Introducing PS501 Control Builder Plus

Common engineering tool for PLC, drives, HMI, fieldbus, network, web services

Power and productivity
for a better world™

Executive summary

Your benefits

Radical total-cost-of-ownership reduction and superior shortest time-to-market helps you to beat your competition

- fast solutions by tool integration and comprehensive, pre-built, tested libraries
- common data entered once – used by many
- data exchange with 3rd party tools via CSV import/export
- programming, communication, visualization, libraries and drives share common data in one tool
- effortless debugging, also supported by new multiple watch list
- easy commissioning: single-point-of-access to machinery drives and PLC keeps setup time to minimum
- online diagnostics for PLC and drives built-in
- diagnostics is set up automatically
- context-sensitive menus adapt automatically to the current task for highest efficiency

Improve your product quality

- by data consistency
- global variables defined only once
- automatic diagnostics configuration
- programming editor with built-in syntax check
- variables can be directly used for HMI
- ergonomic, multi-language user interface supports your engineers

Your sustainable, competitive advantages

- ABB uses global standards CoDeSys, IEC61131-3, PLCopen, PROFINET, PROFIBUS DP and the most common fieldbusses
- ABB has selected CoDeSys which is used by thousands of engineers
- IEC61131-3 enable development around the globe
- broad use of ABB technologies in universities
- IEC61131-3 assures global talent opportunities for your projects
- ABB favours Internet technology for data communication
- ABB integrates remote access and visualisation via the world wide web

ABB – a strong partner for your productivity

- ABB is global market leader in variable frequency drives and motors
- ABB is one of the PLC pioneers and offers PLC since 1970
- ABB is the pioneer in wireless communication and wireless power supply for factory automation
- ABB has about 130.000 employees worldwide
- ABB is a leading innovator thanks to over 6.000 R&D employees and over 1 billion $ R&D investment per year (2010)

ABB supports you globally in about 100 countries

- well-maintained customer relationship
- helpline, internet, FAQ and training
- PartsOnline for rapid hassle-free spare part delivery

ABB is a global leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact.

www.abb.com/plc www.abb.com/drives

CoDeSys

New PS501 Control Builder Plus
Single-point-of-access – easy to use

The single-point-of-access is the engineering PC on which PS501 Control Builder Plus is running.

Straightforward access to:
- PLC AC500-eCo
- PLC AC500
- AC500 remote I/O
- ABB drives
- ABB HMI

New PS501 Control Builder Plus
Features

Internet protocols configuration
- new: SMTP e-mail
- new: FTP file transfers
- HTTP web server
- SNTP time synchronization
- DHCP IP address assignment
- socket programming for project-specific protocols
- IEC60870-5-104 for substation automation
- new: PING request and reply
- new: DNS

Important features for efficient development
- new: file/directory management library
- new: ZIP archives
- new: gateway library PROFINET – CAN
- new: gateway library PROFINET – serial
- new: transparent real-time tuneling of CAN, CANopen and serial over PROFINET
- new: built-in multi-online-change to update multiple PLC at once
- new: remote firmware updates
- new: multiple watch list for superior diagnostics and debugging
- new: easy network and fieldbus monitoring and diagnostics down to the port
- new: diagnostics when online
- new: ABB's Jokab Safety Pluto manager project data can be integrated
- new: libraries supporting new hardware and sophisticated functionality
- sampling trace brings functionality of oscilloscope
- recipe management for fast, secure, efficient production solutions
- alarm handling for enhanced maintenance and commissioning

Five standardized IEC61131-3 programming languages
- function block diagram FBD
- instruction list IL
- ladder diagram LD
- structured text ST
- sequential function chart SFC

CoDeSys

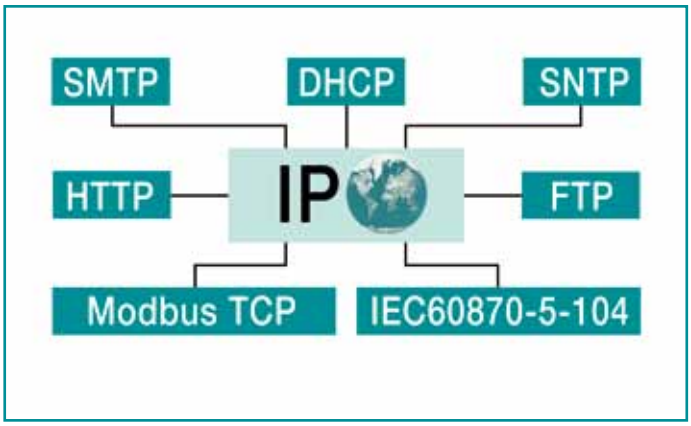
Extended programming capabilities for highly-specific solutions
- built-in free: continuous function charts CFC
- new: convenient C integration in project code and libraries, using 3rd party compiler

