to the connected motor and optimizing current, speed and position controllers.<br>– Manual operation: The tool allows for manually controlling the units directly from the PC. |
| | **Parameterization**<br>– Parameter tree: Uniform editor for parameter setting of different unit types<br>– PDO Editor: A process data object editor for graphic configuration of process data for the MOVIAXIS® multi-axis servo inverter.<br>– Gateway configurator: Uniform tool for diagnostics and configuration of the fieldbus gateways UFx41B, DFx and MOVIFIT® with Classic and Technology function levels |
| | **Diagnostics and visualization**<br>– Status: Support for unit diagnostics, provides general unit status information, manual unit reset possible<br>– Application Builder: Editor for creating application-specific visualizations and application-specific diagnostics. Visualization is connected via data download with the inverter program IPOS and the parameter settings.<br>– Fieldbus monitor: Diagnostics for communication between fieldbus and unit (monitor modes) and setpoint specification on the unit, controller-independent (control mode)<br>– Scope: Diagnostics by using an oscilloscope program for all SEW-EURODRIVE inverters |
| | **Programming**<br>– PLC Editor: Programming the MOVI-PLC® controllers series using application programs written once; can be applied independent of the unit<br>– IPOS® Assembler and Compiler |

# Parameterizable MOVIVISION® system software

The new, intuitive MOVIVISION® software solution allows system manufacturers and operators to startup the materials handling system of their plant, a drive system or an individual drive quickly and easily without special programming skills and with a minimum expenditure of time. Even during the production process, the operator can always respond to manufacturing modifications without tying up human resources to a disproportionately high extent.

## MOVIVISION® performs the following tasks:

| | |
|---|---|
| | – Designing and dimensioning the system |
| | – Plant data management and administration |
| | – Plant parameterization<br>– Plant startup<br>– Simplification of plant maintenance |
| | – Plant diagnostics<br>– Plant operation and monitoring |

# Plant overview and operating principle

The combination of central data storage and decentralized intelligence makes MOVIVISION® the comfortable software solution in materials handling technology. The decentralized intelligence simplifies and shortens the complex communication paths between all hardware and software components of the plant. Fastest possible bus cycle and response times on every level ensure a permanent flow of information and commands. This also allows for an object-oriented display.

Each individual user can display the entire production plant, the drive systems or individual drives.
User-friendliness is ensured by the easy-to-use MOVIVISION® interface. The user can perform tasks, e.g. startup or production changes during operation, quickly and easily, at any time and from any location: simply by setting parameters. Special programming skills are not necessary.

**MOVIVISION® configuration and diagnostics tool:**
**Users can access the central database of the MOVIVISION® server via the Windows-based configuration and diagnostics tool PLC/PPS.**

**MOVIVISION®** server

- All data is stored in one central database
- A link to the connected, decentralized control components is established
- Data exchange between the server and decentralized control components is realized via fieldbus and/or networks
- Only here, parameters are set or changed
- Management and supervision of access authorizations
- High degree of data security and user-friendliness

**MOVIVISION®** client

The interface displays the data of the decentralized control components visually. Parameter and diagnostic data of each unit is displayed separately. Both nodes are divided into

- Drive level
- Positioning level
- Technological level

It is possible to grant different access rights to the users, e.g. for monitoring, for parameter setting, for initial startup, for replacing units, etc.

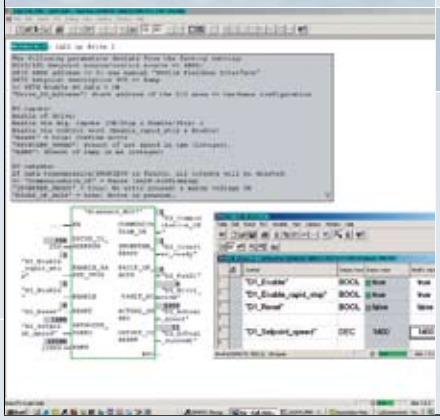
# Project planning tools

## Servo project planning tool

Applications from the “Servo” drive range not only place exacting demands on dynamics and precision of the implemented drive technology, but require a lot of time and effort for project planning. The individual system solution provided by SEW-EURODRIVE not only offers dynamic and precise drive technology, but also tailor-made software that guides users quickly and simply to their goal: The new servo project planning tool for optimum project planning of servo applications.

