CODESYS SoftMotion Axes (96)

CODESYS SoftMotion Axes extends the functional range of CODESYS Control SL systems from pure logic to motion control with optional support for CNC and robotics.

This license is application-based and requires at least the application-based license CODESYS Control Standard S for the PLC.

With this license, up to *96 real axes*, and additionally *96 virtual axes*, can be controlled.

The CODESYS SoftMotion package can be downloaded with the CODESYS Installer. The release notes are published on the CODESYS website.

Product description

CODESYS SoftMotion Axes enables the control of single-axis and synchronized multi-axis movements (electronic cams, electronic gears).

CNC and robotics functionality can be added with a “SoftMotion Axis Groups/CNC Interpolators” license.

Functional principle

- Engineering of motion control using function blocks
- Configuration of drives based on the fieldbus support integrated in the CODESYS Development System
- Separation of application development from drive configuration. The drives in the device tree are accessed symbolically (by name) from the application. Changes in the drive configuration are possible without changing the application.

Typical applications

- As an additional option for powerful, CODESYS compatible control systems with good real-time behavior (FPU recommended)
- Actuation of single-axis and multi-axis movements, for example with position and velocity definitions, drive functions, and phase actuation
- Implementation of electronic cams

CODESYS SoftMotion Axes extends the CODESYS Development System with the following elements:

- Extensive library of function blocks for the control of axes
- Visualization templates for efficient commissioning
- Integrated axis and drive configuration in the device tree

- Convenient commissioning of axes (“Online Configuration Mode”) without any special IEC 61131-3 application code

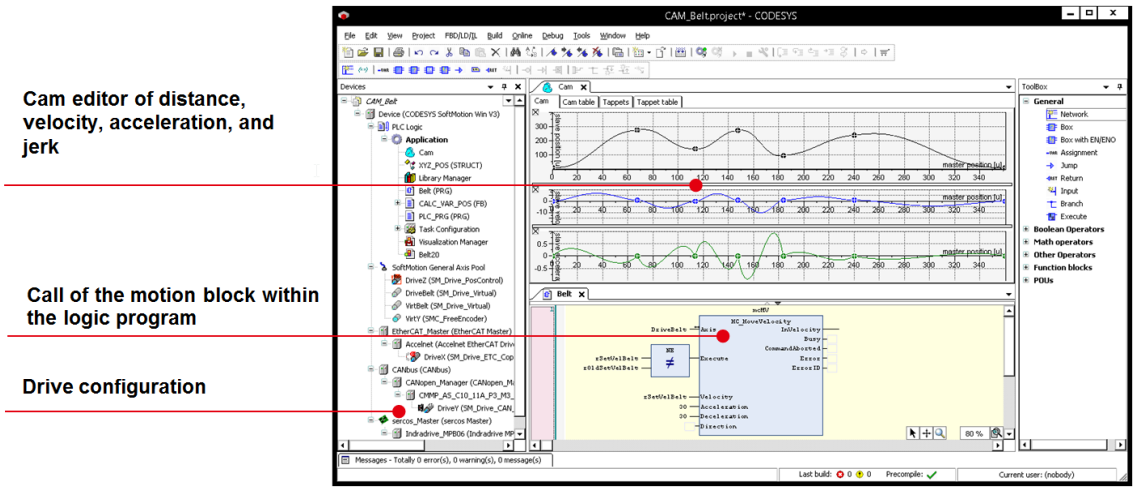
Scope of the SoftMotion library

- Certified function blocks according to PLCopen MotionControl, Part 1 (V2.0):
  - Absolute and relative positioning (MC_MoveAbsolute, MC_MoveRelative)
  - Superimposed positioning (MC_MoveSuperimposed)
  - Movement at constant velocity (MC_MoveVelocity)
  - Consistent support of jerk-limited profiles (continuous acceleration for any kind of interruption of the current motion)
  - Drive-guided homing (MC_Home)
  - Blocking stop (MC_Stop)
  - Control release (MC_Power)
  - Read and write parameters (MC_Read/WriteParameter)
  - Read actual position (MC_ReadActualPosition)
  - Position, velocity, and acceleration profiles (MC_*Profile)
  - Probe (MC_TouchProbe, MC_AbortTrigger)
  - Set and move position (MC_SetPosition)
  - Read actual velocity and actual torque (MC_ReadActualVelocity, MC_ReadActualTorque)
  - Cam switch (MC_DigitalCamSwitch)
  - Electronic gear with synchronization position (MC_GearInPos)
  - Full stop (MC_Halt)
  - Tracking of master signals while respecting limits for velocity, acceleration, and jerk (SMC_TrackSetValues)
  - Additional blocks
  - Control and query of the brake
  - Monitoring of the drag error, a position window, or maximum values
  - Distance measurement (also of modulo axes)
  - External definition of position, velocity, and target value from the application
  - Management of errors in the function blocks
  - Controller-guided homing
  - Operation of cams and cam switches
  - Definition of the specified target torque
  - Commissioning the drive
  - Absolute and relative positioning with transitional velocity (SMC_MoveContinuousAbsolute and SMC_MoveContinuousRelative)
  - Setting control mode to position, velocity, or torque
  - Override (MC_SetOverride)
  - Read future set values (axis position, velocity, and acceleration) (SMC_ReadSetValues)
  - Read the travel time until an axis position is reached (SMC_GetTravelTime)
- Visualization templates for the most important function blocks for fast commissioning with the visualization integrated in the CODESYS Development System
- Application programming interface for creating cams (library SM3_CamBuilder)

