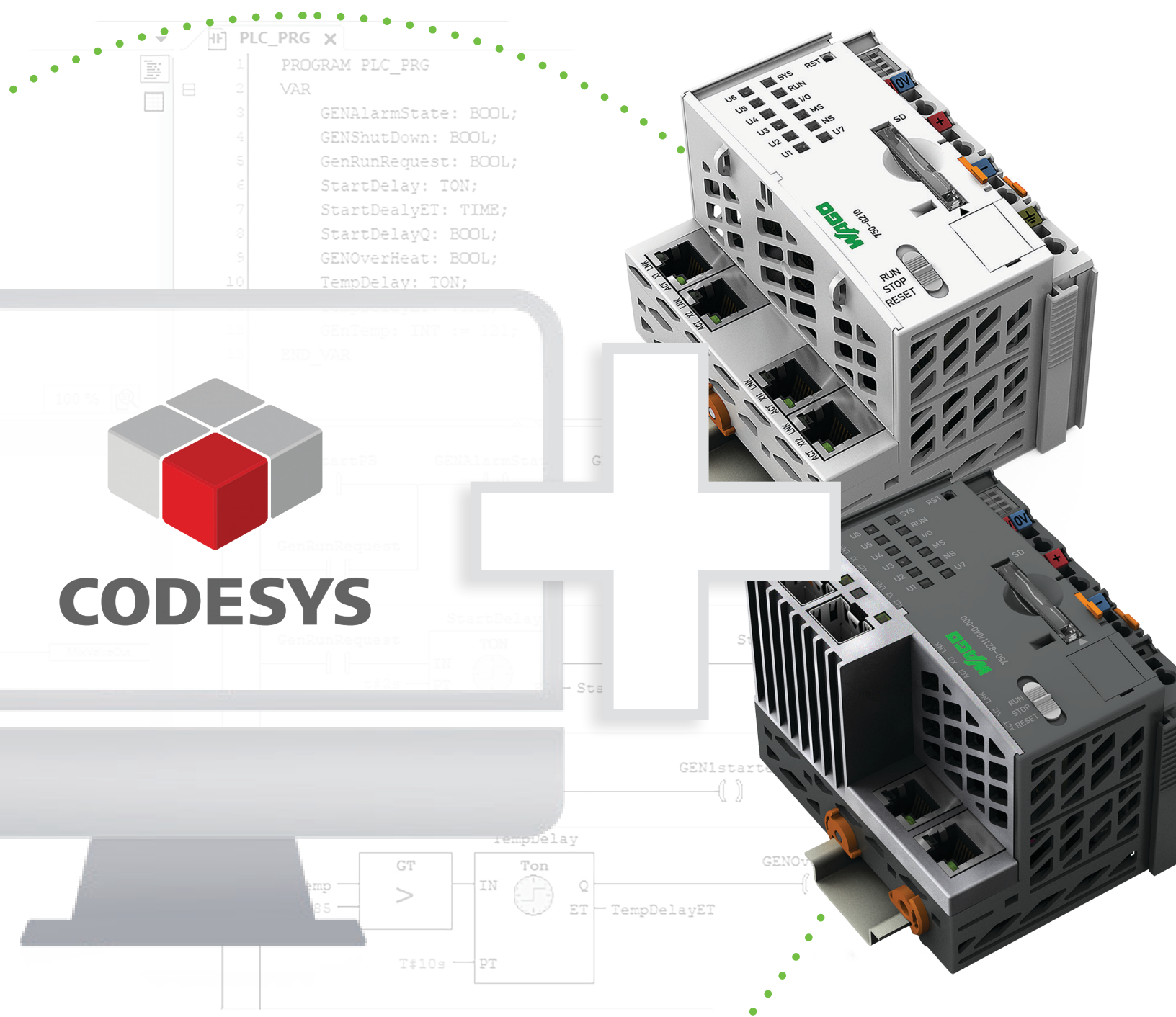# WAGO

WAGO PFC200s with Codesys 3.5
Colossal Performance in Minimum Space
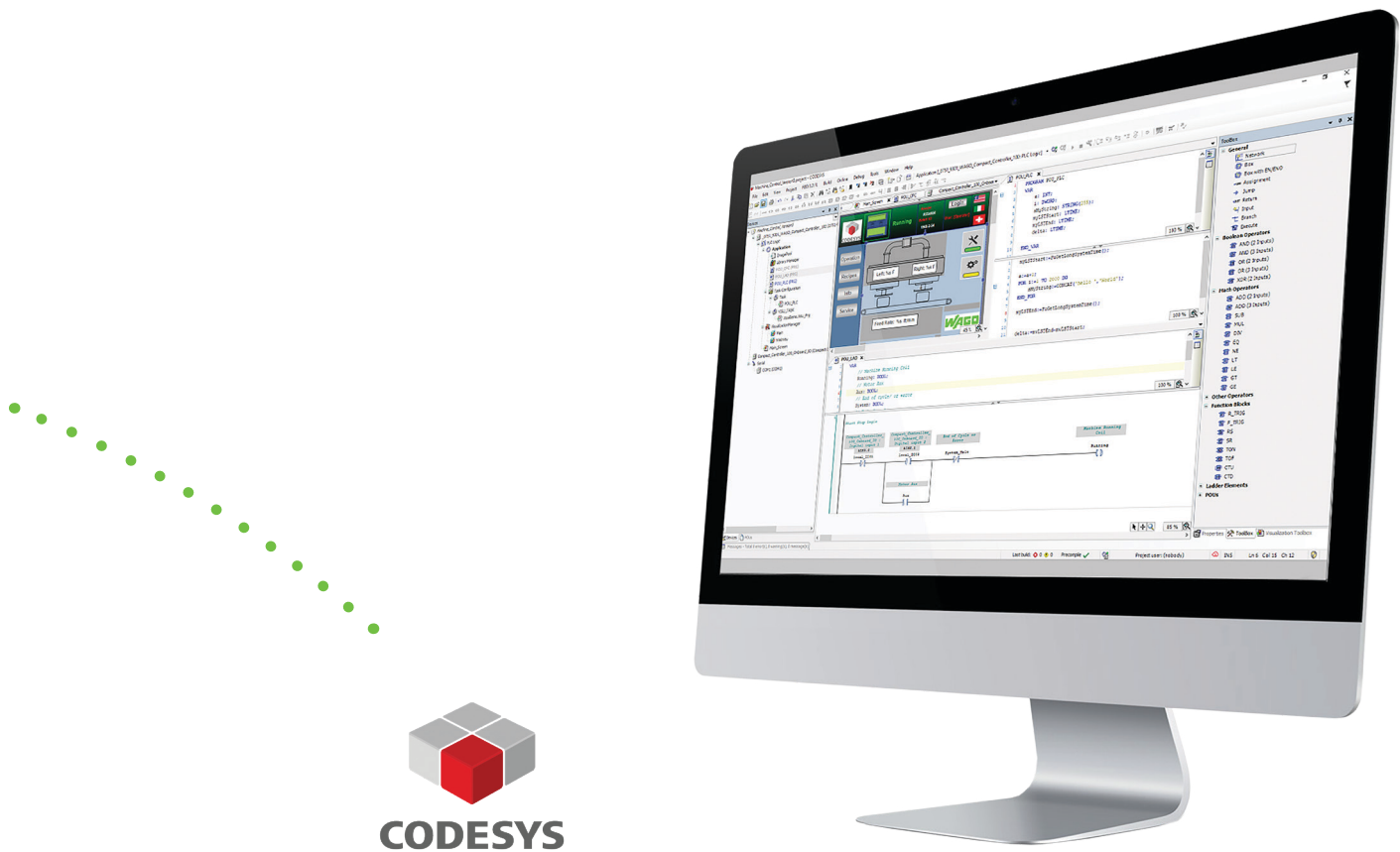
CODESYS

A True Duo

PFC200 Controllers

Bring your innovations to market faster and earn a quicker return on investment with WAGO's PFC200 line of controllers combined with the market leading engineering tool CODESYS 3.5. The very powerful PFC200 controller can be combined with over 500 I/O modules of the 750 series to address all your control needs. Programming logic, developing visualizations and managing network communications is straight forward with the CODESYS 3.5 engineering tool reducing costs and speeding time to market.

Your Benefits:
• Programming according to IEC 61131-3 using CODESYS 3.5
• Virtually free HMI via web visualizations
• PLC and IT functions in one device
• Multiple PFCs to optimize your application
• High cybersecurity standards (SSL, SSH, OpenVPN and firewall)
• Linux® real-time operating system
• Docker-ready PFC200 controller
• Multiple built-in industrial communications for gateway applications

CODESYS 3.5 Engineering Tool

PFC200s are programmed using market leading CODESYS V3.5 development software to help reduce development time and costs. Engineers are able to use the most appropriate programming languages for their applications. In addition, the same software is used to create web visualizations that can be used by equipment operators and maintenance staff to interface with machines.