## EPLAN® macros

For efficient electric design, SEW-EURODRIVE offers product data on the basis of the E-CAD system EPLAN® Electric P8. Apart from the typical macro drawings, this product data also comprises the complete technical data and product information. The product data can be directly downloaded from the EPLAN® data portal to a P8 wiring diagram project. This saves you a lot of time for creating wiring diagrams as there is no need for creating your own drawings and no complex data has to be prepared.



## Sample programs for SIMATIC STEP7

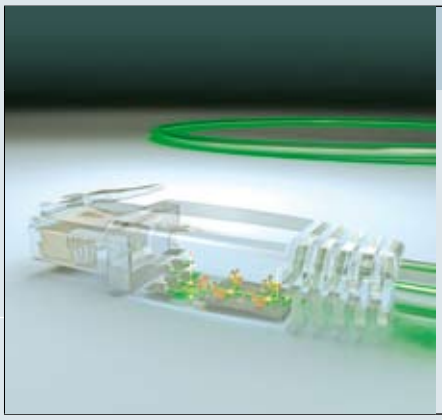
Time-consuming and expensive startup procedures are a thing of the past: SEW-EURODRIVE provides sample programs on the Internet at no cost. These programs make project planning, programming, diagnostics and communication with the SIMATIC STEP7 programmable logic controller user-friendly and reliable. The sample programs contain S7 sample control programs for MOVIMOT® gearmotors, MOVITRAC® B frequency inverters, MOVIDRIVE® drive inverters and MOVIAXIS® multi-axis servo inverters. S7 sample modules are also available for operating the DP-V1 parameter channels.

What sounds really simple actually requires a highly efficient technology and all of our expertise as a leading drive technology specialist. The result: **MOVIGEAR®**. These versatile mechatronic systems combine gear unit, motor, and electronics in one housing and reduce your energy costs by up to 50 %, which contributes to reducing your total cost of ownership as well. This is what we call Drive 360° – Seeing the big picture: from problem-solving competence to system availability, from low installation and operating costs over energy efficiency to the complete system – and beyond.

**www.sew-eurodrive.com**

SEW EURODRIVE

# Fieldbus concepts



**Industrial ETHERNET: One cable – many possibilities**

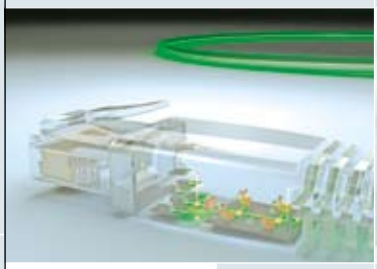
Information technology is becoming increasingly important in industrial systems. Technical product data should be able to be called up at every PC in the company at the touch of a button, without additional manufacturer-specific software. At the same time, vertical data communication at the control level is to be available over a broad bandwidth as is horizontal process data communication between the controller and the application (e.g. drive inverters).

| ETHERNET – A bus system offering numerous advantages |
|---|
| Vertical and horizontal integration with Industrial EtherNet |
| Realtime capable process data communication between the controller and the drive technology (soft realtime) with 10 process data words (per slave) |
| Fast data transfer at 100 Mbit/s |
| Diagnostics for drive technology via z. B. Internet Explorer |
| Programming and diagnostics for the drive technology can be carried out via EtherNet, which makes remote maintenance easy to handle |
| Broadband data communication between the master level and field level |
| Control and engineering combined in one bus system |
| Fast, integrated info system configuration |

| Functions |
|---|
| Process data communication by means of protocol, either PROFINET IO/RT, EtherNet/IP or Modbus TCP or EtherCAT®, for simple and fast access to data at the master and field levels |
| Control and diagnostics via EtherNet – Local operation, diagnostics and maintenance at the field level |
| Integrated web server (not EtherCAT®) to diagnose drive technology using the Internet Explorer |
| Central data backup at master level |
| Parameter setting and programming using MOVITOOLS® MotionStudio via EtherNet |
| Reduction of installation costs and maintenance due to installation of only one diagnostic or engineering bus system |

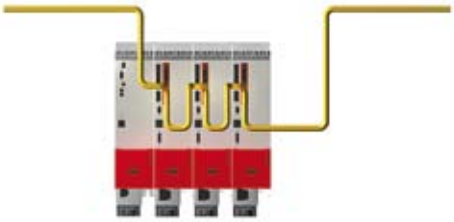
# Comprehensive Service from SEW-EURODRIVE for Process Data Communication

