

Motion Control at the Highest Level

The MOVIAXIS® Multi-Axis Servo Inverter



Powerful, Reliable and Flexible – The Multi-Faceted MOVIAxis® Servo Inverter

Technology and motion control functions that meet the highest standards, combined with maximum dynamics, energy-efficient components and global availability:

All this is provided by SEW-EURODRIVE's modular system of highly dynamic servo drives. MOVIAxis® is the perfect multi-axis servo inverter for drive and automation solutions that save time, costs and effort.

The powerful and reliable MOVIAxis® handles a variety of drive solutions and offers a wide range of communication and automation options for almost any application. Its big advantage is its high degree of flexibility: Depending on the desired machine and system concept, the MOVIAxis® multi-axis servo drive can be com-

bined flexibly and adapted to meet the specific requirements of the automation structures. MOVIAxis® has a central position in the portfolio of servo drive systems. It is perfectly integrated in the existing modular concept of SEW-EURODRIVE, allowing for a multitude of drive and automation solutions.

Driving the world – with innovative drive solutions for all branches of industry and for every application. Products and systems from SEW-EURODRIVE for any application – worldwide. SEW-EURODRIVE products can be found in a variety of industries, e.g. automotive, building materials, food and beverage as well as metal-processing. The decision to use drive technology “made by SEW-EURODRIVE” stands for safety regarding functionality and investment.



Combining Productivity and Intelligence



This objective is the basis for the entire MOVIAxis® product series and the complementary servo drive technology portfolio of SEW-EURODRIVE.

This objective is achieved by

Optimum adaptation to the application and maximum flexibility of the entire drive/automation system in terms of:

- Product scalability (hardware and software)
- Communication and networking options
- Drive functionality and automation options
- Engineering, startup, configuration and diagnostics using MOVITools® MotionStudio

A variety of application options for variable machines and systems:

- Power range from 10 kW rated supply power, up to 187 kW peak power
- A maximum peak current of 250 A
- Integrated safety technology
- Robust housing design and simple mounting
- Support of all common encoder systems

Guaranteed solutions with the best ratio between costs / solution / resources:

- 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



MOVIAXIS® – Absolutely Functional

The options for solving a drive task depend on the available functionality. MOVIAXIS® has a comprehensive range of features with many standard functions, which means that the standard variant is already well-equipped.

Fieldbus/network communication		
– Profibus	○	
– DeviceNet	○	
– ProfiNet	○	
– EtherNet/IP	○	
– CAN2	●	
– EtherCAT®	○	
– CAN1/SBus (with automatic address assignment)	●	
– User-defined units	●	
– TCP/IP, UDP/IP	●	
Motion Control/technology functions		
– Cam disks (40 pieces) incl. online curve calculation	●	
– Virtual encoder	●	
– Event/sequence control	●	
– Electronic gear unit	●	
– Touch probe	●	
– Cam control	●	
– Sensor-based positioning	●	
– Jog mode	●	
– Reference travels	●	
– Modulo function	●	
Encoder/motor data		
– Synchronous, asynchronous, linear motor operation	●	
– Non-linear torque characteristic curve	●	
– Hiperface®, Resolver, TTL, Endat 2.1	●	
– Encoder calibration and auto commutation	●	
– Non-SEW motors	○	
– Brake test function	●	
– Multi-motor operation (max. 3 motors)	●	
Motion Control		
– MOVI-PLC® basic*	○	
– MOVI-PLC® advanced	○	
– IEC 61131 motion libraries	○	
Basic unit functions		
– User level – password management	●	
– Graphical function connection	●	
– Double CAN system bus	●	
– EtherCAT®-based system bus	○	
– Digital inputs	9	
– Digital outputs	4	
Diagnostics/service/monitoring		
– Offline scope	●	
– 8 channel scope	●	
– Thermal motor management	●	
– Thermal inverter management	●	
– Electronic nameplate	●	
– Overload prevention	●	
– Central data storage/SD card	●	
– Auto reload data record for axis replacement	●	
Safety technology		
– STO (Safe Torque Off) cat. 3	○	
– STO (Safe Torque Off) cat. 4	○	
– SS1, SS2, SLS	○	



* On request

● Standard

○ Optional



All unit functions can be connected and configured graphically to save time and effort. Pre-configured wizards and technology editors are integrated for standard tasks, such as single-axis positioning. The required MOVITOOLS® MotionStudio software can be downloaded free of charge.

