CODESYS Control RTE SL

CODESYS Control RTE SL is a real-time software PLC for PC-based industrial controllers under Windows - programmable with the IEC 61131-3 development System CODESYS.

Technical description

Document version applies to product version: 3.5.22.20

Product	Real-time software PLC for PC-based industrial controllers under Windows, programmable according to IEC 61131-3 with the CODESYS Development System
Delivery form	Windows Setup (Setup.exe, 32-bit and 64-bit installer included)
Article number	2302000000
Licensing	Application-based licensing (since V3.5.20.0)
Demo / test mode	2 hours runtime; manual restart required afterwards

System requirements

Operating system	Windows 10 / Windows 11 / Windows IoT Enterprise Only Microsoft-maintained versions are supported.
CPU architecture	x86 (32-bit) and x64 (64-bit), multicore CPU required
RAM (minimum)	1 GB (TODO: konkreten Wert durch QS bestätigen lassen)
RAM (recommended)	4 GB or higher (TODO: konkreten Wert durch QS bestätigen lassen)
Disk space (minimum)	1 GB free disk space (TODO: konkreten Wert durch QS bestätigen lassen)
Hyperthreading	Not supported – must be disabled in BIOS
Efficiency Cores (E-Cores)	Not supported – must be disabled in BIOS
CPU virtualization (VT-x / AMD-V)	Must be disabled in BIOS, or the Windows features “Virtual Machine Platform” and “Hypervisor Platform” must be deactivated
Container / virtual machine	Not supported – the real-time kernel requires direct hardware access not available in containers or VMs
Windows power scheme	“High Performance” / “Always on” required; Fast Startup and Hibernate must be disabled

Windows Update	Automatic updates must be disabled (uncontrolled reboots affect availability)
Network interfaces	NICs used by the RTE must not be set to power-saving / sleep mode
Programming system	CODESYS Development System V3.5 SP19 Patch 1 minimum (V3.5 SP20 or higher recommended)
Required 3rd party software	Npcap driver (required for Ethernet-based fieldbusses, see footnote 2)

Supported hardware

Ethernet chipsets	• Realtek • Intel Pro1000 compatible • Intel i210 / i225 / i226 (2.5G)
CAN interface cards (PCI / PCIe)	• Peak: PCI, PCIe, MiniPCIe (SJA1000-based) • Ixxat: SJA1000 (PCI card) • Automata: all PCI cards (1- and 2-channel) • Innodisk: PCIe CAN adapter • HMS: passive CAN cards
PROFINET hardware (Hilscher)	PROFINET Controller: Hilscher CIFX or netX 100/500 with firmware 3.x

Real-time properties

Real-time kernel	Proprietary real-time kernel included – no additional hardware or OS extension required
Jitter (typical, suitable hardware)	< 20 µs
Shortest known cycle time	250 µs (on suitable hardware)
Task pinning to isolated cores	Available with application-based license tiers Standard L, Performance M and Performance L

IEC 61131-3 programming

Programming languages	IL, ST, FBD, LD, SFC, CFC
IEC 61131-3 standard library	Yes
POU types	PRG, FB, FUN, GVL, DUT, INTERFACE
Object-oriented programming	Classes / function blocks with methods, properties, interfaces, inheritance and polymorphism
Pointers and references	POINTER TO, REFERENCE TO, including interface references
Data types	Standard IEC types, STRUCT, UNION, ENUM, ARRAY (incl. variable-length arrays)

Compile-time features	Attribute pragmas, conditional compilation, library namespaces
Number of IEC tasks / POUs	Not restricted (depends on application-based license tier)

Functions

Online change	Yes
Retain / Persistent data	Yes (hard disk / flash card / battery-buffered SRAM card)
User management	Yes
Encrypted communication (TLS)	Yes
Breakpoints / debugging / Write / Force	Yes
Trace / Trend	Yes
Alarm Manager / Recipe Management	Yes
CAA libraries	Yes
Block driver (CAN, Serial, UDP, TCP)	Yes
Operation mode (run/stop switch)	No
Device logbook	Yes
GIT support	Yes (via CODESYS Git add-on)
SL Extension Package	Not supported

Communication / Interfaces

OPC UA Server	Yes [1)]
OPC UA Client	Yes
OPC UA PubSub	Yes
MQTT	Yes
Network variables	Yes
SNMP	Yes
Symbol configuration / Data Source manager	Yes
CODESYS PLCHandler	Yes (API for external visualization / diagnostic tools)

Fieldbusses

CANopen Manager / Device	Yes
EtherCAT Master (incl. Distributed Clocks)	Yes [2)]
EtherNet/IP Scanner / Adapter	Yes [2) 3)]
J1939	Yes
Modbus TCP Master / Slave	Yes [2)]

Modbus Serial (RTU) Master / Slave	Yes
PROFINET Controller / Device	Yes [2)]
Sercos III Master	Yes
IO-Link Master	Yes
BACnet	Yes
KNX	Yes

Other fieldbusses on request.