Professional engineering software for IEC 61131-3 compliant projects
• Support of all IEC 61131-3 programming languages
• Program Organization Units (POUs) for code optimization
• User developed Function Blocks with security for IP protection
• Code documentation via single and multi-line comment tools

Build your own operator interfaces via HTML5 Web Visualizations
• User interfaces via a web browser
• Develop dynamic HMI screens for operators and maintenance
• Tag commands with role based permissions
• Leverage pre-designed objects such as push-buttons, pilot lights, trend graphs and more
• Embedded graphic files as backgrounds for user clarity

Expand your options via a Linux based real-time operating system
• Docker applications in parallel with IEC61131
• Add data handling apps like Node Red

2
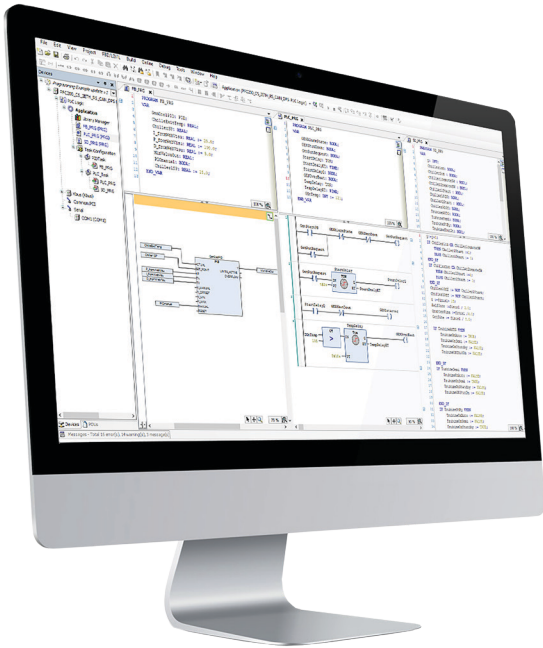
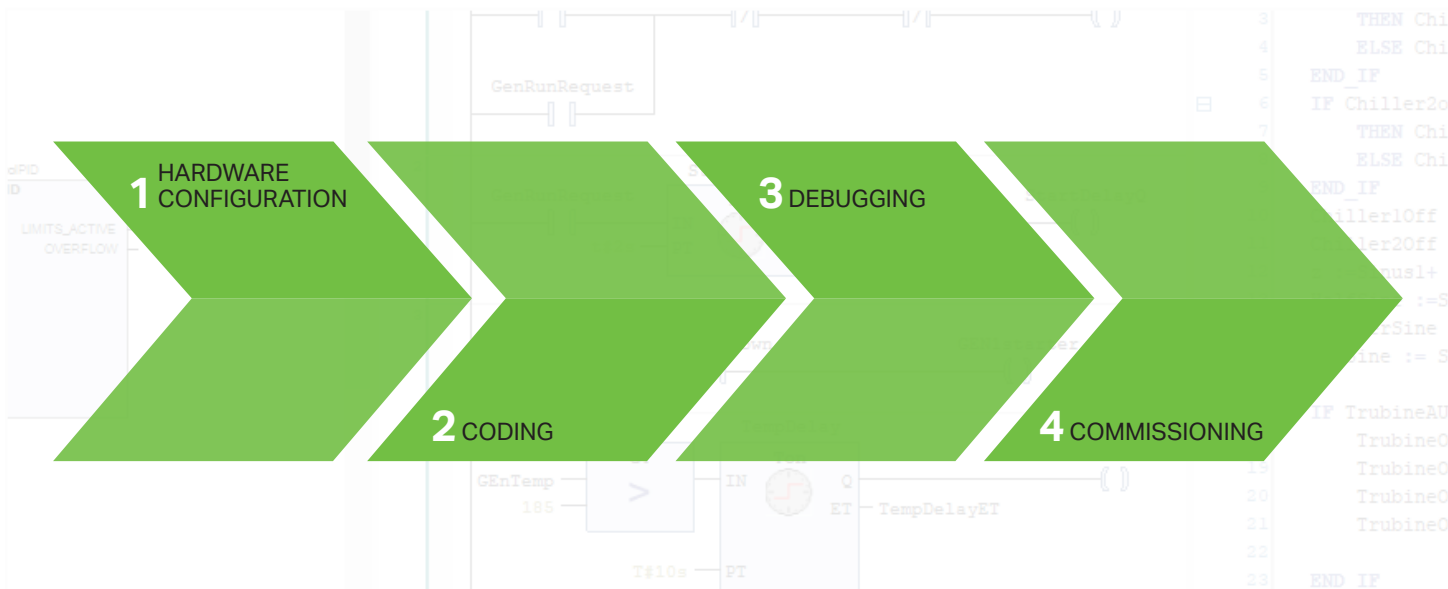# Software