Industrial ETHERNET fieldbus interfaces are available for the following standardized communication profiles:

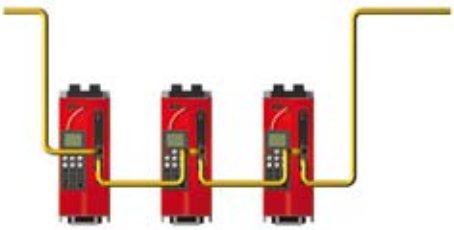
| Industrial ETHERNET | | For MOVIAXIS® | For MOVIDRIVE® | For MOVITRAC® B | For MOVIFIT® | For MOVIPRO® |
|---|---|---|---|---|---|---|
|  | | | | | | |
| PROFINET | **PROFINET** | UFR41B in the master module | DFE32B option | | available | available |
| MODBUS TCP | **MODBUS TCP** | | DFE33B option | | available | available |
| EtherNet/IP | **EtherNet/IP** | | | | | |
| EtherCAT Technology Group | **EtherCAT®** | XFE24A option | DFE24B option | | – | – |

Industrial ETHERNET's high transmission rates and its widespread use within the information technology industry make it an ideal medium to use. Furthermore, it enables the use of IT technology, such as e-mail for notification if an error occurs and diagnostics for the implemented components using the Internet Explorer.

# EtherCAT® and Motion Control – High-speed Industrial Ethernet

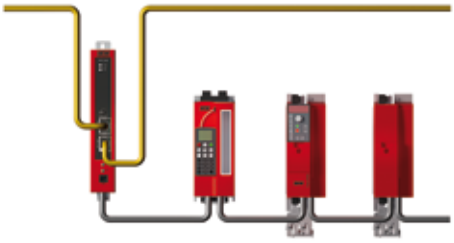


**Servo drive systems: MOVIAXIS® multi-axis servo inverter with XFE24A**



**MOVIDRIVE® inverter with DFE24B**

**MOVITRAC® frequency inverter with DFE24B**



**Applications with SEW drives, connected via DFE24B gateway**

**Motion control:**
With synchronization via distributed clock and a synchronization cycle of 0.5 to 10 ms, the hard realtime communication for MOVIDRIVE® inverters and MOVIAXIS® multi-axis servo inverters allows for the following operating modes:

- High-performance motion control operation with centrally calculated motion functions and clock-synchronous speed, position or torque settings
- Integrated motion control functions, such as electronic cam, electronic gear unit, touch probe, positioning, etc. by clock-synchronous control
- Conventional PLC operation

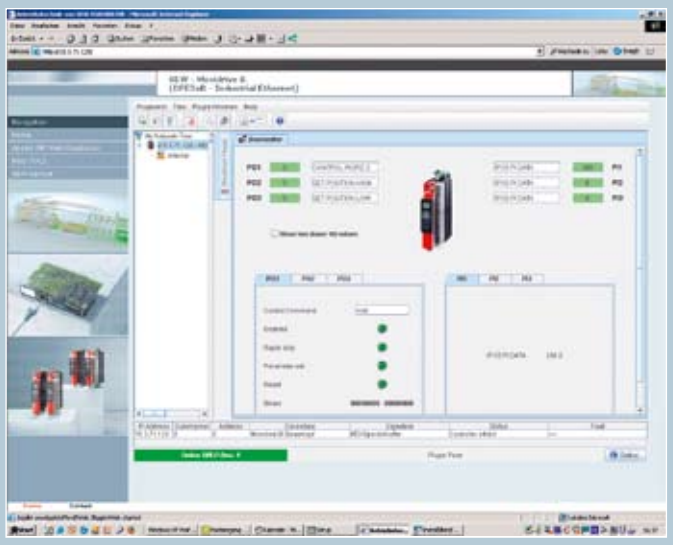
**PLC operation:**
In conventional PLC operation, non-synchronized process data (such as control and status values, speed or position setpoint or actual values) are transfered. This allows for control of application modules (positioning, modulo, winder, etc.) in the MOVIDRIVE® inverter, but also enables MOVITRAC® frequency inverters and other SEW drives with SBus interface to be used for simple drive tasks.