MOVIAXIS® Axis Module – Compact Power

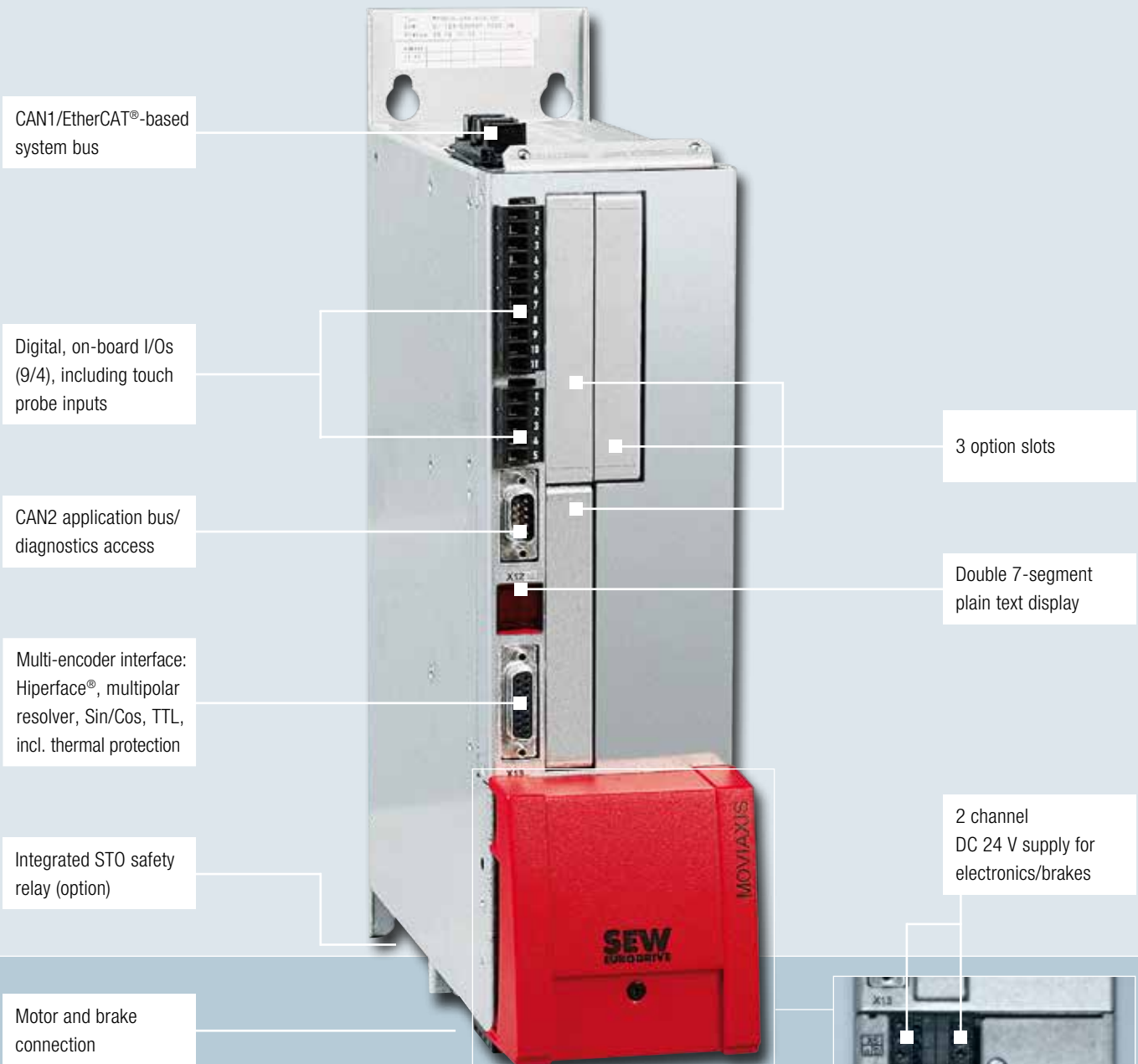
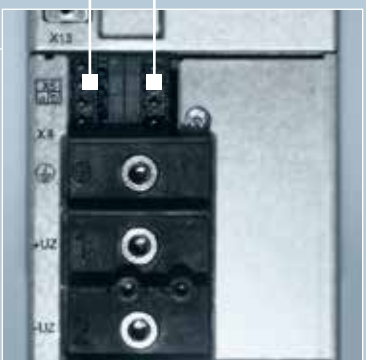


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The Option Cards

The option cards can be used to adapt the already well-equipped standard axis modules even more specifically to the application.

