



BOSCH

Bosch Connected Industry

Nexeed Automation

Automation reimagined

**Reading
sample**



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Introduction

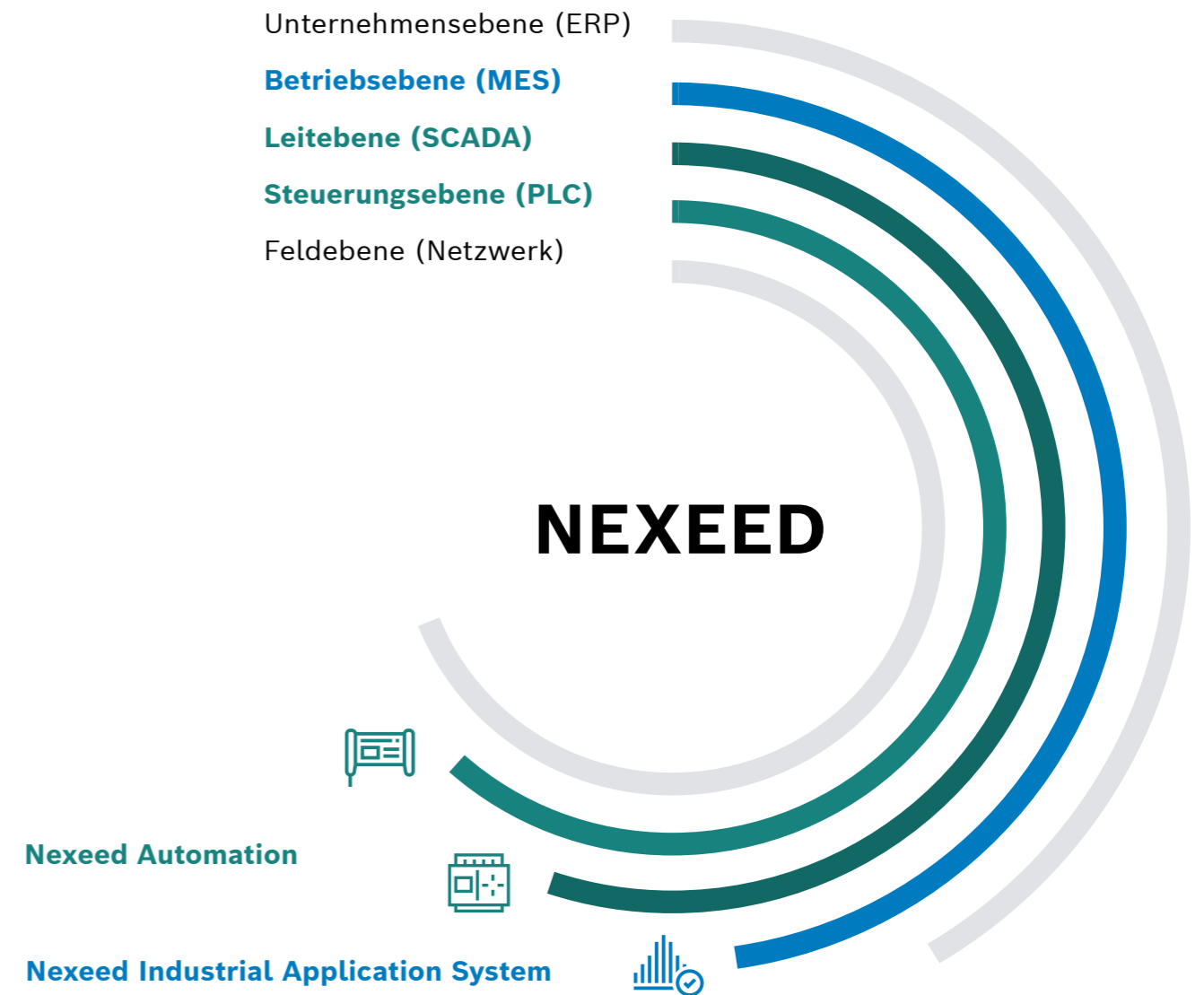
Bringing together software and services for industry 4.0

With the NEXEED portfolio, Bosch Connected Industry offers IIoT software and services for mechanical engineering and manufacturing. The focus is always on users: Every solution is designed to make their daily lives easier. Bosch Connected Industry continues to develop its NEXEED portfolio at locations in Germany, Hungary and China. This portfolio includes the manufacturer-independent automation platform Nexeed Automation and the modular Nexeed Industrial Application System for networked production.

Customers receive solutions for numerous use cases, retrofit solutions for existing systems as well as a wide range of services such as consulting, technical support, qualification and implementation support. This catalog introduces our software and hardware systems for the Nexeed Automation platform.

To learn about the full NEXEED portfolio, visit our website at:
www.bosch-connected-industry.com

Unternehmensebene (ERP)
Betriebsebene (MES)
Leitebene (SCADA)
Steuerungsebene (PLC)
Feldebene (Netzwerk)





Nexeed Automation

Shaping the future today



Digitalization carries clear expectations: Transparency and efficiency along the entire value stream. This is ensured by intelligent software solutions and services, which we at Bosch Connected Industry have combined in a comprehensive portfolio under the name NEXEED. With NEXEED, we have one main goal: To support you in the best way possible with regard to the digitalization and networking of your production. The Nexeed Automation automation platform ensures greater efficiency and availability in mechanical and systems engineering. Product complexity and the diversity of product variants are constantly increasing. Machine operators and manufacturers are always looking for new concepts and solutions for flexible

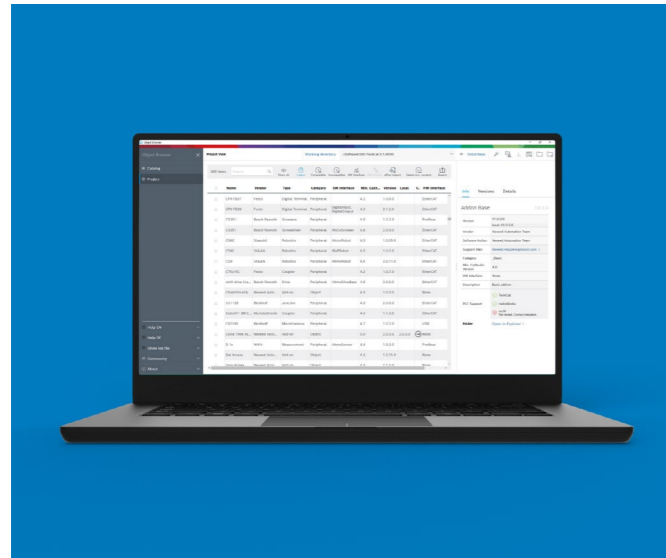
production. The reason: Frequent product changes and individualization from batch size one—with constant quality and at competitive prices—represent considerable hurdles in the production process. The need for future-oriented, efficient and user-friendly software and hardware solutions in the automation environment is therefore constantly increasing. Fixed processes must be replaced by flexible processes that can be controlled and directed by higher-level IT systems. At the same time, the requirements of software and hardware are becoming more and more diverse. Modern, networked control technology and the efficient handling of machine data are decisive success factors for mechanical and plant construction.

This is exactly where Nexeed Automation comes into play. With our software and hardware system packages, you can implement your systems and machine projects in assembly, testing and process technology in a targeted and efficient manner. There is no need for in-depth programming knowledge or system-level expertise in aspects such as fieldbus, HMI or robotics: In addition to the actual control programming, our solution enables you to implement visualization tasks, motion control, safety, MATLAB, testing and measurement technology exactly as needed. The commissioning and maintenance of existing systems can also be carried out quickly with Nexeed Automation. Continuity and compatibility are

particularly important to us, which is why we enable a high degree of consistency and reuse in operation. With Nexeed Automation, we create real added value for machine operators and machine manufacturers.