Visualization

Local target visualization	Included; activation depends on application-based license tier
Remote target visualization	Included; activation depends on application-based license tier
Web visualization	Included; activation depends on application-based license tier

License modules

All functions described in this datasheet are technically part of the CODESYS Control RTE SL runtime. Their activation requires a license: either via the application-based license tier (see table below) or via a dedicated CODESYS Store license module. The following modules license individual functions independently of the application-based tier:

License module	Function activated
CODESYS IIoT Libraries SL	IoT library function blocks (REST, JSON, MQTT, web client, e-mail, …)
CODESYS BACnet SL	Building automation via BACnet
CODESYS KNX SL	Building automation via KNX
CODESYS OPC UA PubSub SL	OPC UA Publish/Subscribe
Third-party products approved for RTE	Functions provided by approved third-party CODESYS-compatible products

[1)] Local OPC UA connections from the RTE to a client on the same host are limited in performance due to system constraints and cannot be further optimized.

[2)] Requires the Npcap driver to be installed on the Windows system.

[3)] Known limitation: the platform does not pass the EtherNet/IP conformance test.

Note

Use the free **Device Reader** tool (included in the CODESYS Development System) to verify the supported features of a specific hardware platform.

Detailed BIOS and Windows configuration recommendations are provided in the Hardware Configuration section of the CODESYS Online Help.

Compatibility

Use case	Supported
Newer runtime system loads older boot projects	Yes
Older runtime system loads newer boot projects	No

Application-based license tiers (since V3.5.20)

License	I/O ch.	Fieldbus instances	Task pinning	Notes
Basic S	64	none	No	Smallest applications
Basic M	128	2x CAN/Modbus/J1939	No	
Basic L	256	2x CAN/Modbus/J1939	No	
Standard S	512	1x Ethernet-based + 4x CAN/ Modbus/J1939	No	
Standard M	2048	1x Ethernet-based + 8x CAN/ Modbus/J1939	No	
Standard L	4096	2x Ethernet-based + 10x CAN/ Modbus/J1939	Yes	
Performance M	8192	4x Ethernet-based + 12x CAN/ Modbus/J1939	Yes	
Performance L	16384	8x Ethernet-based + 16x CAN/ Modbus/J1939	Yes	

Note

All application-based licenses include 5 years of free software updates from the date of purchase.

Standards and Conformance

Standard / Specification	Conformance
IEC 61131-3	Programming according to IEC 61131-3 (IL, ST, FBD, LD, SFC, CFC)
PLCopen Motion Control	Compliant via CODESYS SoftMotion (activation through application-based license tier)

Disclaimer

Performance figures (jitter, cycle time) given in this datasheet are example values measured under laboratory conditions on suitable hardware. They do not represent a guaranteed property. Validation of real-time and performance characteristics on the actual target hardware is the responsibility of the user.

Deterministic real-time behavior is only ensured when the BIOS and Windows configuration requirements listed in this datasheet are observed. File I/O, OPC UA Server, Web Visualization,

logging and Online Change are not real-time capable and must not be used from time-critical IEC tasks.

Restrictions stated in this datasheet are part of the contract. Properties that are not explicitly documented are not warranted.

Further information

CODESYS Online Help

CODESYS Store

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 Control RTE SL

Item number:

2302000000

Sales/Source of supply:

CODESYS Store
https://store.codesys.com

Included in delivery:

Windows Setup (Setup.exe, 32-bit and 64-bit installer included)

System requirements and restrictions

Programming System	Minimum CODESYS Development System V3.5 SP19 Patch 1 (recommended V3.5 SP20 or higher)
Runtime System	Minimum CODESYS Control RTE SL V3.5 SP19 Patch 1 or higher
Supported platforms and devices	Supported Windows Versions: Windows 10 / 11 / IoT Enterprise 32Bit or 64 Bit, with Multicore-CPUs The versions maintained by Microsoft are supported.
Additional Requirements	Installation of CODESYS Control RTE SL
Restrictions	Not released for use in containers or virtual machines (VMs)! Hyperthreading is not supported a and must be deactivated The following CAN-PCI cards are supported: • Peak PCI: PCIe, MiniPCIe (SJA1000-based) • Ixxat: SJA1000 (PCI card)

	• Automata: all PCI cards (1 and 2 channel) • Innodisk: PCIe CAN adapter • HMS: passive CAN cards The following Ethernet chipsets are supported: • Realtek • Intel (Pro1000 compatible) • Intel i210/i225/i226 (2,5G) Following Hilscher hardware is supported: • PROFINET Controller: Hilscher CIFX or netX 100/500 controller with firmware 3.x Efficency Cores (e-cores) are not supported and must be deactived
Licensing	 Application based license: The CODESYS Control SL runtime system can be licensed with an application-based license. The license is activated on a software-based license container (soft container) that is permanently bound to the device. Alternatively, the license can be stored on a CODESYS key (USB dongle). The size and functional scope of the IEC application are licensed. See the table of license tiers in the technical description. The license is activated on a software-based license container (soft container) permanently linked to the controller, or stored on a CODESYS Key (USB dongle) for portable licensing. Note: Without a license, the software runs in demo mode for two hours. After that, a manual restart is required.
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.

Creation date: 2026-09-24