All axis option cards are configured and integrated in the axis modules at the factory. Information is processed via an internal, fast option bus, which enables direct evaluation of the option cards by the axes. The signals can

also be forwarded via different system buses and fieldbuses for further processing in higher-level controllers.

This allows for high-performance, local signal processing and cost-optimized use of existing equipment without additional external I/O components. The multi-encoder card also enables logistics-optimized connection of various encoder systems.

Option cards overview

Profibus	For direct connection of individual MOVIAXIS® axes to Profibus master controllers
K-Net	For connection to K-Net master controllers
EtherCAT®	For connection to all EtherCAT® master systems
Digital I/Os (8I/8O)	For processing of 8 digital inputs and 8 digital outputs, either directly in the axis module or in the higher-level controller
Digital/analog 4I/4O, 2aI/2aO	For processing 4 digital inputs and 4 digital outputs as well as 2 analog inputs and 2 analog outputs with 12 bit resolution each
Multi-encoder card	For processing of encoders in the axis module or for reading in master encoders for MOVI-PLC® (Hiperface®, Encoder, EnDat 2.1, Sin/Cos, etc.)
Multi-encoder card SSI	For processing of encoder signals in the axis module or for reading in master encoder signals for MOVI-PLC® (SSI, Hiperface®, Encoder, EnDat 2.1, Sin/Cos, etc.)

MOVIAXIS® Master Module – The Control Center

MOVIAXIS® master modules are the universal control center for the entire MOVIAXIS® system. They are generally available in two variants: Fieldbus/network gateway and MOVI-PLC® advanced motion controller.



Profibus
fieldbus connection

DeviceNet
fieldbus connection

EtherCAT®-based
system bus

TCP/IP, UOP/IP
– Parameter setting
and network interface

The pooling of functions, which is enabled by these two master module categories, provides many advantages for the entire system:

- Significant cost-savings, since individual fieldbus cards for each axis are no longer necessary.
- Time- and cost-savings during startup and service due to auto addressing of the system bus and the central data backup used in case of service.
- Simple and fast realization of any automation task thanks to one controller for all axes. Programming or parameterizing of individual axes is no longer necessary when using a controller.

SD card with central data storage of all axes and system components including auto reload routine in case of service

CAN2 application bus

CAN1 system bus

The Master Module with Central Fieldbus and Network Gateway Offers the Following Features and User Benefits:

– Communication

Profibus, DeviceNet, ProfiNet, Ethernet/IP – High-performance, central fieldbus/network access

Advantages: Fieldbus cards no longer required in the axes, which is advantageous in terms of costs and logistics

– Data backup

Central data storage of all axis parameters and program settings

Advantages: No scattered data memories assigned to individual axes, which minimizes the handling and confusion risk

– Service and downtimes

Automatic data backup in case a component of the axis system is replaced

Advantages: No separate programming required if an axis is replaced. The data record of the previous axis is automatically loaded into the new axis component, which reduces time and costs

– Office connection

TCP/IP and UDP/IP communication

Advantages: Peer-to-peer communication, connection to standard Ethernet networks or for parameter setting, which simplifies handling

– Scalable system bus configuration

Advantages: Master modules can communicate with the axis system on different levels via CAN1, CAN1+2 or an EtherCAT®-based system bus, which leads to cost transparency



The Master Module with Central MOVI-PLC® advanced Motion Controller Offers the Following Features and User Benefits:

– Scalable motion control

Different technology levels available for tiered application solutions

Advantages: From single-axis movements (e.g. positioning) to coordinated multi-axis movements (high-performance electronic cam) to completely pre-configured application solutions (4-axis handling module), which simplify handling

– Path control

Kinematic transformation and support incl. simulation for realizing diverse handling and robotics systems

