

ECS *servo system* **MCS** *servo motors*

for multi-axis applications



Lenze Global Drive – dynamic, powerful, compact



Lenze

ECS, MCS | dynamic, powerful, compact

The ECS servo system

Servo drives with a high overload capacity designed specifically for multi-axis applications with high dynamics.

The servo system comprises axis modules and power supply modules which can be combined to an optimised unit for multi-axis applications. The control tasks and motion control functions can be split according to the application-specific requirements between a central control, e. g. an industrial PC, and the ECS servo system.

A high degree of precision is achieved when carrying out multi-axis coordinated movements by transferring synchronised speed and torque setpoints via the integrated Lenze system bus with microsecond accuracy at cycle times down to 1 ms. The ECS servo system is therefore optimised for gantry systems, robots, packaging machinery or feeding and removal devices in handling technology.

MCS servo motors

The new synchronous servo motors – compact, reliable and highly dynamic

The stator winding has been created by combining individual coils in the new SEpT (Single Element Pole Technology) design. High-quality magnetic materials and specially designed poles provide the required conditions for excellent drive characteristics. The result combines a significant increase in power density with a reduction in mass inertia. Minimal detent torques ensure excellent concentricity and therefore optimum control characteristics. The robust mechanical structure with reinforced bearings and fully encapsulated stator together with the high degree of protection increase operational reliability even in harsh environmental conditions.



*Power supply module
as a panel-mounted unit*



*8A axis module
as a cold plate device*



*Axis module 64A
in push-through technique*



MCS 06 servo motor

Advantages | easy to use, full network capabilities, robust

The advantages of the ECS servo system

- ▶ High dynamics
 - Axis modules can support overloads of between 200% and 300%
 - Dynamic energy exchange via DC bus connection
- ▶ Central power supply modules
 - Minimum cabling
 - Reduced expenditure on switching elements and fuses on the supply side
 - Built-in mains and DC bus monitoring function
 - Central interference suppression
- ▶ Couldn't be easier to assemble
 - Pluggable connection system for power and control terminals which is protected against reverse polarity and is accessible from the front
 - Choose between wall mounting, push-through technique or cold plate technique
- ▶ Flexible configuration for adaptation to motion control
 - Setpoint selection and actual value feedback via bus
 - Control loops can be freely allocated as required on the controller and axis modules (with ECSxA)
- ▶ Full network capabilities
 - 2 CAN interfaces in the axis module as standard
 - All popular fieldbus systems are available as optional additional plug-in communication modules
- ▶ "Safe standstill" in accordance with EN 954-1 control category 3
- ▶ UL-approved, CE-compliant
- ▶ Built-in motor brake control
 - Minimum external expenditure due to internal functions
 - Built-in monitoring functions for brake circuit
- ▶ Can be combined with synchronous and asynchronous motors
 - Resolver or encoder as feedback system (TTL, SinCos, SinCos absolute value)
- ▶ Optimum matching to MCS range of highly dynamic motors
- ▶ Simple application thanks to coordinated drive variants for positioning, actuating or coordinated multi-axis applications

The advantages of MCS servo motors

- ▶ Highly dynamic due to reduced moments of inertia
- ▶ Compact design with high power density
- ▶ Robust resolver feedback system as standard
 - Optional SinCos encoder for maximum precision
- ▶ Easy to install and maintain due to plug connections
- ▶ Enclosure: IP54, IP65 optional
- ▶ UR-approved, meets CSA requirements, CE-compliant
- ▶ Smooth housing surface
- ▶ Fully encapsulated stator



MCS 14 servo motor

System overview | complete automation systems for multi-axis applications

With the automation system components from Lenze and ECS servo drives, it is very straightforward to set up a complete automation system with coordinated interfaces.