Nexeed Automation Portfolio

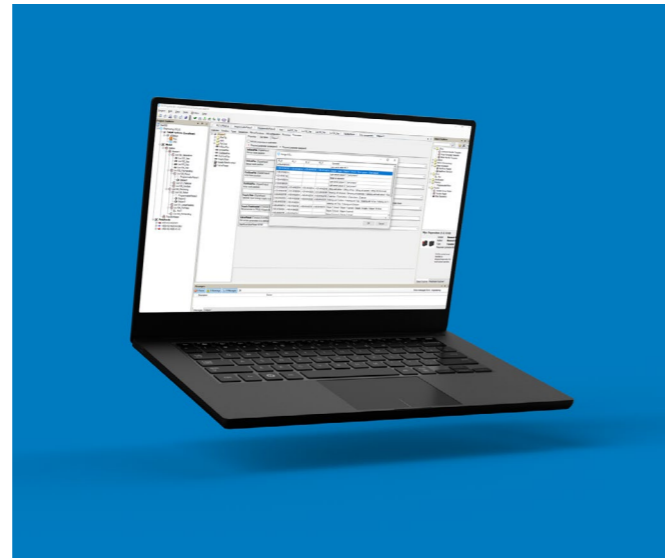
Our customer journey



Planning

Mechatronic Planning

- Control plus Objects**
- Control plus Object Browser**
- ECAE (Toolbox)**



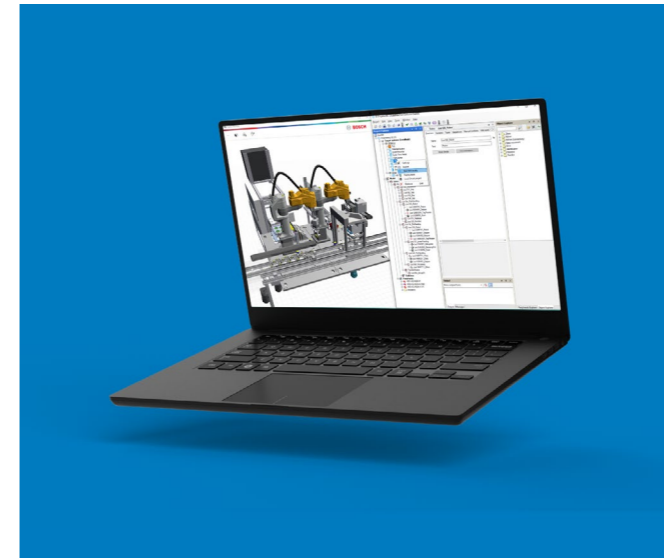
Engineering

Engineering Framework

- Control plus Object Library**
- Control plus Object Browser**
- Control plus Studio**
- Control plus PLC Framework**
- Control plus HMI Editor**
- Control plus Machine Hub**

Technology Packages

- Integrated Vision**
- Integrated Robotics/Robotics Vision Interface**
- Integrated Dispensing**



Testing

Simulation

- 3D Simulation**



Operation

Operation

- Control plus HMI**
- Diagnostics
 - Part Counter app**
 - Shift Manager app**
 - Event Recorder app**
- Assistance Systems
 - Virtual Assist**
 - Augmented Assist**
 - Cycle Time Assist**
- Applications Analysis
 - Cycle Time Analysis**
- Device Management
 - Device Portal**

Nexeed Automation software products and services provide comprehensive support to users. The entire development process – from planning and development to testing and operation – is covered: All involved parties – including project engineers, electrical designers and programmers – can be sure that all phases will fit together smoothly and that the data flow and continuity will be ensured at all times. The illustration above shows which products or components are used in which phase to ensure the efficiency of the project process.

References

Our Customers



The companies listed as references are trained in Nexeed Automation and have many years of experience in successful project implementation.

We'd like to extend our gratitude for the good, fair working relationships we've maintained.

We will be happy to support you

Our contacts



Our customer service team will always be happy to answer any questions you may have about Nexeed Automation and Bosch Connected Industry.

Are you planning a mechanical engineering project and need help with the software concept? Are you already in the middle of the project and need support with

development? Do you just want a hardware offer? Or would you like to develop and roll out a training concept for your associates?

Our customer advisors are ready to help you with all these topics and many more.

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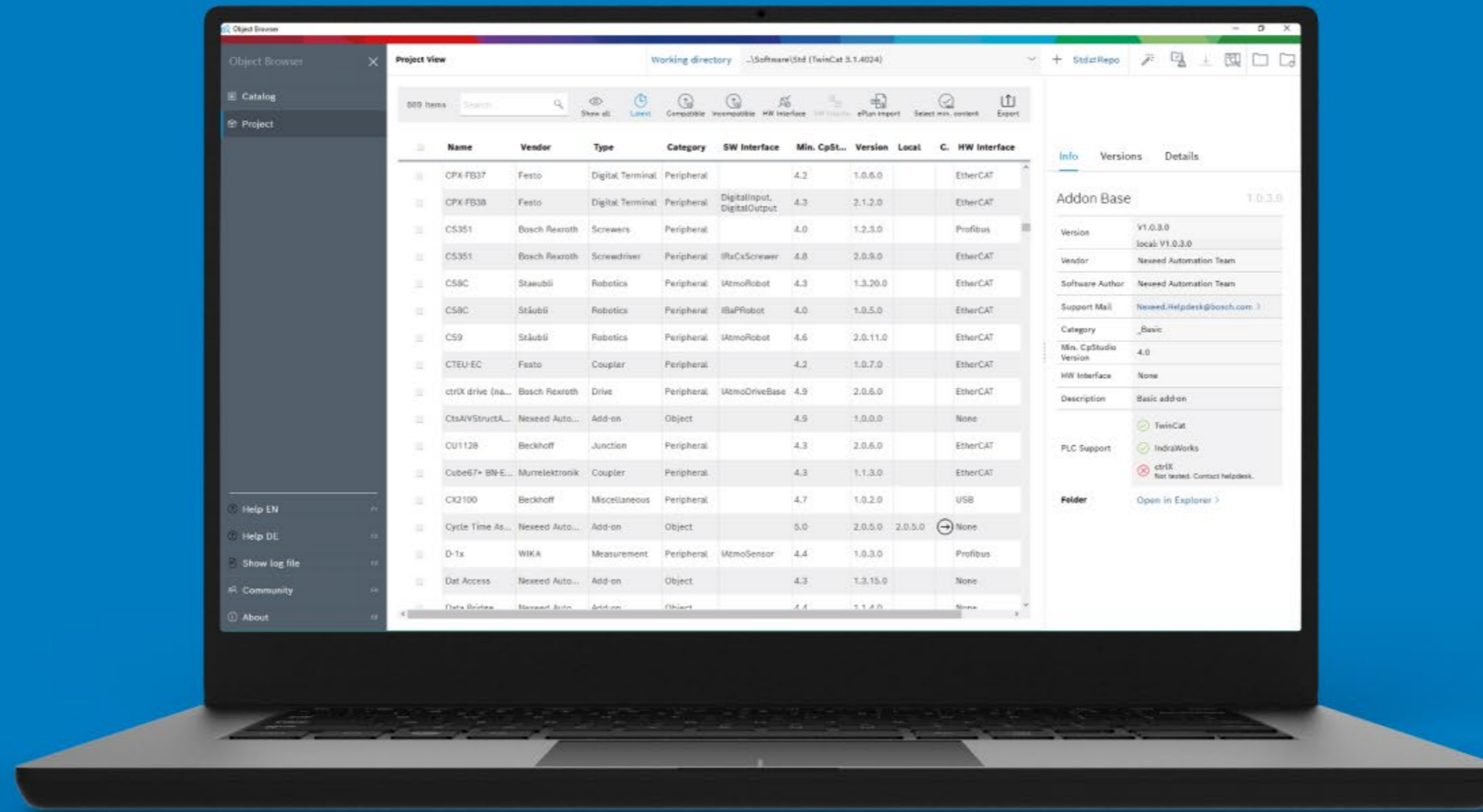
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01 Planning