Advanced visualization with unlimited possibilities
- new: JavaScript for more impressive visualization on smart devices
- new: optional PB610 Panel Builder 600 software for CP600 series panels
- web visualization built using PS501 Control Builder Plus, for internet browsers
- new: web visualization for CP600-Web series panels

Easy network and fieldbus connectivity
- real-time Ethernet-based, PROFINET IO RT and EtherCAT
- PROFIBUS DP
- CANopen
- CAN
- DeviceNET
- Modbus ASCII and RTU, serial and TCP
- ABB CS31 - completely built-in

PROFINET® PROFIBUS®

IT environment
- new: PS501 Control Builder Plus is compatible with Windows 7 Enterprise 32/64 bit
- new: installation media is USB ROM drive. No optical drive required anymore
- Windows XP 32 bit



Ultimate flexibility meets minimal cost
Smart engineering – easy to use

Revolution over evolution

The PS501 Control Builder Plus is a truly revolutionary product which combines all of the tools you require for configuring, programming, debugging and maintaining your automation project from a single, intuitive interface. Packed with advanced features designed specifically with today's high-tech engineering challenges in mind, PS501 Control Builder Plus takes you to the next level in terms of convenience and flexibility.

Data interface with 3rd-party software tools is given by import and export via CSV spreadsheet data format.

PLCs, drives, panels and more

The PS501 Control Builder Plus enables configuration of all standard intelligent automation devices for machine builders manufactured by ABB. This covers the vital areas of programming, parameterization, debugging & diagnostics, and network & fieldbus configuration. For the first time, parameterization and diagnostics of some ABB low voltage drives is integrated with your PLC project.

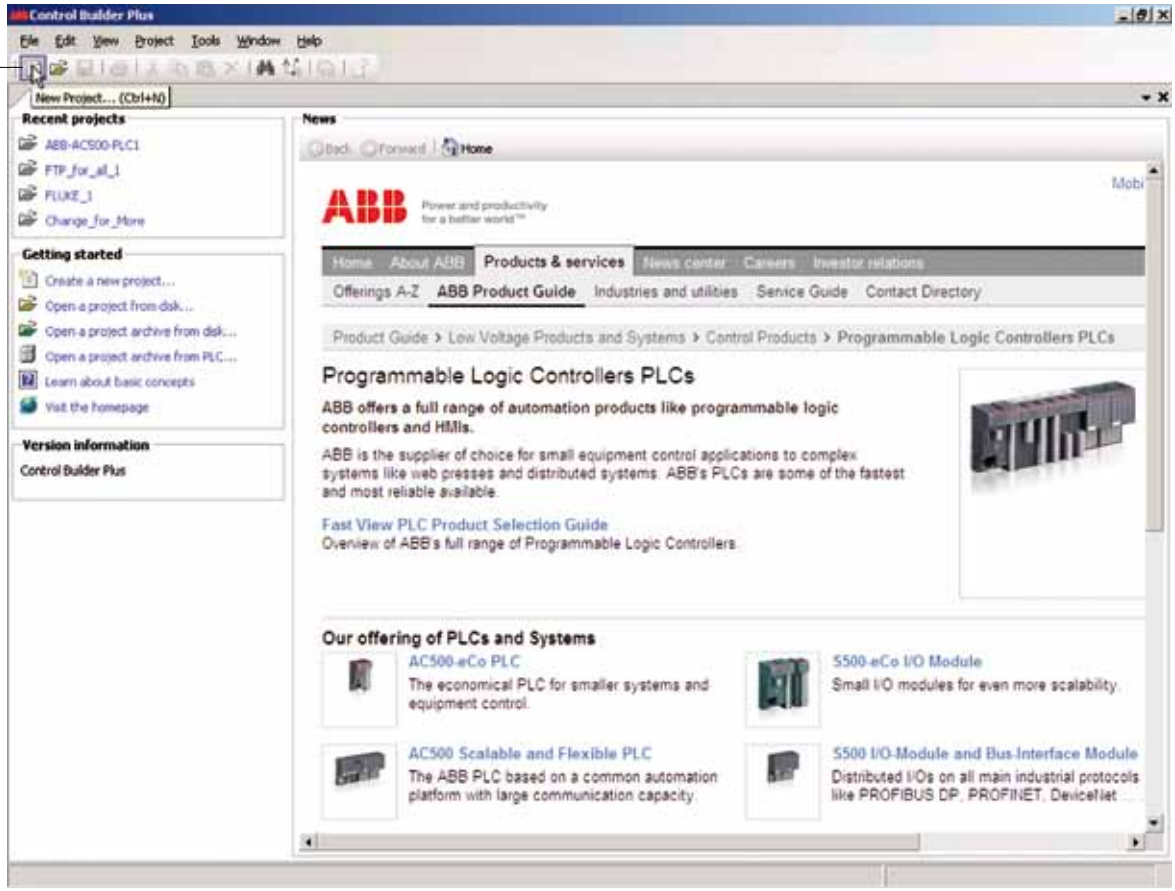
Your ABB drives, PLCs and panels can be simply hooked up to a single PROFIBUS or PROFINET cable and you are good to go. Parameterization is a snap thanks to the ability to access your networked devices from your laptop or PC connected any node on the network. You simply install PS501 Control Builder Plus and you will be up and running in next to no time.