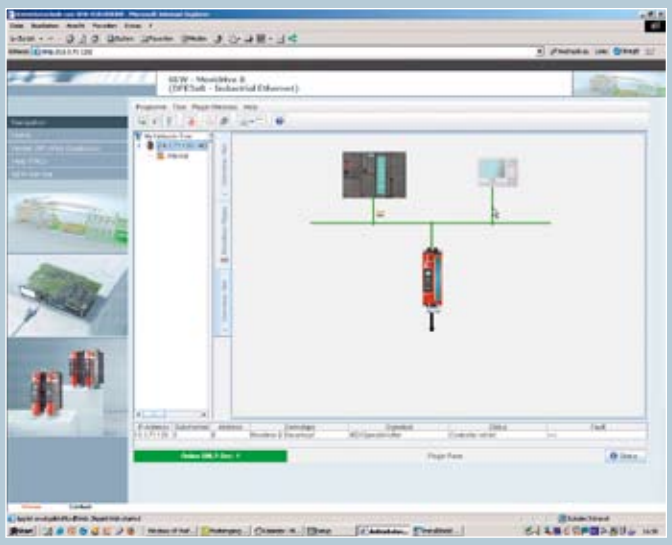
Unlimited engineering access, for example to MOVITOOLS® MotionStudio down to the drive level is ensured by the mailbox gateway in the EtherCAT® master.

## Web-based diagnostics

The ETHERNET fieldbus interfaces (PROFINET, EtherNet/IP and Modbus) offer an integrated WEB server for simple drive engineering diagnostics using the Internet Explorer. The server makes the display values accessible and enables simple, password-protected configuration.

- Diagnostics via Internet Explorer
- Displays process values such as speed, position, current etc. – numerically and graphically
- Displays unit data and status information
- Displays binary inputs/outputs with status and function
- Displays analog inputs/outputs with values and function
- Fieldbus communication diagnostics
- Displays fieldbus process data
- User documentation is stored on the web server
- Network configuration





# Diagnostic units

Preventive maintenance is becoming an increasingly important feature for many systems from an economic point of view. The diagnostic units from SEW-EURODRIVE offer perfect assistance: They help to prevent downtimes and increase system availability.

**DUV Diagnostic Unit Vibration**
**Drive diagnostics using vibration analysis**

The DUV diagnostic unit from SEW-EURODRIVE is the perfect sensor for simple and reliable monitoring of rolling bearings. The DUV diagnostic unit measures the structure-borne noise and uses this value to calculate the frequency spectrum. The unit uses this frequency spectrum to constantly evaluate the condition of the rolling bearings. The structure-born noise sensor and evaluation electronics are fully integrated in the diagnostic unit.

**DUV diagnostic unit – Advantages at a glance:**

- Rolling bearings and gearing components are permanently monitored
- The condition of the rolling bearing and damage development can be easily detected and identfied: The colors green, yellow and red indicate the damage development
- Monitoring options: Values can be read directly from the sensor or can be visualized externally via switch outputs (DUV can be linked to bus systems)
- Level monitor that monitors the entire vibration spectrum
- Permanent monitoring of five bearing sites or 20 individual frequencies (e.g. tooth meshing frequency, imbalance) with one sensor
- Parameters can also be set by the system operater via RS-232 interface
- Data is recorded, processed, and evaluated decentrally
- Vibration speed is monitored according to DIN ISO 10816-1
- Monitoring is also possible for ATEX zone 1/21 (special design)
- Maintenance intervals can be planned individually

**DUO Diagnostic Oil Aging**
**Gear unit oil diagnostics using thermal analysis**

The DUO diagnostic unit from SEW-EURODRIVE is the perfect sensor to determine the remaining service life of gear unit oil and indicate the right time for an oil change. A thermal sensor installed in the gear unit measures the oil temperature and forwards this information to an evaluation unit, which then calculates the time remaining until the next oil change for the specified oil type.

The diagnostic unit takes the oxidation characteristics under thermal stress of the different oils into account.

**DUO diagnostic unit – Advantages at a glance:**

- Reduction in oil costs
- Optimum utilization of oil service life
- Startup can be performed directly on the diagnostic unit (without PC)
- Simple detection and reading of the time remaining until the next oil change
- 5 different oil types can be parameterized
- Warning message is issued if predefined limit values are exceeded, such as max. oil temperature
- Permanent monitoring of oil aging
- Maintenance intervals can be planned individually
- Monitoring is also possible for ATEX zone 1/21 (special design)

**DUB diagnostic unit**
**Brake diagnostics with function and wear analysis**

The DUB (Diagnostic Unit Brake) diagnostic unit from SEW-EURODRIVE is the ideal sensor for monitoring the wear and functionality of the brake. The voltage-dependent signal can be evaluated by an SEW-EURODRIVE frequency inverter or a higher-level controller.