A holistic approach to special-purpose mechanical engineering

Mechatronic Planning

Control plus Objects

Control plus Object Browser

ECAE

Project success and efficiency in control technology/ automation are based on cross-trade cooperation and good planning. Nexeed Automation provides modules that support both collaboration and planning.

Planned reuse is a success factor for reducing the duration of projects and minimizing risk in the software project. In this context, Nexeed Automation delivers 2 aspects:

One aspect is the planning of the reuse of software objects—self-contained software consisting of a PLC module, HMI view, EPLAN macro, error texts—even during the configuration of the machine. The base system already includes a large repository of device

objects for planning reuse at an early stage. In addition, users in mechanical engineering can encapsulate any module of their project, e.g. processes, into an object, manage it and reuse it in other projects.

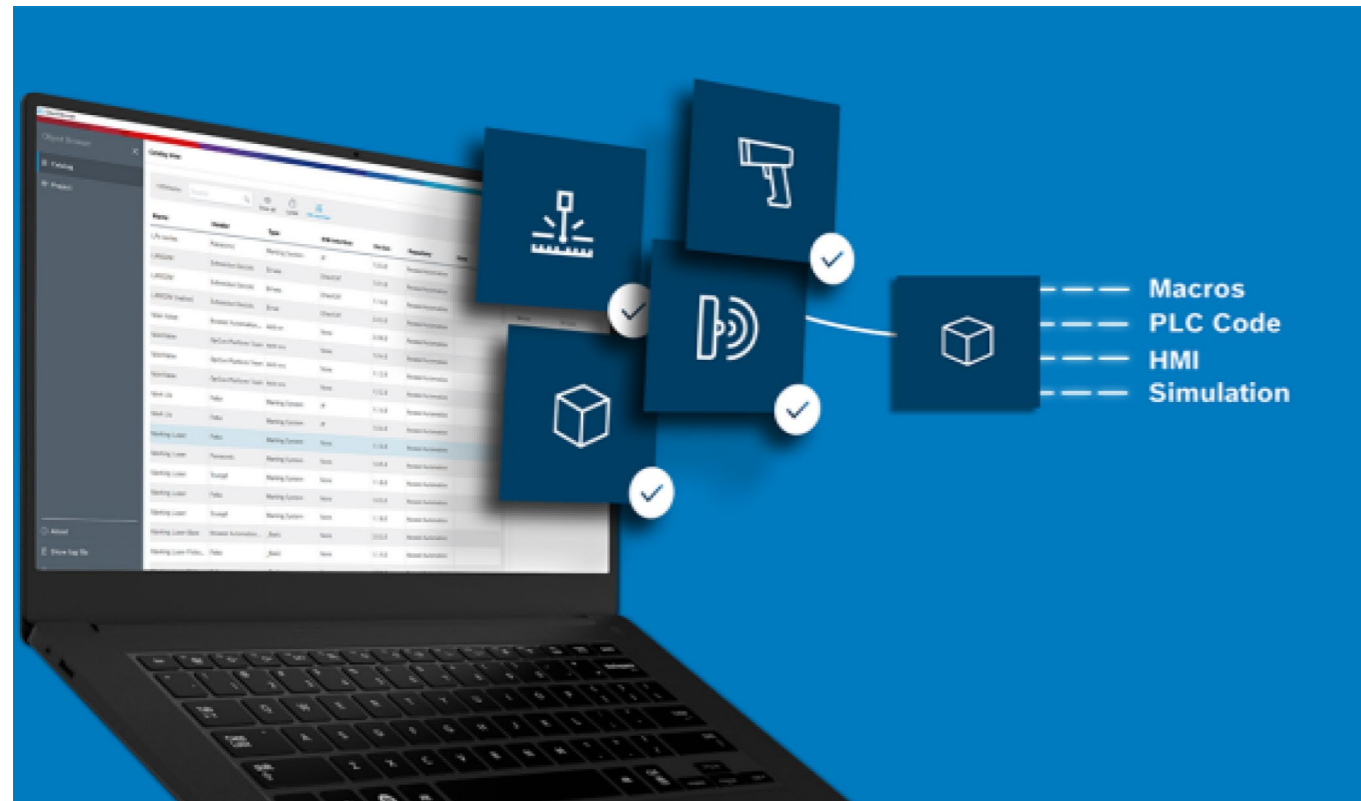
Another aspect is the reuse of engineering data that has already been developed prior to software development. This includes the option of transferring electrical design data from EPLAN.



Mechatronic Planning

Control plus Objects

Reusable functions



Device software objects contain all the necessary elements and are easy to find.

Defining devices and functions once and packing together everything that belongs to them and making them easy to reuse – this is the idea behind Control plus objects. Devices and functions can be used quickly and easily without in-depth expert knowledge and ensure consistency and enhanced quality.

What are device modules?

The central development tool Control plus Studio enables you, as a machine builder, to build your machine projects – regardless of the controller manufacturer. You can integrate and parameterize your device objects using drag and drop, configure a process-specific machine visualization, define information services and diagnostic functions, and generate your code. By means of central, one-time data entry for control, visualization and data management, development times

can be reduced by up to 50 percent. In addition to the Control plus Studio development tool, the base system offers a wide range of self-contained, tested and reusable objects. Well over 1000 device objects are already mapped in the object library. These objects are managed in the library, regularly extended by updates and kept up to date.