CODESYS

Multiple Programming Languages
The PFC200 is programed with CODESYS, the leading software platform for IEC61131-3 compliant project engineering. This system combines advanced programming with capabilities of professional software development for modern control applications. *Supported IEC61131-3 Languages include:*

• Ladder Diagram

• Structured Text

• Function Block Diagram

• Continuous Function Chart

• Sequential Function Chart

Development of HMI screens directly in the IEC61131-3 environment
Developing a human machine interface (HMI) and a PLC application will enable users to operate & maintain their systems in a very efficient manner. The HTML5 based visualizations are hosted within the PFC200 and can be viewed using most web browsers on your PC and mobile devices. With the logic and HMI development tools using a common database, engineering development time and maintenance costs can be reduced.

• Create modern and professional visualization screens quickly

• Integrated alarm management tools

• Language, Images and Unit conversion switching

• Multi-level security access features

• Common element libraries such as gauges, pushbuttons, & trends

1 HARDWARE CONFIGURATION

2 CODING

3 DEBUGGING

4 COMMISSIONING

Software Development Process
CODESYS 3.5 software takes the lead throughout the entire development process. With proven tools, engineers can quickly engineer code, visualizations, debug and commission their projects.

Typical application programming passes through different phases. The CODESYS development system supports users all the way from configuration to commissiong.

Features of the Development Environment:
CODESYS 3.5 software provides control engineers and technicians advanced tools to assist with code development, plus features for commissioning and debugging. These features include:

- Tools for creating structured & efficient applications
- WAGO and CODESYS libraries with documentation
- Multi-Controller development in one application
- Task system to optimize application performance
- Customizable windows
- Color-coded syntax & automatic syntax checking
- Integrated debugging plus tracing tools

- Security built-in: file encryption & communications
- Monitoring of variable values online
- Online programming changes
- CODESYS network variables for data exchange between different controllers
- Device tree for hardware structure mapping

WAGO offers the CODESYS development system free of charge.
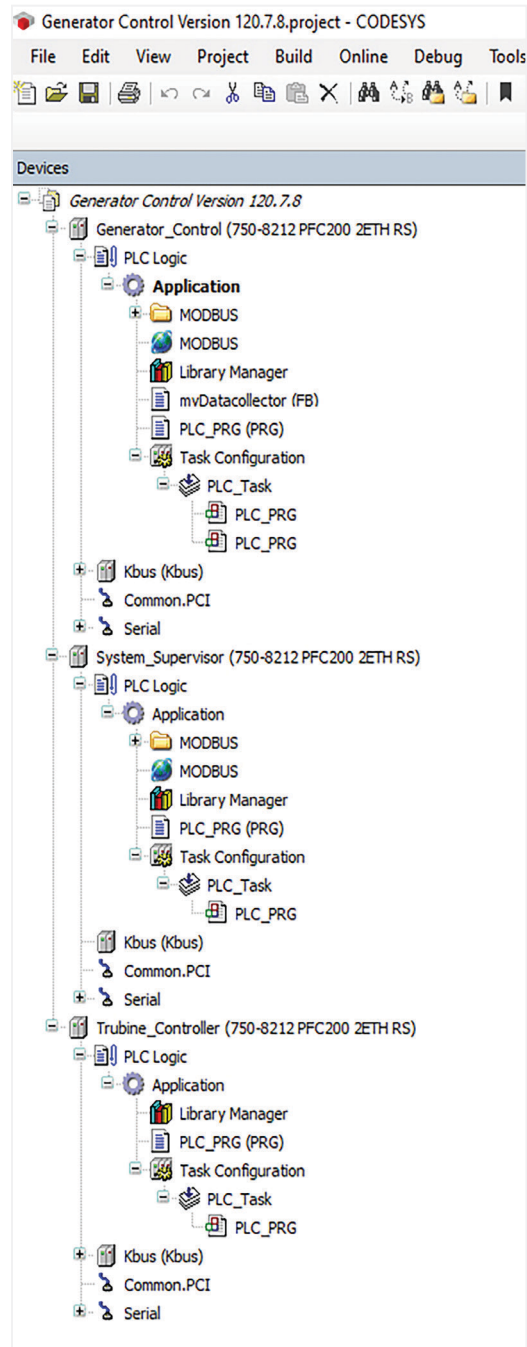Download at WAGO.com/us