Two sensors allow you to monitor proper brake functioning and lining wear simultaneously and reliably.

**DUB diagnostic unit – Advantages at a glance:**

- Brake lining wear can be detected in good time
- Reliable brake function monitoring
- Condition signal of the micro-switch can be implemented as normally closed or normally open contact
- Easily processed voltage-dependent output signal
- Evaluation directly via SEW-EURODRIVE inverter with suitable error protocol
- Can be used in damp conditions up to IP65
- Self-cleaning contacts inside the sensor
- Maintenance intervals can be planned individually according to wear

# Functional safety technology

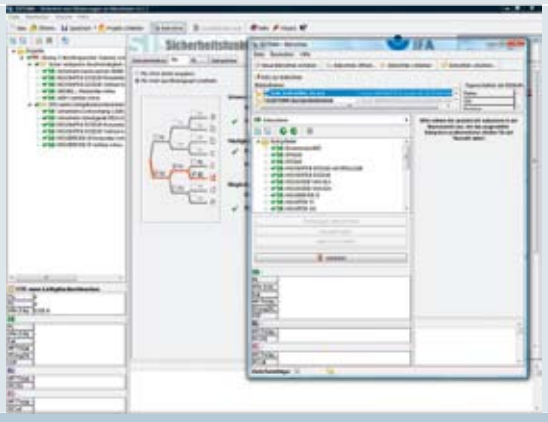
Avoiding industrial accidents while maintaining trouble-free and economical system operation is the central challenge of today's automation concepts. With the integrated and modular components of the MOVISAFE® functional safety technology, SEW-EURODRIVE provides solutions that can be implemented in many industries and applications.

## MOVISAFE®: Integrated functional safety

MOVISAFE® options cards and safety modules provide our drive electronics with all the important safe motion functions. Downtimes are reduced by selective shutdown, costs are reduced by prefabricated products and elimination of external protection devices. All these measures increase the productivity in the production and operation of plants. Moreover, startup is facilitated as safe drive technology can be easily integrated into existing safety applications with PROFIsafe communication.

## Compliance with standards and implementation

To comply with EN ISO 13849-1 requirements, the actual performance level must be calculated for all the safety functions present in the plant. This calculation can be made, for example, using the Sistema tool of the Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA; www.dguv.de/ifa), which is available free of charge. SEW-EURODRIVE offers a library with all the products of the modular system free of charge to allow users to handle the software easier and quicker. If requested, our safety experts will of course make these calculations for you, including the complete documentation.



**MOVISAFE®:**
**Functional safety technology integrated in the MOVIDRIVE® inverter**

**MOVISAFE® DCS 21B + DCS31B option cards**

- Standard type:
  Safe disconnection of the torque (STO) according to IEC 61800-5-2
- From size 1: additional safe motion functions, according to IEC 61800-5-2 with DCS21B/31B (SLS, SDI, SLA, SSM, SLI, SCA, SCA, SLP, STO, SS1, SS2, SOS)
- DCS31B: with integrated logic processing for linking inputs and outputs as required
- DCS21B + DCS31B are certified according to SIL 3 (IEC 61508), to PL e (EN ISO 13849-1) and cat. 4 (EN 954-1)

**MOVISAFE® DFS12B/DFS22B option cards**

Optional: PROFIsafe can be combined as safe fieldbus interface

**MOVISAFE®:**
**Modular functional safety technology for use with control cabinet drive electronics:**

- **MOVITRAC® B frequency inverter**
- **MOVIDRIVE® B drive inverter**
- **MOVIAXIS® multi-axis servo inverter**

**MOVISAFE® UCS..B safety modules**

- UCS11B and UCS12B for single-axis and double-axis applications; meet the safe motion functions of IEC 61800-5-2 (SLS, SDI, SLA, SSM, SLI, SBC, SCA, SCA, SLP, STO, SS1, SS2, SOS).
- UCS10B comes equipped with standard safety logic, such as STO.
- All safety modules have integrated logic processing for linking inputs/outputs as required
- Basis: UCS10B, UCS11B and UCS12B with I/O expansion modules can be expanded by up to 64 digital inputs/outputs
- Other safety relay contacts can be used for potential-free integration into emergency stop chains
- Optional type: UCS10B/11B/12B with safe PROFIsafe fieldbus interface and/or SBus diagnostic interface
- All safety modules are certified according to SIL 3 (IEC 61508) and cat. 4/PL e (EN ISO 13849-1).