Your advantages at a glance

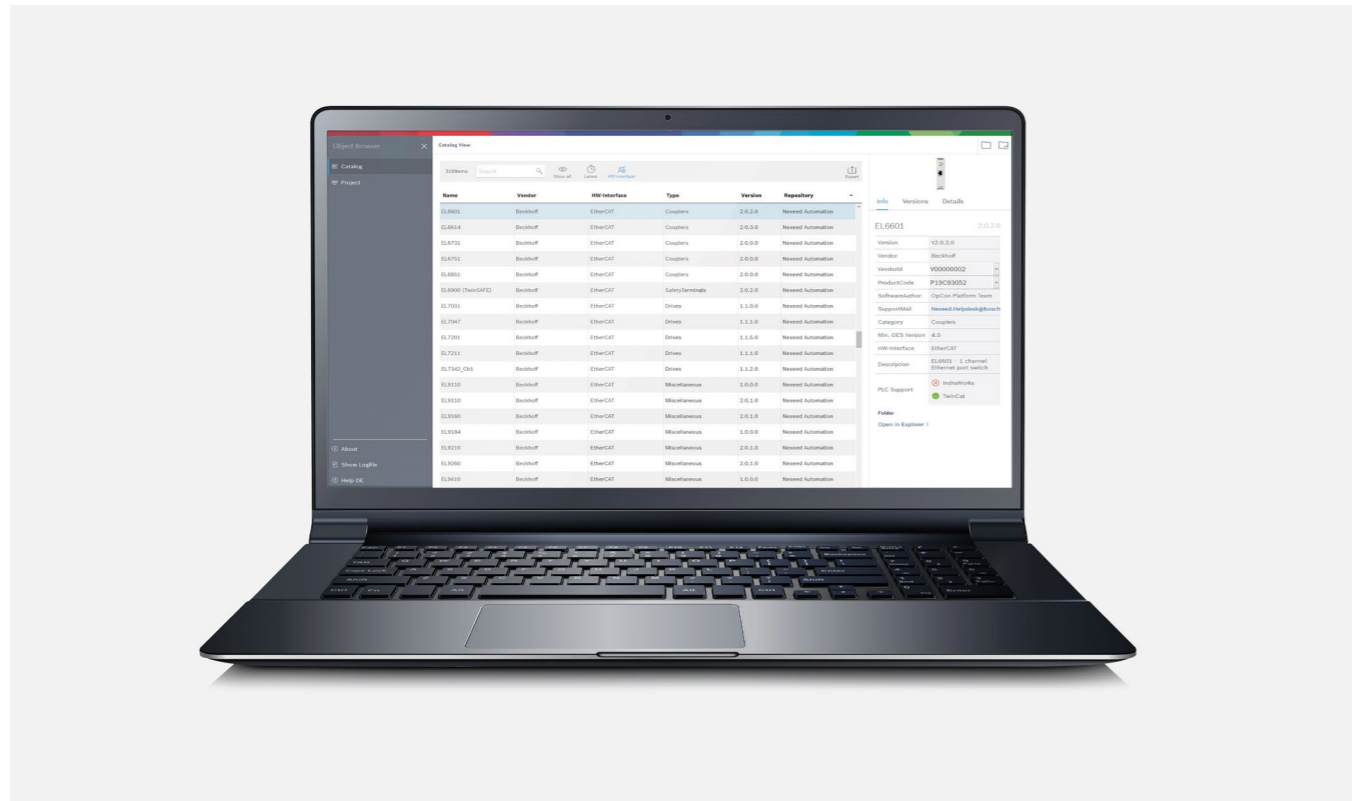
- ▶ Improve speed with tested control libraries, PLC code, out-of-the-box HMI views, documentation, and more
- ▶ Thanks to tested device software objects that undergo multiple use, fewer potential sources of error arise in a machine application
- ▶ The use of prepared device software objects reduces the time and cost risk for unplanned adaptation work during the machine application.

✔ Included in the Control plus runtime license

Mechatronic Planning

Control plus Object Browser

Find software objects easily and accurately



Clear structure in the Control plus Object Browser

The Object Browser allows you to manage software objects, compile them for Control plus Studio projects and update them as the project progresses.

In addition to our central Object Library, you can also manage other libraries in the Object Browser, such as customer-specific software objects. This makes it easy to keep your projects up to date.

A search function makes it easy to find the objects you need. General descriptions of the objects, as well as their version history, documentation and information on parameters, provide further support when deciding which object to use. In addition, the Object Browser offers options for importing the EPLAN data of your machine project. The imported data is compared with the linked Object Library and selected accordingly.

This allows you to directly assemble the objects for your project and use them in Control plus Studio without the need to search.

The Object Browser offers you two different views depending on the project phase you are in: the catalog view and the project view.

The catalog view – machine manufacturers

In the configuration and planning phase, the Object Browser provides the machine manufacturer with an insight into the available objects. This forms the basis of a better cost estimate, as it is possible to see at a glance which devices objects are already available for.

The project view – machine developers

Using the project view, programmers can assemble the required components of a project very easily. The comparison function shows the difference between the objects in the project and the object library at any time. This allows you to view version differences at a glance. The change history of each object makes it easier to decide on an update.



Your advantages at a glance

- ▶ Cost savings through reuse
- ▶ Risk minimization through the use of tried-and-tested software objects
- ▶ Flexibility and independence through integration of internal software objects
- ▶ Overview of existing software objects and projects
- ▶ Large selection of objects for device connection for the controller, including user interfaces for the HMI



✔ Included in the Control plus runtime license

Mechatronic Planning

ECAE

Easily create and transfer electrical circuit diagrams



A sample circuit diagram, which can be used to create electrical diagrams in EPLAN

The ECAE toolbox from Nexeed Automation offers the perfect package for ensuring the straightforward creation of electrical diagrams in EPLAN and the seamless transfer of information to software programmers.

In addition to an up-to-date sample circuit diagram, a macro library is also available. This contains a constantly updated and expanded collection of macros that are suitable for objects from the Control plus Library. These two components ensure that electrical circuit diagrams for Control plus projects can be created quickly and easily.

The interface for the Control plus engineering environment provides programmers with a simple method of exporting configured devices. After importing the created file into Control plus Studio, extensive information is immediately made available in the

engineering environment, including the bus setup, configured devices and interface texts in several languages. This ensures an efficient toolchain and simple interaction between the electrical designers and programmers, saving a great deal of effort.

A validation function is also integrated directly into EPLAN that can be used to test the electrical plan at any time. In addition to pre-selected rules, custom test rules can also be created.

The ECAE package from Nexeed Automation consists of the following components:



Nexeed sample circuit diagram



Macro library



Integration of macros in Object Browser



EPLAN AML ProjectCheck



EPLAN-AML export interface



Control plus AML import interface



Your advantages at a glance

- ▶ Get started with construction more easily thanks to the Nexeed Automation sample circuit diagram
- ▶ Fast EPLAN creation by means of pre-fabricated and tested macros
- ▶ Clearly structured overview of macros in the Object Browser
- ▶ Validation function (AML ProjectCheck) integrated into EPLAN with pre-selected and configurable test rules
- ▶ Efficient toolchain thanks to EPLAN export and AML import interface

The license is annual and requires the engineering dongle.

① ECAE Toolbox 365* engineering license

Article no. 3800.590.170

Article designation NXA-LC-ECAE-365

Price (excl. VAT/RRP)