Advantages: The customer can implement the best kinematics for the application, using MOVIAXIS® and MOVI-PLC® for optimum support and trouble-free programming

– One platform for everything

Combination of motion control and PLC as well as path control in one system

Advantages: All control functions are integrated seamlessly in one platform, which means they can be realized consistently without much effort

– Data management

Central data storage and auto reload can be realized similar to the gateway

Advantages: In case of replacement, all data, parameters and settings of the previous

unit are automatically downloaded, which results in shorter startup processes and minimal downtimes

– Communication

Fieldbus and communication interfaces similar to master module with gateway

Advantages: Maximum compatibility with existing communication structures and optimum integration in networks, which means communication options in the axis modules are no longer necessary

– Comprehensive periphery

Can be connected with DOPs – Drive Operator Panels – for remote visualization and startup. Can also be combined with MOVI-PLC® I/O for reading in various I/O signals in the controller

Advantages: One-source automation including the complete control periphery – fast, prequalified and seamless

– IEC libraries

Pre-configured and tested IEC 61131 libraries for all inverter systems of SEW-EURODRIVE

Advantages: Simple and fast programming of all drives from SEW-EURODRIVE. Integration of additional standard drives, which means efficient application and work processes



Overview of the MOVIAXIS® Portfolio



Along with axis modules and master modules, the MOVIAXIS® series comprises supply modules, additional modules, option/ expansion cards and a comprehensive range of accessories.

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.

Various types of MOVIAXIS® master modules are available:

- Fieldbus gateway with data memory
- 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 one of the various types of master modules.

Features:

- Maximum overload of 250%* for maximum 1 s (max. 250 A; the overload time increases for lower overloads)
- Fast TouchProbe 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)

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

* Basis 8 kHz rated current values

Additional Components and Options

Switched-mode power supply module



The DC 24 V switched-mode power supply module supplies MOVIAXIS® from the DC link with up to 600 W via maximum 3x DC 24 V channels, if required. An external DC 24 V backup voltage can be applied. Supply of external DC 24 V consumers is also possible.

DC link discharge module



This system component was developed to prevent very sensitive machine and plant components or tools/moulds from colliding. In case of unintentional power failure, the component discharges the DC link of MOVIAXIS®, preventing unintentional machine movements.

Capacitor module



Capacitor modules are additional components that can be integrated optimally in the axis system. They are used to buffer energy in an intelligent way. The energy supplied to the DC link when applying the brake of a motor is activated through a charging circuit and quickly “stored”. During an acceleration process, this energy is then supplied back to the main DC link and utilized again. Only braking energy that exceeds the capacity of the capacitor modules is dissipated via the braking resistor.

The capacitor module is a simple and easily integrated additional component for saving or re-using energy.

Features:

- Maximum storable energy of 1000 Ws
- Peak power 50 kW

Buffer module



Buffer modules are additional components that can be optimally integrated into the axis system. They are used to store energy. Buffer modules are charged with energy from the DC link irrespective of whether the motors are decelerated or accelerated. This means buffer modules make available a “guaranteed amount of energy” in the DC link. This amount of energy can be used to move drives to a safe position (return movement), for example in the event of a power failure in the system.

Feature:

- Maximum storable energy of 1000 Ws

MOVIAxis® – Saving Energy in Many Ways

Energy-saving solutions are based on the proven modular concept of SEW-EURODRIVE as well: Just one individual drive component with the proper energy efficiency may be sufficient to achieve a positive energy balance. But only the scalable combinations that can be adapted to the customer application turn energy-efficient drive components into impressive energy savers, conserving resources and the environment.

MXC storage modules

The optional MXC storage modules were developed for storing energy temporarily. They can be connected to all other MXP supply modules. Braking energy is “moved” temporarily and utilized again during the next acceleration process.

This dramatically minimizes the average amount of energy extracted from the power supply and reduces or completely prevents heating of the control cabinet due to energy dissipation in braking resistors. Any follow-up costs related

to this are also reduced significantly, e.g. for installation of cooling and climate control measures, if necessary.

MXR regenerative power supply modules

The MXR regenerative power supply module has 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.

For energy absorption from the supply system, $\cos \varphi = 1$ is standard. This module 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.