- Documentation of the library functions in the CODESYS Decelopment System and in the online help

Range of functions for the cam editor

- Graphical and numerical planning of cam tables
- Supported segment types:
  - Line
  - 5th degree polynomial
  - 7th degree polynomial
  - inclined sine
  - modified sine
- Configuration of tappets and their switching behavior in the cam
- Configuration of the cam regarding dimension, period, and continuity requirements



Picture 1: Using cam planning to create a motion project in the CODESYS Development System

Supported fieldbus systems and drive connections

- EtherCAT
- CAN/CANopen
- Virtual drives (for virtual axes and tests)
- Position control in the PLC by using PTt control for velocity-controller axes with position feedback (for example, frequency converter with encoder feedback, hydraulic axes with proportional valve, and position feedback)
- Logical axes as copies of other axes with independent offset and on-demand dead-time compensation / actual value smoothing
- Configuration of encoder axes that form any analog signal (for example, as the master axis for cams)

Tested drivers for the following drives

- EtherCAT:
  - Beckhoff EL2521 / EL5101 / EL72x1 / EL7031 / EL7037 / EL7041 / EL7047

- Bonfiglioli iBMD
- Bosch Rexroth IndraDrive CoE / ctrlX DRIVE CoE / ctrlX DRIVE SoE
- CMZ BD / LBD / SBD
- Control Techniques Digitax / Mentor / Unidrive
- Copley Accelnet
- Delta ASDA A2 / A3 / B3
- Delta R1-EC5621
- Festo CMMP EtherCAT
- Generic CiA 402 (also for multi-axis drives)
- Generic SoE (also for multi-axis drives)
- Hitachi ADV series
- Infranor XtrapulsPac
- JAT Ecovario
- KEB BD / F5 / H6
- KEBA KeDrive D3
- Kollmorgen AKD/ AKD Servodrive / AKD-N/C / MKD-N/C / AKD2G
- Metronix ARS 2000 series
- Mitsubishi Melservo MR-J5 / MR-JET
- Nidec Unidrive M
- Omron G5
- Panasonic MINAS A5B / A6B / A6 MultiDrive
- Parker compax3 / SBC / PSD
- Sanyo Denki RS2
- Schneider Electric Lexium32 / Lexium32i
- Servotronix CDHD
- Stäubli uniVAL
- Stöber Posidrive, SD6, SI6/SC6
- WEG SCA06
- Yaskawa Sigma7 series

• CAN/CANopen
- Bonfiglioli iBMD
- CMZ BD / SD / LBD / SBD / IBD(60) / NBD
- Festo EMCA / CMMP
- Generic CiA 402 (also for multi-axis drives)
- Infranor cd1-k / XtrapulsPac
- JAT Ecovario
- KEB BD / F5 / Stepless Technology
- Metronix ARS 2000 series
- Nanotec PD4C
- Schneider Electric Lexium05 / Lexium23 / Lexium28 / Lexium32 / Lexium32i / SD-3

General information

Supplier:

CODESYS GmbH
Memminger Strasse 151
87439 Kempten
Germany

Support:

Technical support is not included with this product. To receive technical support, please purchase a CODESYS Support Ticket.

https://support.codesys.com

Item:

CODESYS SoftMotion Axes (96)

Item number:

2305000021

Sales/Source of supply:

CODESYS Store
https://store.codesys.com

Included in delivery:

- CODESYS package with SoftMotion functionality
- License key

System requirements and restrictions

Programming System	CODESYS Development System V3.5.19.10 or higher
Runtime System	CODESYS Control Version 3.5.19.0 or higher
Supported Platforms/ Devices	All supported by CODESYS: • Real-time capable operating system platforms • CPU platforms with available FPU (Floating Point Unit) • Devices with integrated fieldbus (EtherCAT, CAN/ CANopen)
Additional Requirements	WIBU Codemeter Support SoftMotion Light works with CiA 402 compatible drives with CANopen or EtherCAT. Compatibility can be checked with the test project *SML_CompatibilityCheck_DS402.project*
Restrictions	-

Licensing	 Single device license: The license can be used on the target device/PLC on which the CODESYS runtime system is installed. Licenses are activated on a software-based license container (soft container), which is permanently connected to the controller. Alternatively, the license can be stored on a CODESYS Key (USB dongle). By replugging the CODESYS Key, the license can be used on any other controller.
Required Accessories	Optional: CODESYS Key

Note: Technical specifications are subject to change. Errors and omissions excepted. The content of the current online version of this document applies.

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