For 1 unit €8,775

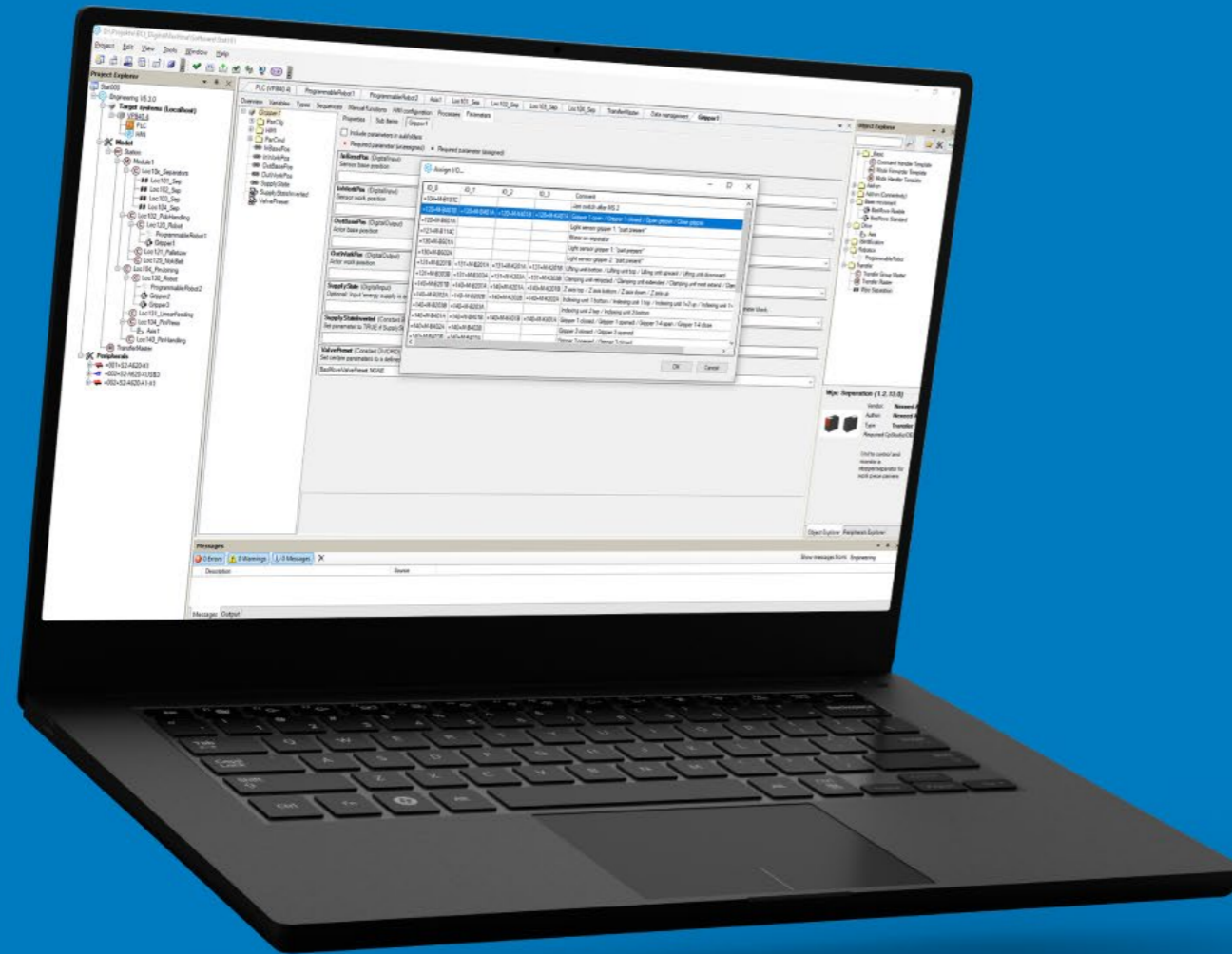
For 5 units €20,925

Engineering dongle

Article no. 3800.590.273

Article designation NXA-LC-Engineering Dongle

Price (excl. VAT/RRP) €379



02 Engineering

Automation reimagined

Engineering Framework

Control plus Object Library

Control plus Object Browser

Control plus Studio

Control plus PLC Framework

Control plus HMI

Control plus Code Checker

Control plus Machine Hub

Technology Packages

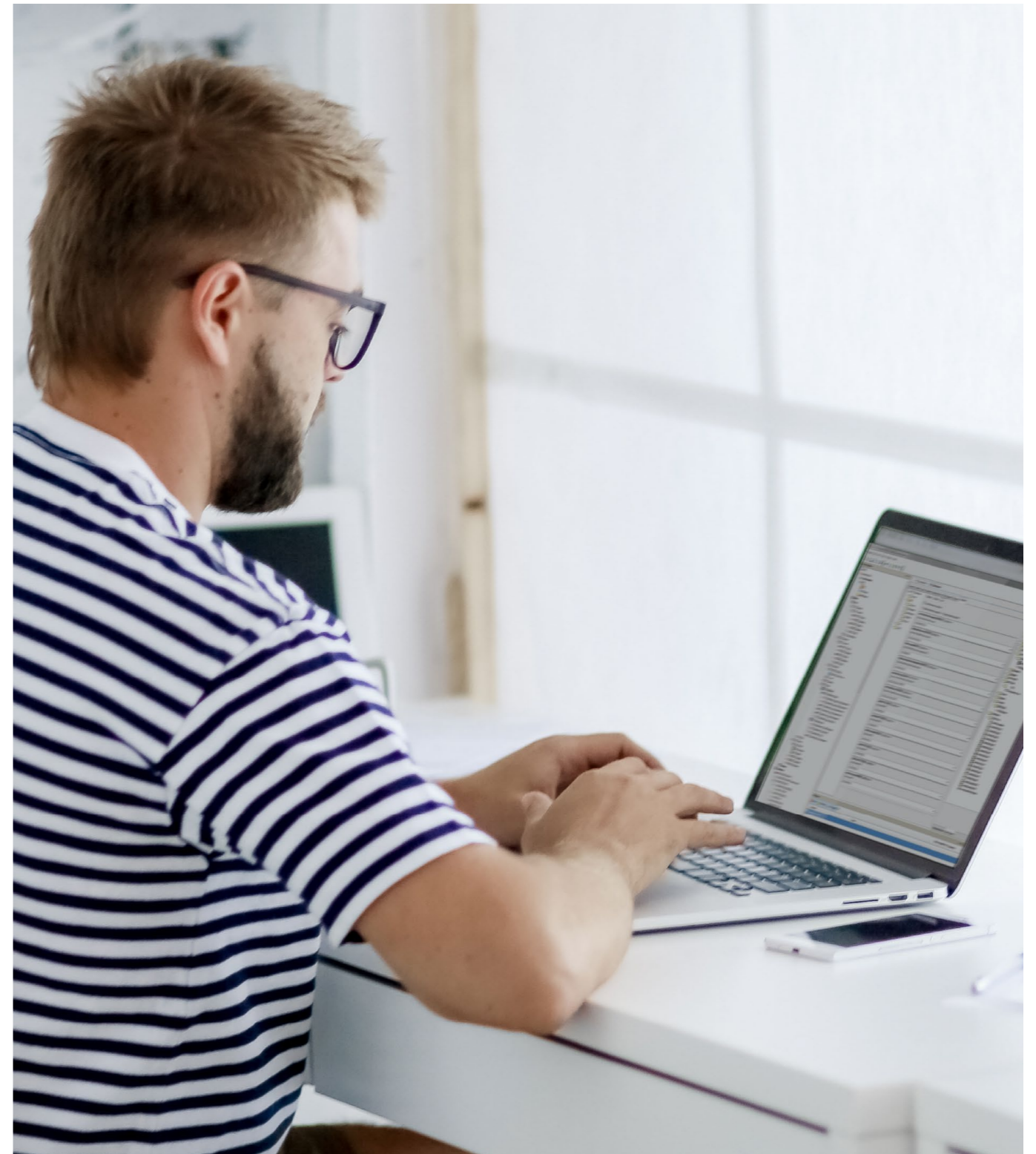
Integrated Vision

Integrated Robotics/
Robotics Vision Interface

Integrated Dispensing

Control plus is built on a base system, the Engineering Framework, and is supplemented by Technology Packages. The Engineering Framework comprises all the basic functions required to handle the software project: Libraries, tools for integrating the libraries, and the engineering tool, including the software for PLC and HMI. Quality assurance tools and the Machine Hub interface concept round off the base system. Technology packages can be added to the base system that provide added value for the development and operation phases.

The packages are preconfigured and only need to be enriched with the purely specific process content of the machine.