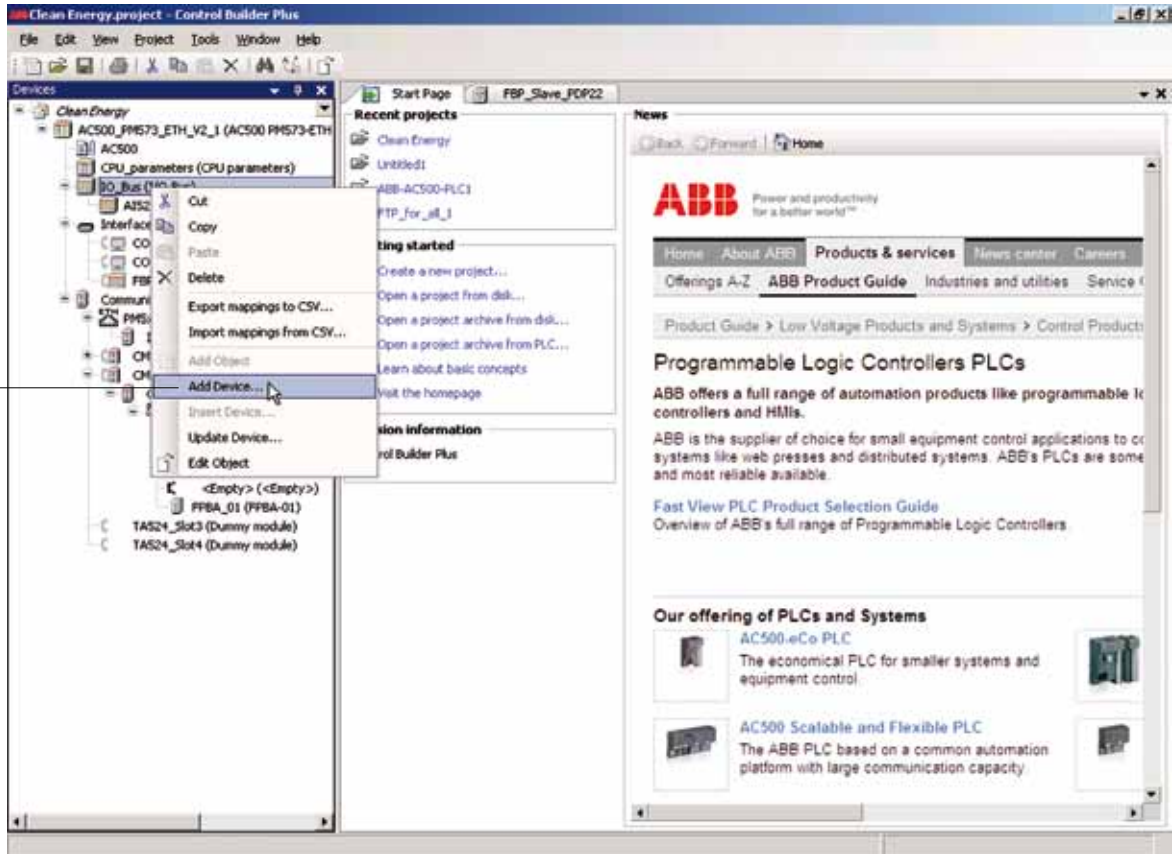
This offers huge savings in terms of time and effort compared to conventional systems, particularly for applications where a distributed arrangement of drives has been integrated into a complex control and visualization system.