Programming

International Standard IEC 61131-3 Languages

Combine languages in a single program

- Ladder diagram
- Structured text
- Function block diagram
- Sequential function chart
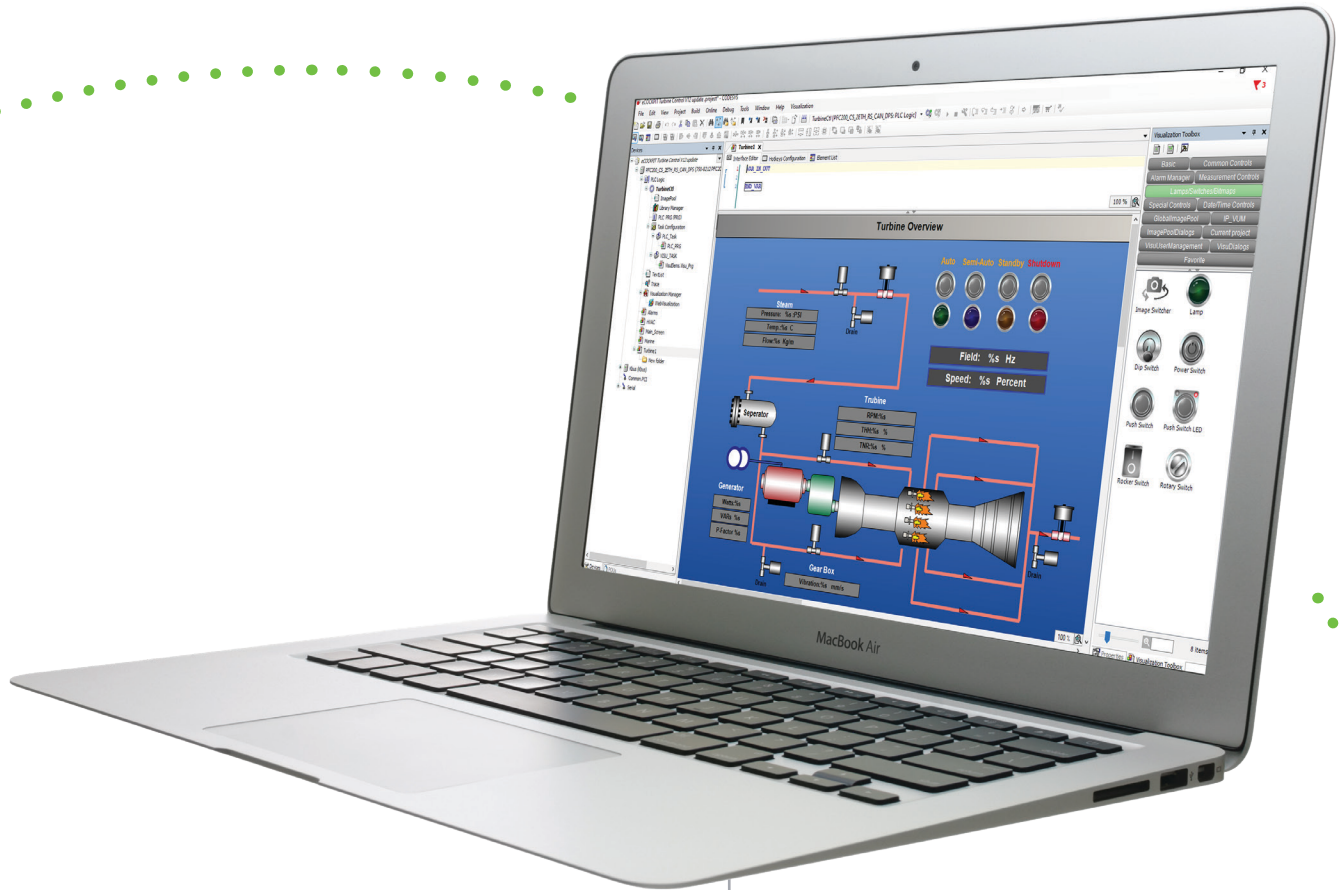- Continuous function Chart