Overview

Engineering Framework

Control plus Object Library

Control plus Object Browser

Control plus Studio

Control plus PLC Framework

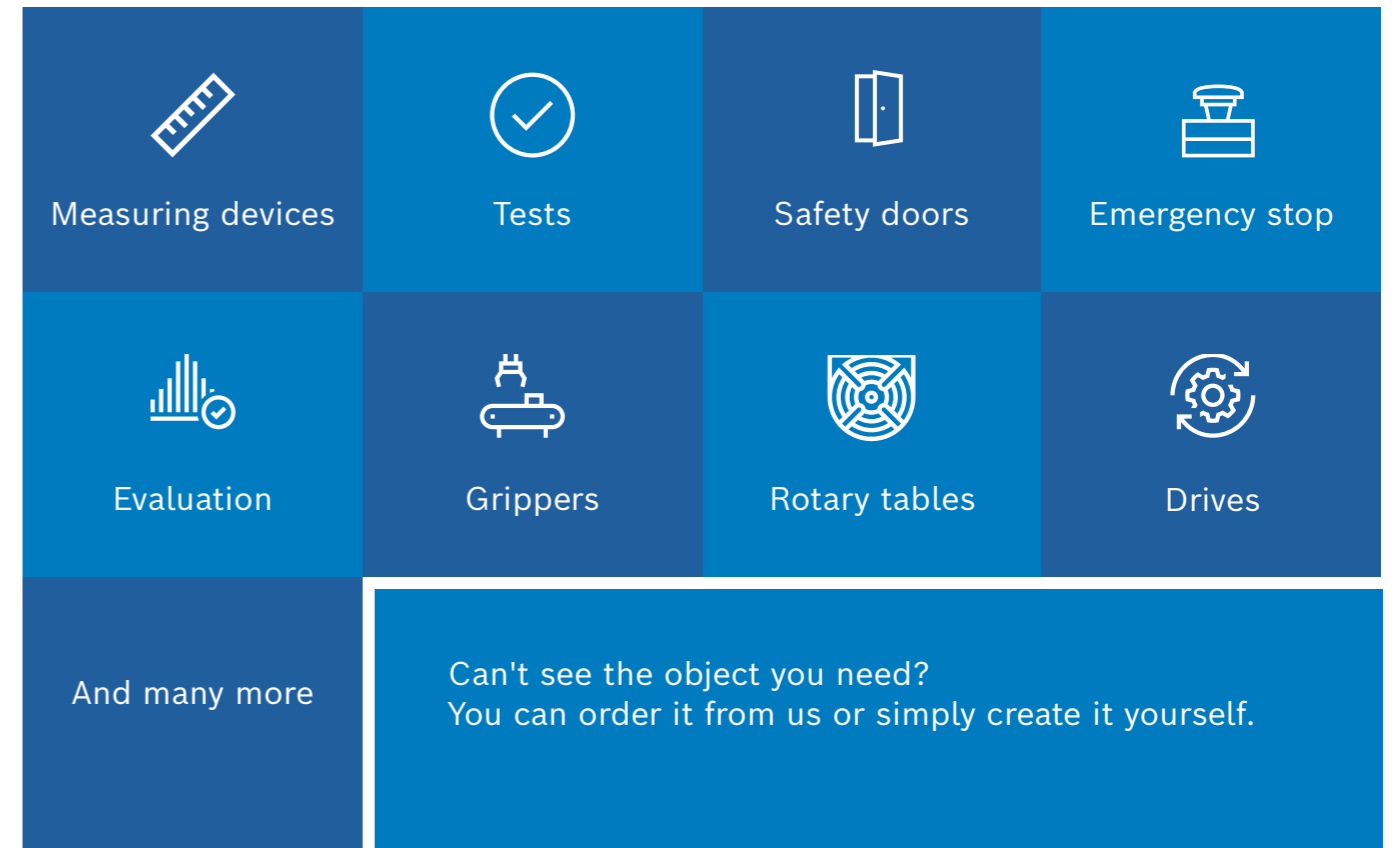
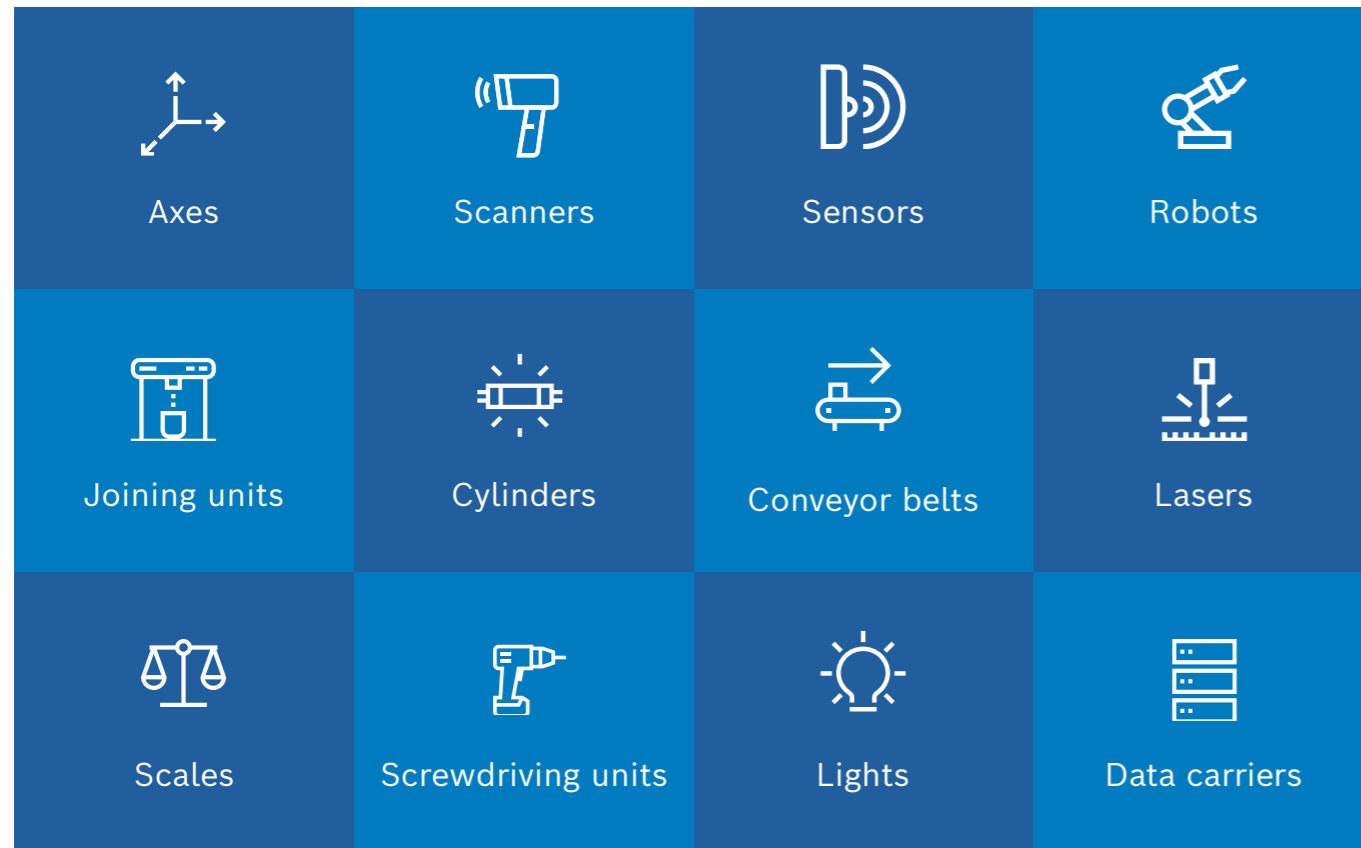
Control plus HMI Configurator

Control plus Code Checker

Control plus Machine Hub

Control plus Object Library

Modular system for efficient device connection



Part of the Control plus engineering environment is the Object Library, which has well over 400 self-contained, tested and reusable objects for device connection. These can be easily used without device-specific expert knowledge. From drive axes and conveyor belts through to measuring and analysis hardware, our Object Library will provide you with access to devices from numerous manufacturers.