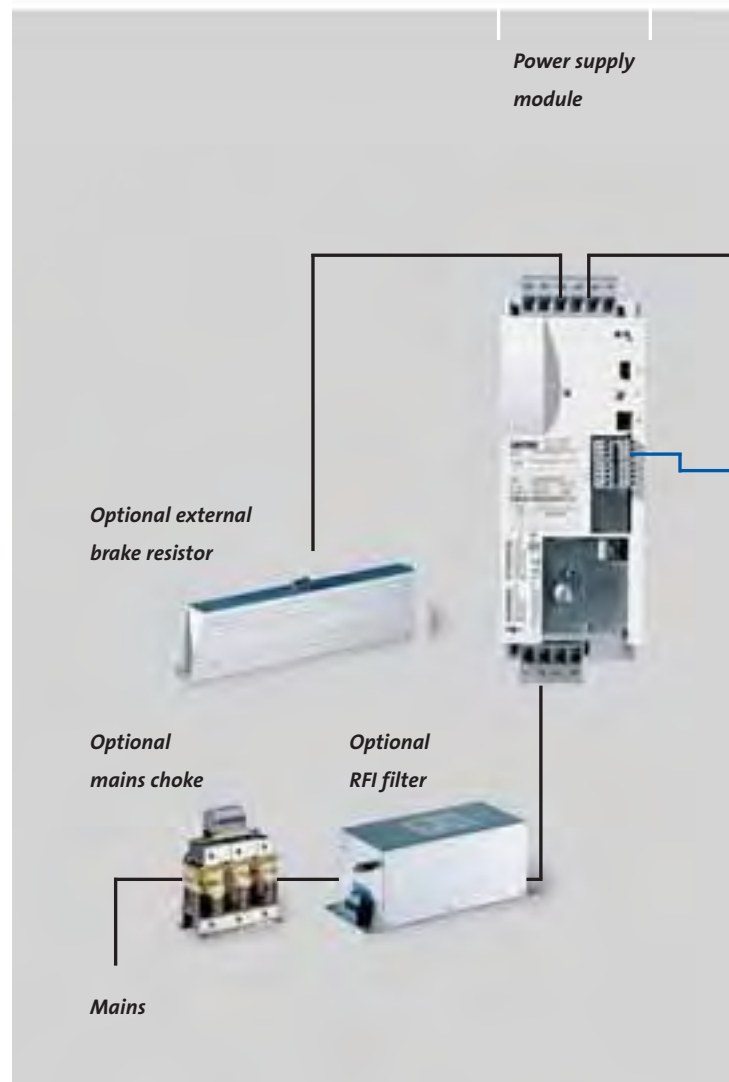
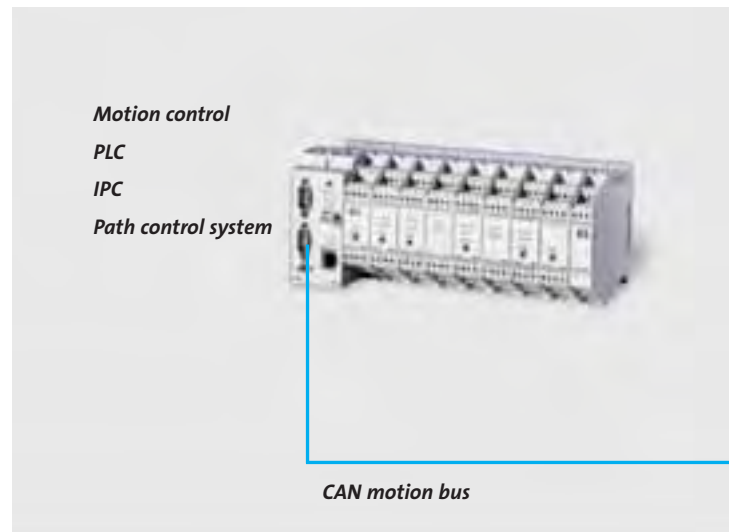
The ETC motion control coordinates synchronous motions on multiple axes – ranging from simple positioning tasks to 3D path control – and can be programmed using the IEC61131-3 compliant languages.

With the IP20 I/O system it is possible to implement additional input/output terminals. We recommend the compact system for applications with only a few I/O points, as it provides a fixed number of digital inputs and outputs. If you need to automate more complex applications, then we can offer a complete I/O portfolio with gateway, electronic modules and backplane bus.

Text displays, graphic displays or touch-screens offer safe and easy ways to operate and monitor the machine. Lenze offers a differentiated range of operating and display units. The standardised integrated development environment optimally integrates displays with the Lenze drives, thereby helping to make the project planning process easier for your particular application.

All of the system components are compatible with the Lenze CAN system bus – which makes it even easier to integrate the system and avoid interface problems.

Of course, a range of power-dependent accessories such as mains chokes and EMC filters is also available.



*To factory control,
higher-level systems*

- PROFIBUS-DP
- INTERBUS
- DeviceNet
- LECOM-AB
(RS485, 232, optical fibre)
- LON
- INTERBUS Loop

*Operating and
service tools*



PC



Human Machine Interface

Axis modules

- Speed and Torque
- Posi and Shaft
- Motion
- Application

CAN system bus



Decentralised I/O system



MCS servo motors

Application software | axis modules

The ECS servo system comes pre-configured for many different application areas. Axis modules with specially written software are available for simple and efficient configuration and commissioning:

- ▶ **Speed and Torque** for general servo applications
- ▶ **Posi and Shaft** for positioning applications and electrical shafts or electrical gearboxes
- ▶ **Motion** for co-ordinated multi-axis applications

Functions can also be freely adapted using the “Application” version which offers free programmability in the IEC61131-3 compliant languages.

Speed and Torque

Speed and Torque is tailored to the application areas “speed and torque control”. The setpoints can either be selected via analog input signals, via the integrated CAN system bus or via fieldbus systems.

In addition, there are also up to 15 predefined fixed speeds which can be used. The acceleration ramps can be either linear or S-shaped. A drift-free standstill is provided for quick stops.

The function “safe standstill” according to EN954-1, category 3, and the actuation of a motor brake with monitoring function are integrated.