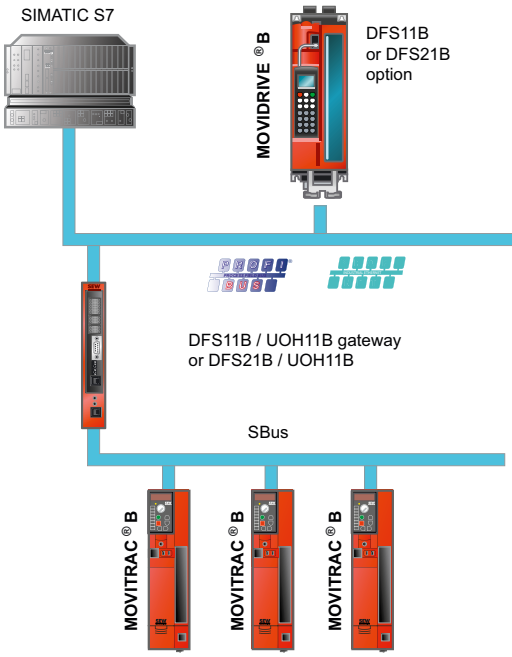
**The DriveAcademy®, the central educational institute of SEW-EURODRIVE, offers year-round training courses on functional safety as well as seminars on how to design machines and systems under safety-relevant aspects.**
**More information and dates at:**
**www.driveacademy.sew-eurodrive.de**

# Safe communication via PROFIsafe

Drive technology from SEW-EURODRIVE can be controlled via PROFIsafe to integrate the safety-relevant drive function into higher-level safety concepts. Process data and safety-relevant information are transmitted across a single medium, which is either PROFIBUS or PROFINET IO. No separate, safety-relevant fieldbus needs to be installed.

## Safe torque off safety function (STO) according to IEC 61800-5-2

### Components for control cabinet installation

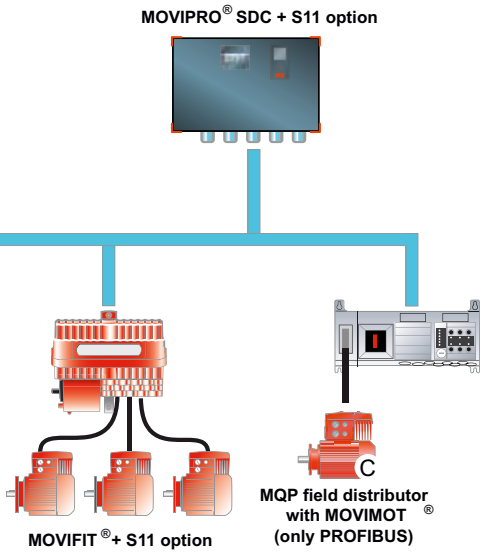



The safe torque off (STO) safety function according to IEC 61800-5-2 can be activated for **MOVIDRIVE® B** and **MOVITRAC® B** inverters via the following options:

- DFS11B interface for connecting MOVIDRIVE® B / MOVITRAC® B: PROFIsafe on PROFIBUS
- DFS21B interface for connecting MOVIDRIVE® B / MOVITRAC® B: PROFIsafe on PROFINET

These components come equipped with a safety-relevant output used for switching an individual MOVIDRIVE® B/MOVITRAC® B inverter or a group of MOVIDRIVE® B/MOVITRAC® B inverters to “safe stop”.

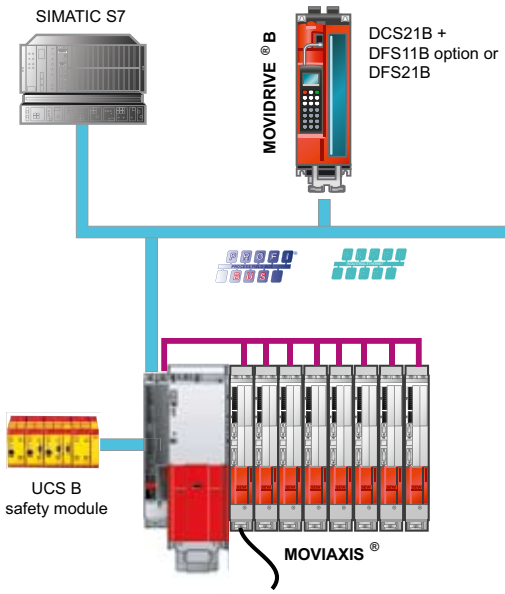
### Components for decentralized installation