Your advantages at a glance:

- combination of all of the tools you require for configuring, programming, debugging and maintaining your PLCs, drives and control panels
- easy and fast programming
- parameterization including many ABB drives
- diagnostics is setup automatically for online monitoring of inputs and outputs
- debugging & diagnostics with multiple, comprehensive watch list
- recipe management provide rapid factory adaptation to changed market requirements
- internet, network & fieldbus configuration within one comfortable tool
- ABB PROFINET drives, Ethernet-PLCs and Ethernet-panels can be simply hooked up to single Ethernet
- ABB PROFIBUS or PROFINET drives connected to AC500 are all accessible by engineering tool
- huge savings in terms of time for drives in distributed arrangement
- one single engineering tool for the entire ABB range, from AC500-eCo through the complete AC500 family.

Ultimate flexibility meets minimal cost
Find immediately what you need





Brilliant user interface enables uncomplicated configuration
What you see is what you get – total convenience

The ease-of-use of PS501 Control Builder Plus is demonstrated in the following pages.

Start PS501 Control Builder Plus like all your PC programs. Open a new project.

1 Click on icon “New Project...(Ctrl+N)”.

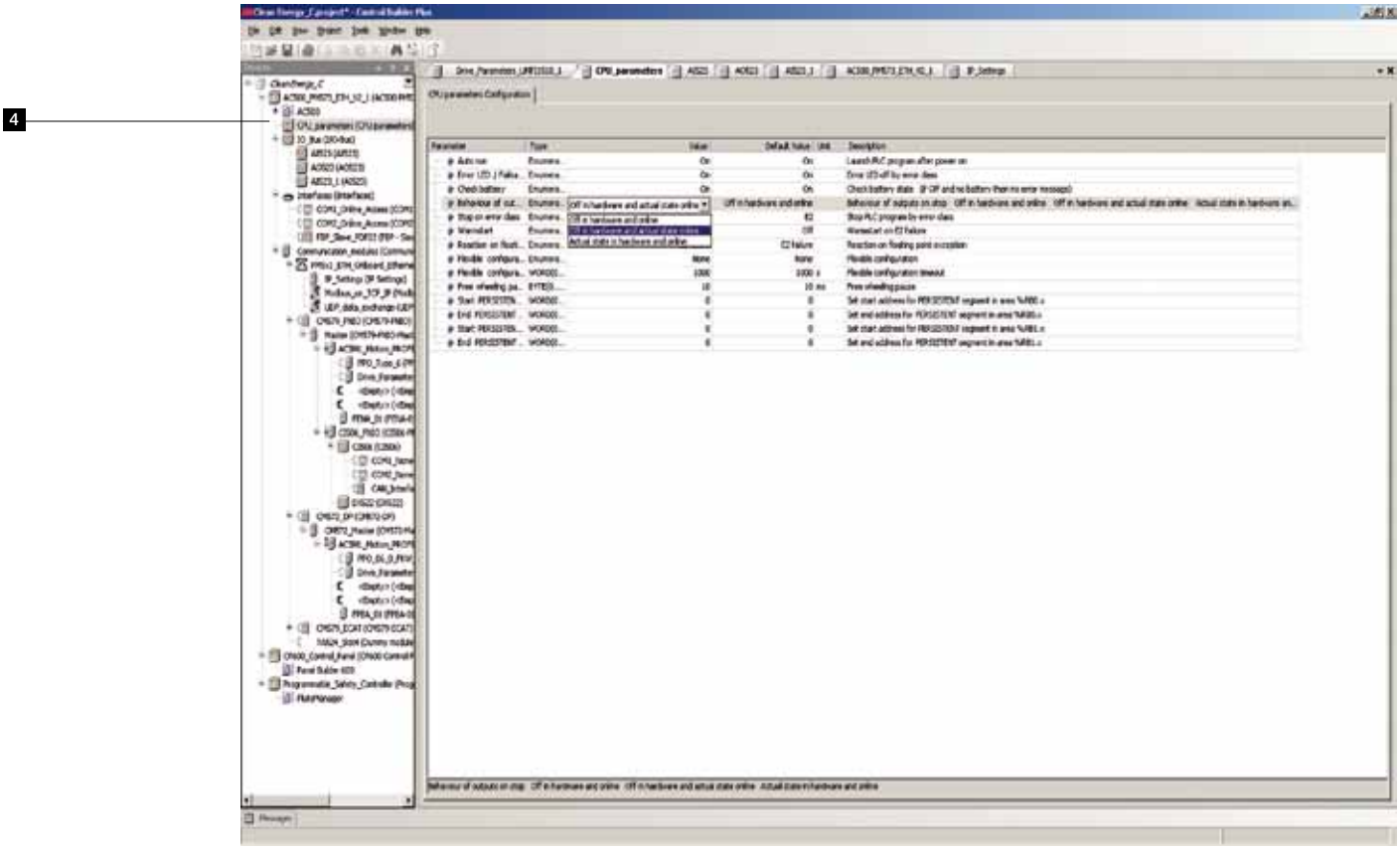
All what you need is there:
- buttons with context-sensitive, automatic balloon help
- quick start hyperlinks to your recent projects
- direct access to ABB´s product information and support web site at http://www.abb.com/plc
- learn about basic concepts for new users
- menus following the PC standard user interface