Posi and Shaft

Up to 15 positioning profiles can be predefined and saved in this application

software. The positioning can be implemented absolutely, relatively, modulo (i.e. relatively and infinitely) or as a manual fixed speed, or in the form of a master frequency follower.

Touch probe positioning is also implemented in various forms, as is torque reduction after reaching the target position and speed override. In addition to eight different options for referencing, “safe standstill” and a motor holding brake logic are integrated here once again.

Motion

This version has been specially designed for coordinated motions of multiple axes under a central control.

The synchronisation of the axes is performed with a CAN motion bus phase follower. The interpolation of the motion sequences can either be implemented linearly or as a second order polynomial.

Touch-probe position detection and various referencing modes are also available.

The “safe standstill” function in compliance with EN954-1, category 3, and the actuation of a motor brake with monitoring function are also integrated in the “Motion” version.



*Horizontal cardboard
packaging machine H200*

Technical data | from a single source

Axis module		ECS x S004	ECS x S008	ECS x S016	ECS x S032	ECS x S048	ECS x S064
		ECS x P004	ECS x P008	ECS x P016	ECS x P032	ECS x P048	ECS x P064
		ECS x M004	ECS x M008	ECS x M016	ECS x M032	ECS x M048	ECS x M064
		ECS x A004	ECS x A008	ECS x A016	ECS x A032	ECS x A048	ECS x A064
Max. output current	[A]	4.0	8.0	16.0	32.0	48.0	64.0
Rated current*	[A]	2.0	4.0	8.0	12.7	17.0	20.0
Standstill current continuous/ short-time	[A _{rms}]	2.0/3.0	4.0/6.0	8.0/12.0	16.0/24.0	23.0/36.0	27.0/48.0
DC-bus voltage	[V _{DC}]	0 ... 770					
Dimensions (W x H x D) [mm] (wall mounting, push-through technique)		88 x 247 x 174				132 x 247 x 174	
Dimensions (W x H x D) [mm] (cold plate)		88 x 282 x 121				132 x 282 x 121	

* Rated current at 3 ~ 400 V mains voltage

Power supply module		ECS x E012	ECS x E020	ECS x E040
Rated current in DC bus	[A]	12.0	20.0	38.5
Mains rated current	[A]	9.6	15.9	31.9
Max. braking power	[kW]	7.6	16.0	32.0
Continuous braking power				
- Ext. resistor	[kW]	2.0	3.0	6.0
- Int. resistor *	[kW]	0.10	0.12	0.15
Mains voltage range	[V _{AC}]	3 ~ 180 – 528 ± 0%		
Dimensions (W x H x D) [mm] (wall mounting, push-through technique)		88 x 247 x 176		132 x 247 x 176
Dimensions (cold plate) (W x H x D) [mm]		88 x 282 x 121		132 x 282 x 121

* Not on cold plate design

Motor type	Standstill torque [Nm]	Rated current [A]	Rated torque [Nm]	Maximum torque [Nm]	Rated speed [rpm]	Mass moment of inertia [10 ⁻⁴ kg m ²]
MCS 06C	0.8	1.3/2.4	0.6/0.5	2.4	4050/6000	0.14
MCS 06F	1.5	1.5/2.5	1.2/0.9	4.4	4050/6000	0.22
MCS 06I	2.0	1.6/2.9	1.5/1.2	6.2	4050/6000	0.3
MCS 09D	3.3	2.3/3.8	2.3/1.8	9.5	4050/6000	1.1
MCS 09F	4.2	2.5/4.5	3.1/2.4	15.0	3750/6000	1.5
MCS 09H	5.5	3.4/6.0	3.8/3.0	20.0	4050/6000	1.9
MCS 09L	7.5	4.2/6.9	4.5/3.6	32.0	4050/5100	2.8
MCS 12D	6.4	2.6/4.5	5.5/4.3	18.0	1950/4050	4.0
MCS 12H	11.4	3.8/5.7	10.0/7.5	29.0	1500/3525	7.3
MCS 12L	15.0	5.9/10.2	13.5/11.0	56.0	1950/4050	10.6
MCS 14D	11.0	4.5/7.5	9.2/7.5	29.0	1500/3600	8.1
MCS 14H	21.0	6.6/11.9	16.0/14.0	55.0	1500/3225	14.2
MCS 14L	28.0	9.7/15.0	23.0/17.2	77.0	1500/3225	23.4
MCS 14P	37.0	10.8/15.6	30.0/21.0	105.0	1350/3225	34.7
MCS 19F	32.0	8.6/14.0	27.0/21.0	86.0	1425/3000	65.0
MCS 19J	51.0	12.3/18.5	40.0/29.0	129.0	1425/3000	105.0
MCS 19P	64.0	14.3/19.0	51.0/32.0	190.0	1350/3000	160.0

Motors for 3 ~ 400 V mains voltage, other designs for 230 V available