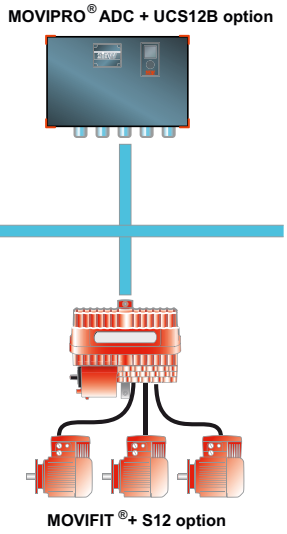

**MOVIMOT®** gearmotors with integrated frequency inverter can be controlled using PROFIBUS/PROFIsafe when the gearmotors are used together with MQS../Z.6F field distributors.
Field distributor types MQS../Z.7F and MQS../Z.8F with integrated MOVIMOT® inverter are also equipped with a PROFIsafe interface.
When operating the decentralized **MOVIFIT®** drive controller together with MOVIFIT® MC or FC units, it can also be controlled via PROFIsafe with the PROFIsafe option S11. The PROFIsafe option S11 provides four additional safety-relevant inputs for connecting safe sensors, and two safety-relevant outputs.

## Expanded safety functions according to IEC 61800-5-2

### Components for control cabinet installation




### Components for decentralized installation




– Additional safe motion functions according to IEC 61800-5-2 can be implemented for MOVIDRIVE® B inverters from size 1. These functions are SLS, SDI, SLA, SSM, SLI, SCA, SCA, SLP, STO, SS1, SS2 and SOS.
– Combining the DCS21B option card with the DFS12B (PROFIBUS) fieldbus interface or DFS22B (PROFINET IO) enables control via PROFIsafe.

Expanded safety functions for the decentralized MOVIFIT® drive controller and for free programming with MOVIPRO® ADC are currently in preparation.

# DriveBenefits – Customized process solutions for your entire value creation chain

The DriveBenefits from SEW-EURODRIVE offer a variety of practice-oriented possibilities to accelerate processes in every value creation phase, to make these processes easier and handle them in a cost-optimized manner. Selecting the suitable components and combining them to form an overall concept will give you sustainable benefits.

**New DriveBenefits modules available:**
- Convenient engineering with extended CAD functions*
- Efficient and reliable provision of product data*
- Ideal selection of drive components using the DriveConfigurator*

**Overview of advantages**
- Measurable cost savings
- Less expenditure of time
- Increased process safety
- Increased efficiency
- Enhanced process automation

**Consistent and integrative**
You find the DriveBenefits of SEW-EURODRIVE in all areas of modern intralogistics processes. In every company – independent of size and industry.

## The DriveBenefit components at a glance:

**1. Engineering and selection**
- SEW Workbench*
- DriveCAD*
- EPLAN® Macros
- DriveConfigurator*

**2. Ordering and procurement logistics**
- Electronic data exchange
- Customized procurement logistics
- Electronic invoicing

**3. Material flow and startup**
- Order-specific documentation*
- Order tracking*
- Intelligent material flow

**4. Operation and spare part management**
- Ordering spare parts*
- Inquiring spare parts*

*Available via the DriveGate® customer portal

# DriveGate® –
# The SEW-EURODRIVE customer portal

The convenient, fast and direct way to a customized process solution:
DriveGate® offers customers of SEW-EURODRIVE access to a comprehensive process and information portfolio. This central online platform can be used to quickly and conveniently find and use various components of the DriveBenefits and other online solutions, such as the SEW Newsletter.

Registration at **www.sew-eurodrive.de** is easy. And the user-friendly user interface of DriveGate® ensures that the services offered can be used easily and safely. Due to data security, some services are only available after individual authorization. Access to DriveGate® is free of charge for customers of SEW-EURODRIVE and available 24 hours a day, worldwide.