Advanced Technologies

- Object oriented programming support
- Offline program simulation for debugging

Multi-Controller Support

- Easily manage multiple controllers & distributed I/O
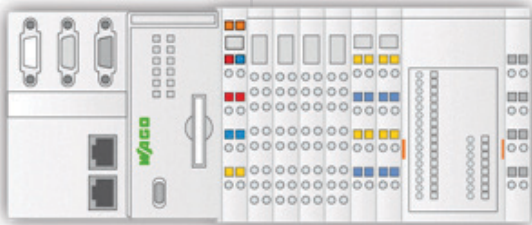- Simultaneous controller download

Visualization

Advanced User Interface

• Develop dynamic web pages for cost effective HMI

• Access to all tags to speed design process

• Pre-configured common devices

ETHERNET

HTML5 Technology

Easily display web pages on PCs, tablets or smartphones

Communications

Ethernet Fieldbus Configuration
The PFC200 controllers support the most popular Ethernet based fieldbuses. You can take advantage of setting the controller to a Master or an adapter form may fieldbuses including:
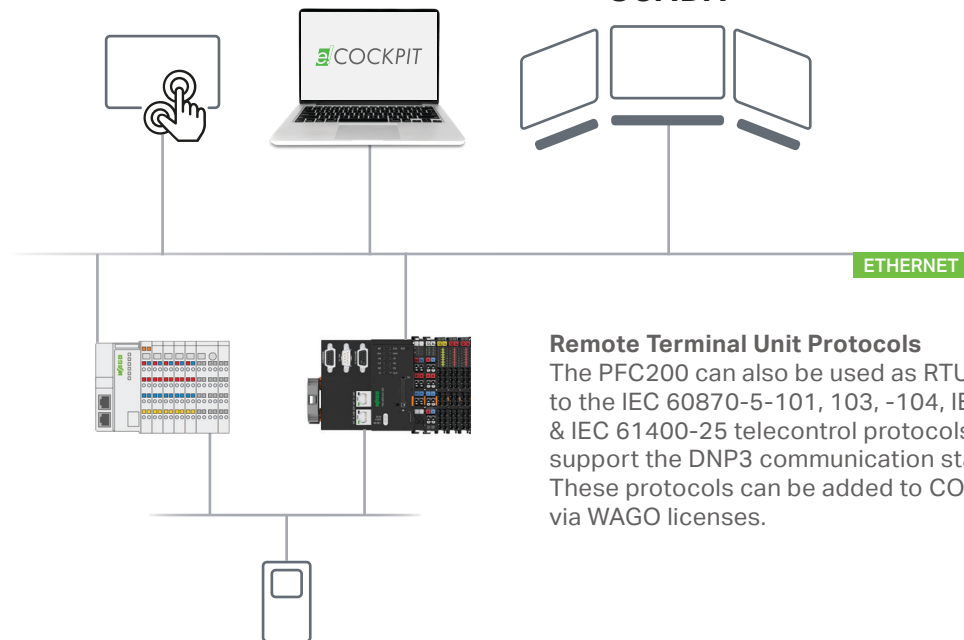
- MODBUS TCP – Master, Server
- EthreNet/IP – Scanner, Adapter
- EtherCAT – Master
- BACnet - Server

The ETHERNET interfaces also support all common protocols such as DHCP, DNS, NTP, FTP & HTTP.

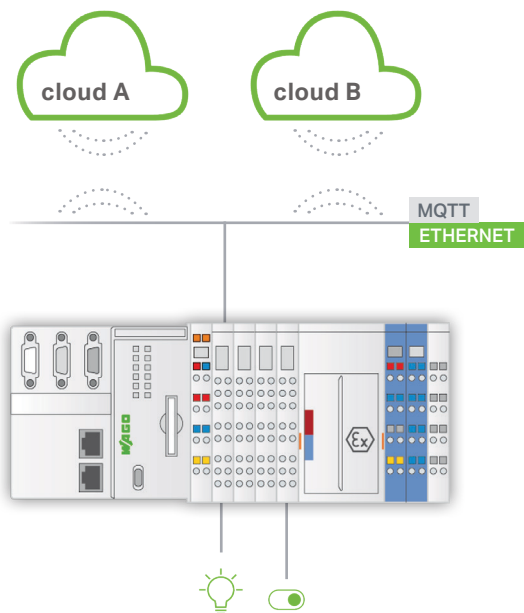A secure connection is provided via SSH, HTTPS, FTPS & TLS
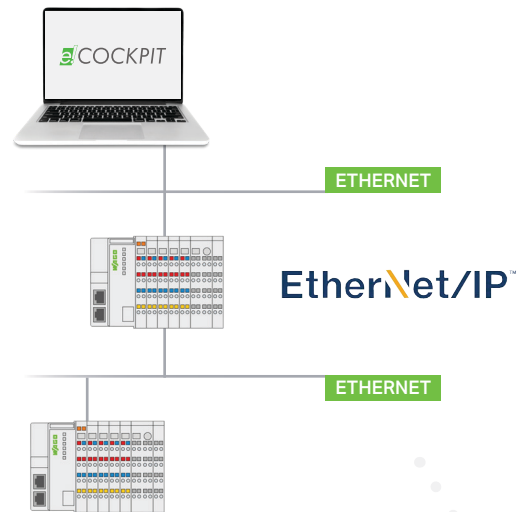
Remote Terminal Unit Protocols
The PFC200 can also be used as RTUs. In addition to the IEC 60870-5-101, 103, -104, IEC 61850 & IEC 61400-25 telecontrol protocols, they also support the DNP3 communication standard. These protocols can be added to CODESYS via WAGO licenses.