The objects are managed within the Object Library and always kept up to date with the latest version. Using the objects allows you to effectively reduce development time and costs.

Regardless of their source, objects can be installed in the project via drag-and-drop and used directly in sequence chains (SFC). This means that your projects can be implemented quickly and easily with precisely those objects that are needed. If a device object you

require is missing from our Object Library, you are welcome to contact us or develop the object yourself. Object development (course ID OP188) is available in an expert training course that builds on the basic programming training (course ID Op120/Op126). All Control plus device objects relate to a specific device version with a specific firmware. After release, the objects are subject to the "Released" status for 4 years before changing to the "Unsupported" status.

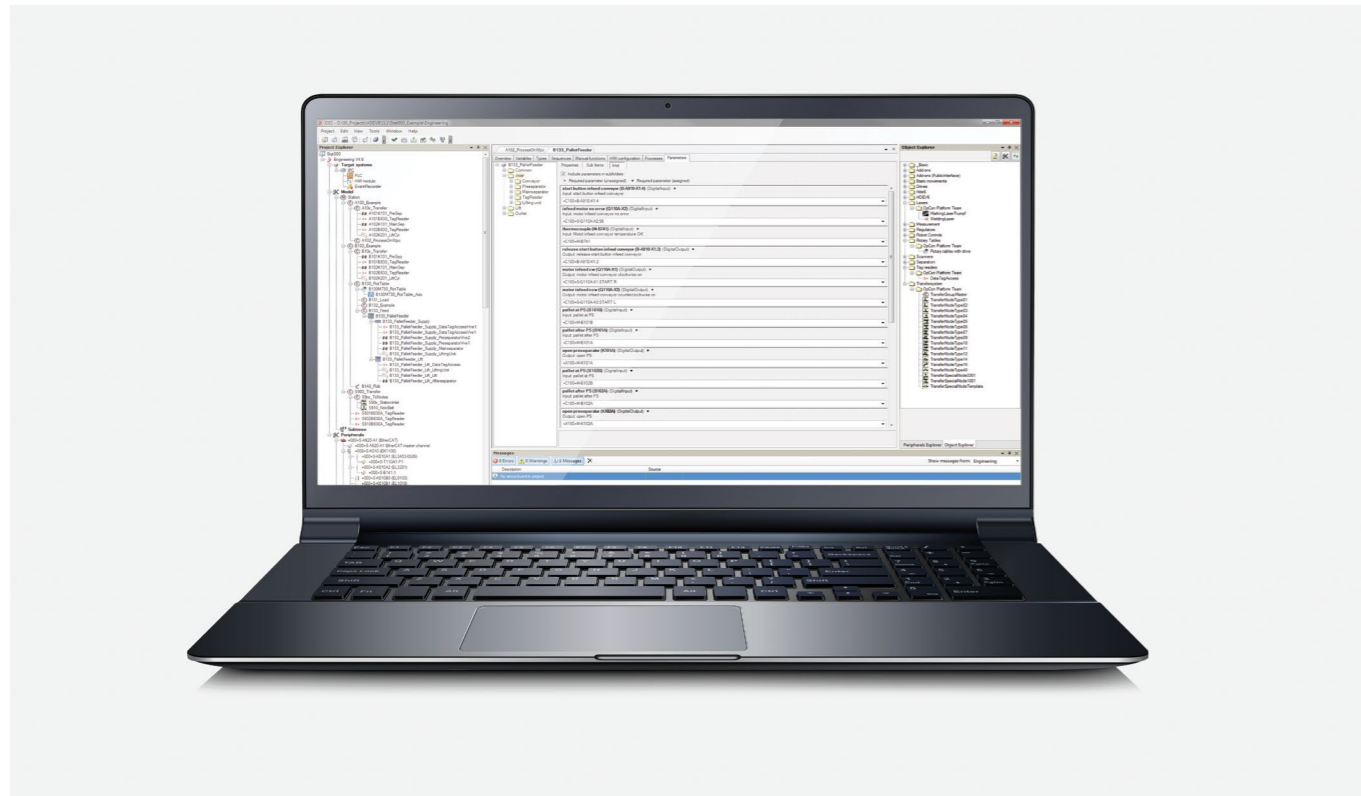
With the maintenance option, the object is continuously tested against modified firmware versions and extended accordingly for a further 4 years.

The Object Library can be viewed via the Object Browser (see section 1).

✓ Included in the Control plus runtime license

Control plus Studio

Project structure from A to Z

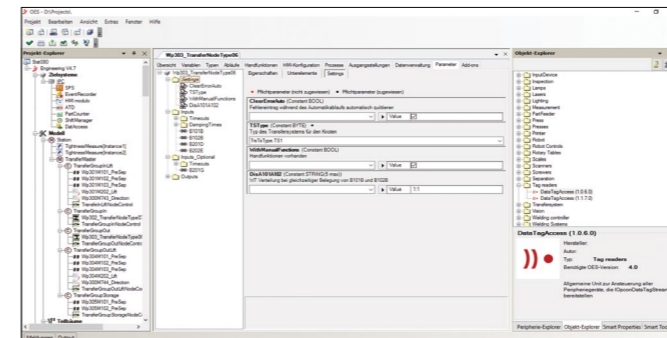


Project configuration in the engineering environment

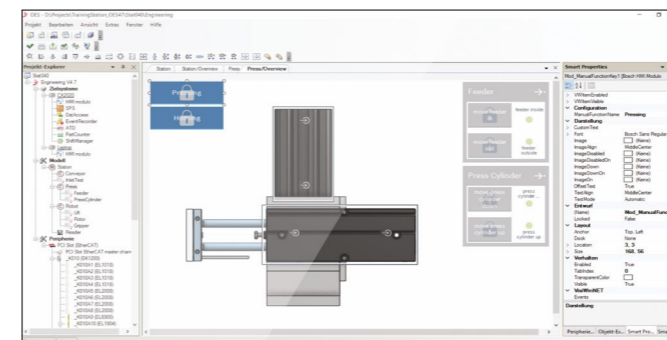
Control plus Studio is the central tool for creating your machine software and user interfaces for machine visualization. Using standardized modular elements, you can model your machine and thus generate a large part of the control code and the user interface. This reduces a lot of tedious, monotonous work and reduces the development time for your machine.

Control plus Studio offers programmers all available modular elements. These can be installed by the programmers in a machine model that reflects the functional layout of the machine. The model serves as the basis for generating PLC code in one of the PLC development environments we support. This allows the programmers to concentrate fully on machine sequences and data management. There is no need to deal with device connection, fault management or status machines, as these are generated or are already integrated in the module elements.

The creation of the machine visualization also forms the basis of the machine model. This means that manual functions of the machine can be tested with a functional user interface in just a few steps.