**Customer portal with many possibilities**

- DriveConfigurator for drive configurations
- Order tracking
- Access to documentation for products, orders, and quotations
- Registration for SEW Workbench
- E-Shop for ordering spare parts
- Clear overview of current quotations
- Newsletter subscription
- DriveCAD for true to scale 2-D and 3-D drawings

# DriveConfigurator – The ideal selection tool for drive components

As part of the process solutions offered by DriveBenefits, the DriveConfigurator of SEW-EURODRIVE is the ideal online tool to select drive components quickly and reliably. The DriveConfigurator is accessed from the DriveGate® customer portal.

With its logical design and guided operation with numerous illustrations, the DriveConfigurator is the perfect tool for customers to easily find a suitable drive and make an online inquiry about it. Beyond that customers can enter their material number and other text for every selected component. In this way, the reference to projects or material master can be ensured already during the quotation process.

**Advantages of the DriveConfigurator**

- Online drive configuration
- Automatic creation of CAD models
- An inquiry can be made for the selected products
- 3-D view of the configured product
- Possibility to assign a customer designation or material number
- Selected configuration can be saved as template

# CDS® – Complete Drive Service
# Green light for your production

CDS® – Complete Drive Service from SEW-EURODRIVE offers system operators a complete range of services for all aspects of drive technology. CDS® covers any service requirement from machines and systems across the entire product life cycle of the drive components and lets operators optimally plan and calculate these requirements in the long term.

## A complete service concept – module for module

You can combine the individual CDS® system modules to form your individual service package. In this way, we provide exactly the system modules you need to meet your specific requirement profiles. The result will be higher availability for your system with downtimes reduced to a minimum.

## CDS® in the product life cycle

Integrative services that can be tailored to the specific needs of every phase of the product life cycle make the Complete Drive Service from SEW-EURODRIVE the perfect solution.

From project planning to retrofit and modernization measures – CDS® covers the entire life cycle of a system.

## The CDS® system modules – Our services at a glance

24-hour service hotline
0180 5 7394357
0180 5 SEWHELP

Installation consulting service

Startup service

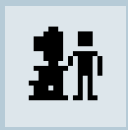
Application programming service

Inspection and maintenance service

Repair service

Spare parts service

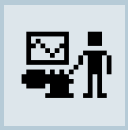
Express assembly service



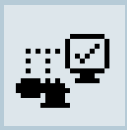
Industrial gear unit service

Pickup and delivery service

Retrofit service



Condition monitoring service



CDM® – Maintenance Management

Training service

# DriveAcademy® – Training made by SEW-EURODRIVE

As the central educational institute at SEW-EURODRIVE, the DriveAcademy® offers a flexible and versatile range of training courses that meet the highest standards. In an ideal learning environment and with state-of-the-art equipment, the DriveAcademy® optimally prepares your employees for the professional challenges to come. Instead of at the DriveAcademy®, the training courses may also be conducted at one of our Drive Technology Centers in your vicinity or directly on your premises.

**The DriveAcademy® offers a broad range of training courses designed for various target groups:**

- Product training, technical training for project planners, design engineers, planners, service engineers, startup engineers, repair staff, as well as trainers and teachers
- Product training covering all relevant topics for SEW employees worldwide
- Training and consultation in personnel development and WIEPROconsulting both for customers and SEW employees

## DriveAcademy® 360° – Experience more at the click of a button

Would you like to find out more about the DriveAcademy®? You are welcome to visit us at **www.driveacademy.sew-eurodrive.de** for a virtual tour of our central training institute.

## Product training

With target group specific product training, the DriveAcademy® provides ideal conditions for hands-on experience with modern drive technology.
Our training courses are based on the latest methods for better learning success, customer orientation for a higher training efficiency as well as practical aspects by using multi-functional training models.

**Your benefits from training and competence development at a glance:**
- More efficient system planning
- Optimized system utilization
- Cost savings due to fewer system downtimes
- Standardized knowledge and working methods
- etc.

## WIEPROconsulting – Always well advised

Target-oriented optimization and corporate success – those are the objectives of WIEPROconsulting. The consulting experts of WIEPROconsulting implement individual know-how into integrative competence. Their focus is on continuous practical improvements of business processes as well as internal processes in all company divisions.

## Modern personnel development

The broad range of personnel and organization development seminars covers management training, communication and personnel related topics through to specific working methods and individual coaching for various target groups. Further, the portfolio comprises the design of complete personnel development concepts for small and medium-sized companies.

Drive 360

# Seeing the big picture.

Globalization means for us: Being close to the customer in all corners of the world.

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