cloud A   cloud B

MQTT
ETHERNET

IIoT Protocols

MQTT is a powerful IoT protocol that has developed into a standard in many industrial automation applications. The PFC200 controller support an MQTT connection by default. With "Multi Cloud Connectivity", the parallel connection of a device to two different cloud systems, IoT platforms or MQTT brokers is possible. This means that different tasks can be implemented in the appropriate cloud application.
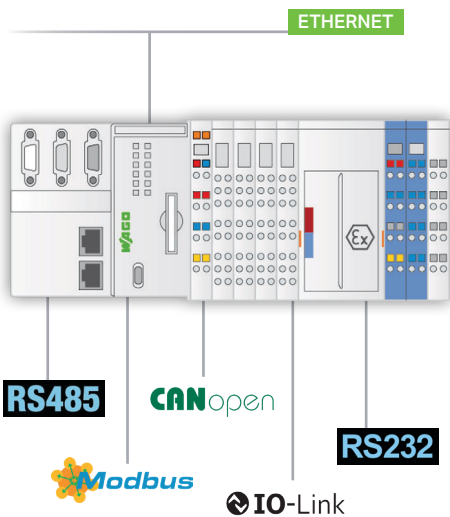
ETHERNET

Industrial Protocols

Use the PFC200 for stand alone control or as a communications gateway between common serial-based communication and Ethernet base protocols. Interface via CANopen, Modbus RTU, RS232 or RS485 with end devices for holistic system control without the need for communication converts.
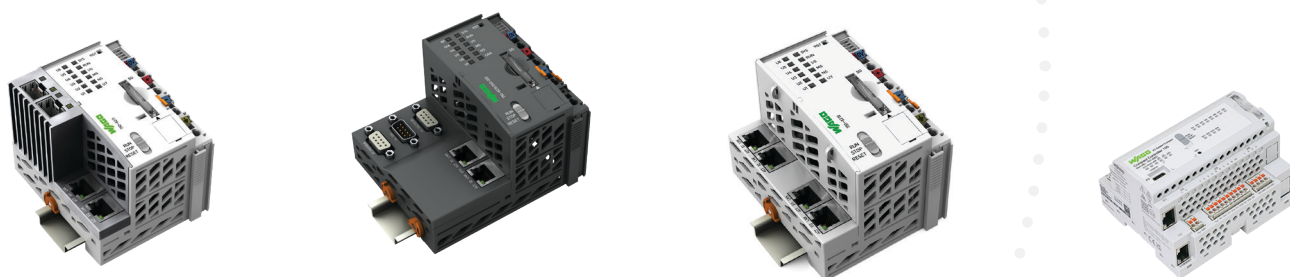
RS485   CANopen
RS232
Modbus
IO-Link