Parameterization of standardized modules



Creation of individual user interfaces for your project in the Control plus HMI Editor

The typical process for creating a project is as follows:

- ▶ Configuration of the target systems (control and display systems)
- ▶ Design of the project structure
- ▶ Integration and parameterization of the objects
- ▶ Transfer of data from EPLAN (optional)
- ▶ Definition of data concepts and formula management
- ▶ Selection and configuration of any services and apps
- ▶ Definition of diagnostic functions
- ▶ Configuration of the machine visualization
- ▶ Re-export to the PLC development environment and to the operating devices



Your advantages at a glance

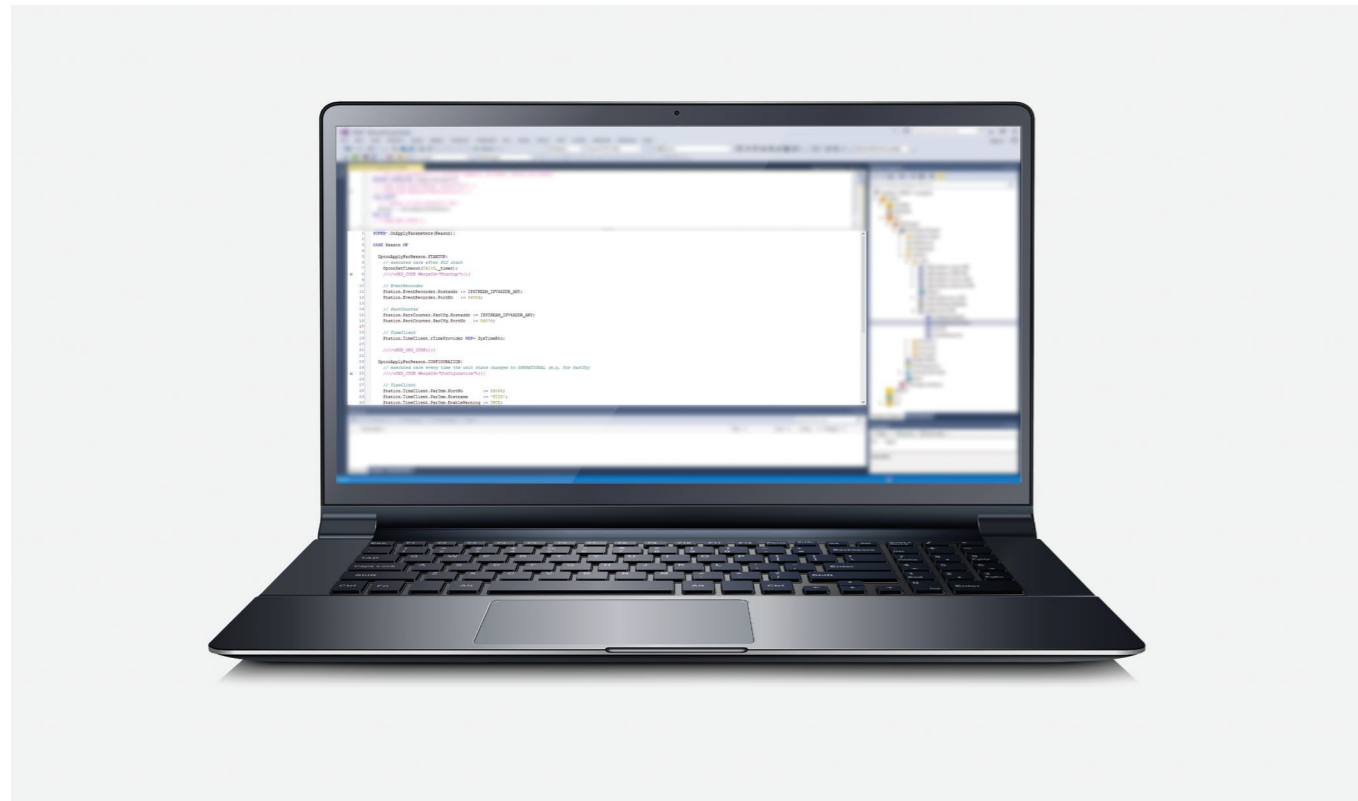
- ▶ Project configuration independent of the controller manufacturer
- ▶ Code generation in an IEC-61131-certified PLC development environment
- ▶ Simple data transfer from EPLAN (data export from EPLAN requires a separate license)
- ▶ Centralized, one-time data entry for control, visualization and data management
- ▶ Modeling and configuration of the machine via drag-and-drop



✔ Included in the Control plus runtime license

Control plus PLC Framework

The programming framework for your control software



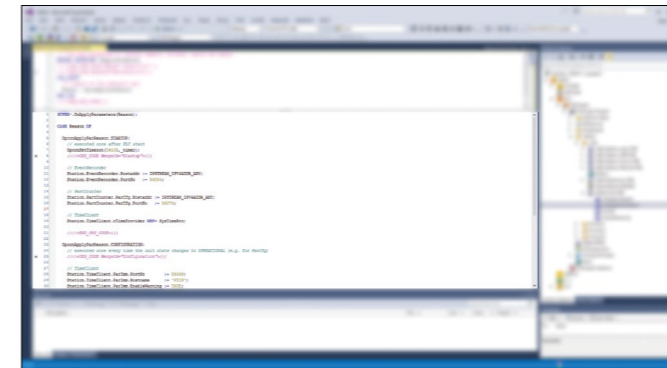
Programming of machine sequences in the PLC development environment.

With the Control plus PLC Framework, we provide your programmers with a basic software structure so that they can create control software independently of the controller being used. The benefit for you: Control plus Studio has a collection of PLC libraries and templates for automatic code generation that can significantly reduce the effort involved.

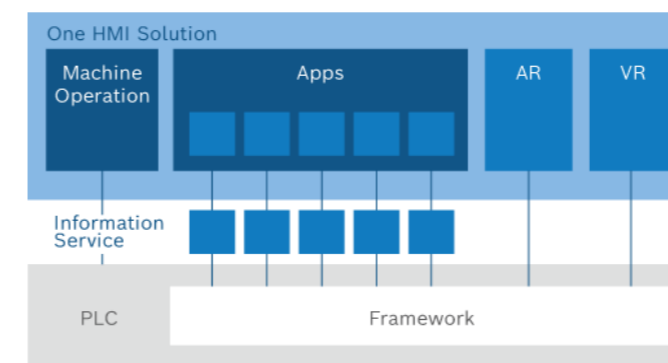
The behavior of the devices implemented in the machine as well as the interaction between the devices is defined and controlled in the PLC Framework. Scaling can occur as needed based on parameters such as machine size and performance requirements. Thus, both smaller machines with manual operation and large automated production lines can be operated on the basis of the same control software.

In addition to the fundamental behavior of the devices and their interaction in the machine, the Framework provides you with many functionalities that are required in applications and which your users can use directly. For many functions, the PLC Framework works hand in hand with Control plus Studio and the Control plus

HMI. The creation of operating modes, manual functions and sequences, including the integration and display of release conditions, is also defined. Using code templates in the PLC Framework, you can automatically generate function blocks and step sequences at many points in the PLC development environment. These blocks are immediately available to you and can then be further programmed by your programmers. This saves you time, provides a uniform source code structure and ensures quality, since automatic generation avoids implementation errors. Proprietary basic functions of the control manufacturers are encapsulated in the PLC Framework. The establishment of a communication connection, the reading and writing of files on the hard



Generated code sections save typing



disk, the querying of the system time and much more are therefore carried out via the same function calls in the Framework. This allows you to easily transfer PLC projects to other supported control platforms without having to change the code for them.



Your advantages at a glance

- ▶ Project consistency
- ▶ Maintainability of the projects
- ▶ Efficient project creation
- ▶ Reduced project risk
- ▶ Cross-project reusability



✔ Included in the Control plus runtime license