MXP81 compact power supply module

For machines with a particularly compact design and fast cycle times, the compact power supply modules meet demands for minimum installation

effort, small housing dimensions and energy buffering to prevent/reduce losses and heat dissipation. Along with a storage module, these

power supply modules contain a braking resistor. Energy that exceeds the storage capacity is automatically dissipated.



In addition to energy consumption, which for synchronous servomotors is already optimized due to their operating principle, the disposal of the braking energy is key.

During the development of MOVIAXIS®, this topic has been paid special attention. Options for re-using the braking energy were developed in order to significantly improve the overall energy balance of a drive solution and to save costs.



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

Reliable Solutions and Multiple Application Options

MOVIAXIS® offers solutions for almost any application that requires a high degree of functionality, a compact design, high power density and perfect motion control.



Being equipped with technology functions, and with MOVI-PLC® as an option, MOVIAXIS® solves application tasks throughout the entire **consumer goods, food and luxury goods industry**, which makes it an alternative to specialist solutions in the fields of

- FFS machines
- Cartonizers
- Carton erectors
- Palletizers
- Dosing
- Order picking
- Labeling



MOVIAXIS® also enables complete machine solutions, e.g. in the **plastics and thermoforming industry**, for

- Thermoforming machines
- Plastic injection molding machines

Extremely dynamic applications in the field of **handling and robotics** can be realized on the basis of the wide power range and the kinematic functions, e.g.

- Packaging robots
- Gantry robots
- Removal handling gear
- Picking robot

In the field of **construction material and wood processing equipment**, MOVIAXIS® is ideal for machinery such as

- Flying saws
- Flying measuring and correction machines
- Pipe bending machines
- Welding machines
- Wire bending machines

Software Tools for Consistent Engineering

MOVITOOLS® MotionStudio

Combining performance, a high degree of functionality and flexibility with simple handling is a challenge. The universal MOVITOOLS® MotionStudio engineering software accomplishes just that.

- Application programs to IEC 61131-3 can be used for all products based on the PLC Editor
- Different communication media and fieldbus systems can be used
- Handling of projects with several different devices (multi-unit perspective)
- Uniform multi-product editors for programming and configuration
- Coordinated IEC libraries concept: Basic, motion or application libraries
- SEW application modules for configuration of a wide range of applications
- Editor for creating customer-specific visualizations and application-specific diagnostics
- Continuity and downward compatibility, i.e. all earlier versions can be started: SHELL, STATUS, COMPILER, ASSEMBLER, LOGODRIVE, BUSMONITOR, CAM, ISYNC
- Diagnostics and scope functions via up to 8 channels
- Gateway startup editor

SEW Workbench

Putting projects into practice requires prior project planning and calculation. The central dimensioning and optimization software SEW Workbench offers the perfect solution for the drive systems of SEW-EURODRIVE.

- Application selection
- Optimum calculation of gear unit and motor
- Price-optimized project planning
- Comparison of different solutions
- Recommendation of "best drive" solution
- Perfect inverter calculation
- Application-specific multi-axis optimization
- Matched configuration of cables and accessories
- Final error check of the configuration
- Optimum parts list generation
- Comprehensive electronic catalog with all products



A Complete Solution Also Means Global Presence and Service

We regard services as an integral part of our solution expertise

SEW-EURODRIVE helps you select a product, ensures reliable plant operation and offers you ideal services throughout the entire life cycle of the plant.

Our sales engineers will assist you with expert advice, analysis and project planning for your application right from the planning stage. Thanks to 67 assembly plants located in 47 countries around the globe, our specialists are always close at hand. This means installation and startup are performed on-site quickly and individually.

Our global after-sales service and the CDS® Complete Drive Service portfolio ensure long-term, trouble-free operation. But just in case, our 24-hour service hotline is available seven days a week for any immediate assistance you might require.

Whether you require startup, repair, spare parts service, condition monitoring, preventative maintenance, or training, the individual modules from SEW-EURODRIVE's Complete Drive Service system CDS® can be combined to offer a service package tailored to suit all requirements. This is the perfect solution for reducing the total cost of ownership (TCO) and life cycle costs (LCC).

Each module is based on the expertise of a global player with practical experience and an understanding of customer service at the highest level.



24-hour service hotline



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

24h Service Hotline

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How we're driving the world



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