RS485   MQTT   RS232
EtherNet/IP   CANopen   BACnet
IO-Link   Modbus   EtherCAT

Support

Controllers with Codesys 3.5 Capability

Part Number	Interfaces	Comments
750-8210	4x Ethernet Ports	Industrial Environments
750-8210/025-000	4x Ethernet Ports	Extended Temperature
750-8210/040-001	4x Ethernet Ports	Extreme Temperatue
750-8211	2x Ethernet, 2x Fiber Optic	Industrial Environments
750-8211/040-000	2x Ethernet, 2x Fiber Optic	Extreme Temperature
750-8211/040-001	2x Ethernet, 2x Fiber Optic	Extreme Temperature + Telecontrol
750-8212	2x Ethernet, 1x RS232/-485	Industrial Environments
750-8212/000-100	2x Ethernet, 1x RS232/-485	Industrial Environments + BACnet/IP
750-8212/025-000	2x Ethernet, 1x RS232/-485	Extended Temperature
750-8212/025-001	2x Ethernet, 1x RS232/-485	Extended Temperature + Telecontrol
750-8212/025-002	2x Ethernet, 1x RS232/-485	Extended Temperature + Telecontrol ECO
750-8212/040-000	2x Ethernet, 1x RS232/-485	Extreme Temperature
750-8212/040-001	2x Ethernet, 1x RS232/-485	Extreme Temperature
750-8212/040-010	2x M12 Ethernet, 1x RS232/-485	Extreme Temperature + Telecontrol
750-8213	2x Ethernet, 1x CANopen	Industrial Environments
750-8213/040-010	2x M12 Ethernet, 1x CANopen	Extreme Temperature
750-8214	2x Ethernet, 1x RS232/-485, 1x CANopen	Industrial Environments
750-8215	4x Ethernet, 1x CANopen, 1x USB	Industrial Environments
750-8216	2x Ethernet, 1x RS232/-485, 1x CANopen, 1x Profibus Client	Industrial Environments
750-8216/025-000	2x Ethernet, 1x RS232/-485, 1x CANopen, 1x Profibus Client	Extended Temperature
750-8216/025-001	2x Ethernet, 1x RS232/-485, 1x CANopen, 1x Profibus Client	Extended Temperature + Telecontrol
750-8216/040-000	2x Ethernet, 1x RS232/-485, 1x CANopen, 1x Profibus Client	Extreme Temperature
751-9301	2x Ethernet, 1x RS485	Industrial Environments

Large Memory, Fast Processor and Numerous Communication Interfaces
The features are impressive: Despite its compact size, WAGO's programmable logical controller (PLC) carries all the vital interfaces with either 2 or 4 Ethernet Ports – depending on the version you select. For ultimate in versatility, the ETHERNET interfaces can be configured independently, meaning separate networks can be configured with the PLC. As an alternative, the ETHERNET ports can function as an ETHERNET switch to create a line topology. Other available interfaces built into the PFC200 are RS232/485, and CANopen. The SD card slot provides additional functionality, such as allowing large image files to be stored on an SD card for Web visualization.

The rugged controller accommodates a 1 GHz Cortex A8 processor, flanked by 512 MB RAM for exceptionally fast operating speeds. The largest possible program and data memory of 1.5 GB also provides the PFC200 with sufficient reserves for complex control tasks.

CODESYS 3.5 Ethernet Based Industrial Protocols

CODESYS 3.5 offers users powerful communication capabilities by natively supporting multiple Ethernet based industrial fieldbuses. Controls engineers can use one common programming tool to manage systems no matter the protocols used. Users do not have to purchase, learn or maintain multiple software platforms, helping to save money and speed up program development. The following protocols are standard and come with free technical support and training from WAGO:

- CODESYS 3.5 supports the real-time Ethernet system EtherNet/IP as a Scanner or Adapter. WAGO's PFC200 controller can be used with either of these modes without the need for additional hardware.

- The programming software also supports EtherCAT master functionality, enabling diagnostics and monitoring through the IEC 61131-3 application. Users can use WAGO's PFC200s as a gateway between EtherCAT fieldbuses and other protocols such as MODBUS, MQTT and many others.

- Users are also able to use CODESYS 3.5 with MODBUS TCP/UDP master and client applications. This common protocol offers users the ability to connect with an endless number of devices.

WAGO has also developed tools for additional protocols not found in standard CODESYS 3.5 software. These protocols extend the IEC61131-3 based programming software to many other applications and are available with CODESYS 3.5 software when used with WAGO PFC200 controllers. The addition of these protocols to the system can be completed via licenses that can be ordered by part numbers shown in the table below.

Available Licenses for PFC200 Controllers with CODESYS 3.5

Description	License Part Number
Building Automation	
BACnet/IP Unlimited Tags	2759-283/211-1000
BACnet/IP 256 Tags	2759-2282/211-1000
Energy Applications	
IEC 60870 Server	2759-290/211-1000
IEC 60870 Client	2759-293/211-1000
IEC 61850 Server w/GOOSE Publisher	2759-2240/211-1000
IEC 61850 Server w/GOOSE Subscriber	2759-2243/211-1000
DNP3 Outstation	2759-2290/211-1000
DNP3 Master Medium	2759-2293/211-1000
IIoT	
Sparkplug	2759-247/210-1000
Multi Cloud Connectivity	2759-248/211-1000
Marine Applications	
Redundancy Master	2759-245-211-1000