2 To add an item to the project, select the place where it is to be “connected” and right-click to obtain the context-sensitive menus. Example: here we add an I/O module to local bus of the CPU.

3 Now configure local I/O with a few clicks. We assume you want to add a module. Right-click on the IO_Bus.

4 Double-click on CPU_Parameters to configure behavior of PLC. A clear dialog with all information required comes up.

The configuration can be imported and exported via CSV for user-specific 3rd party engineering tools.

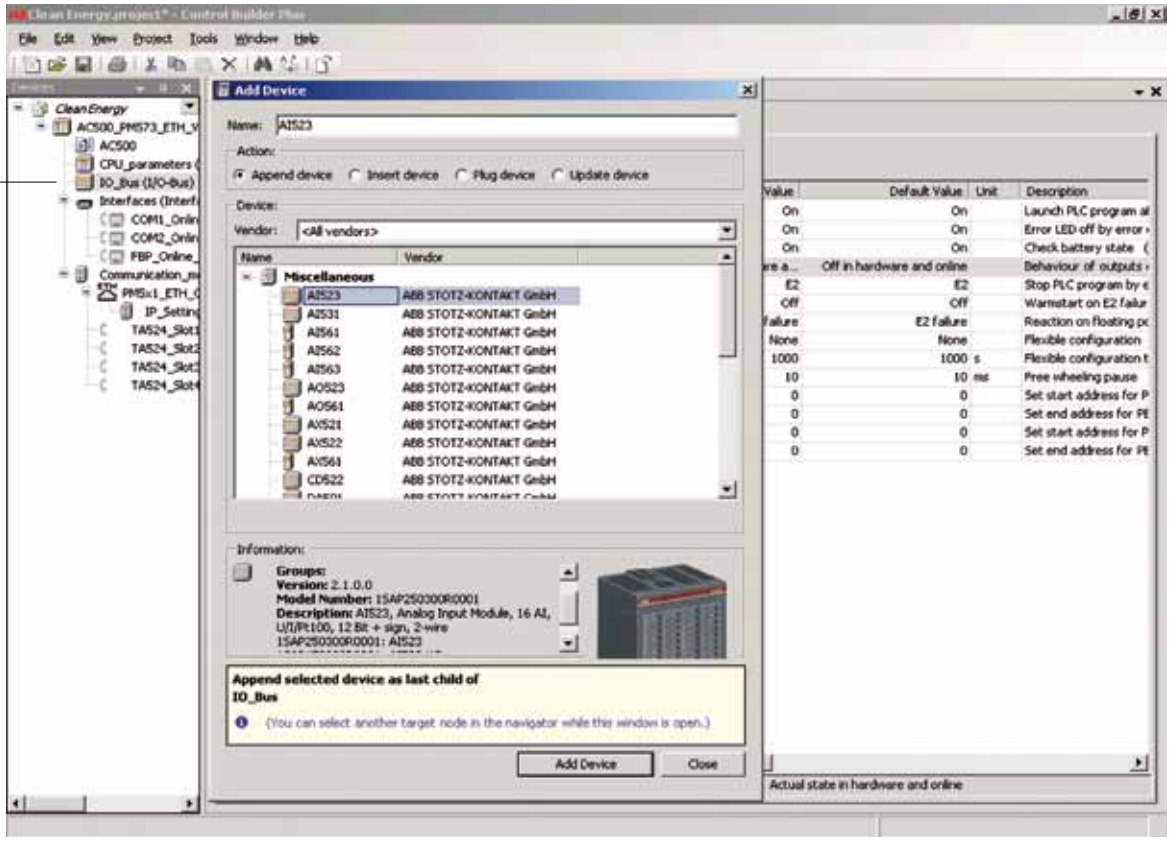


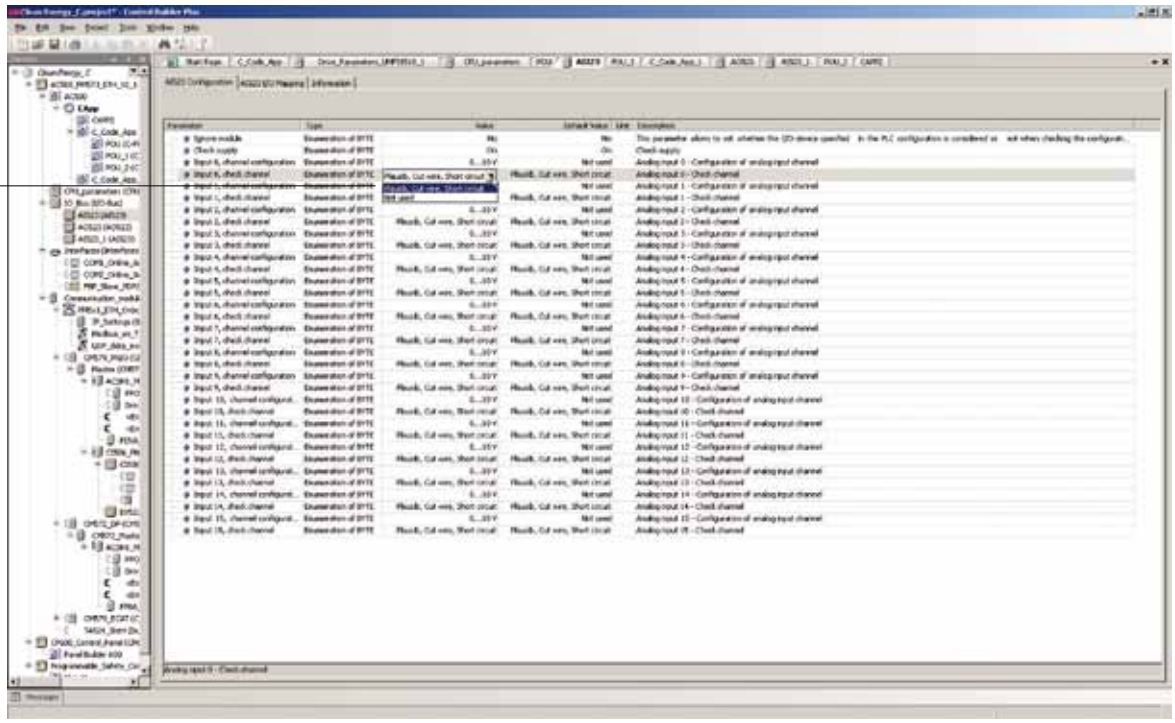
Ultimate flexibility meets minimal cost
Find immediately what you need

5 To continue, always double-click on the item you want to configure.

6 Set values - simply click and configure.

Clear dialogs present well-structured information to get efficiency and higher productivity.





Internet protocol made easy
HTTP – FTP – SMTP – SNTP – DHCP – BOOTP – DNS – PING

The Ethernet port on CPU modules has more to offer than just an interface for the programming PC. It is the bridge to many internet services running on the CPU module.

PS501 Control Builder Plus configures AC500 and AC500-eCo CPU modules to run IP-based services. Please refer to the following list for some of the possibilities and check the screen shots to see how easy it is to configure services in the ABB environment. The system's integrated, license-free web server for the AC500 and AC500-eCo CPU modules is literally a snap to configure with PS501 Control Builder Plus.

Your advantages at a glance:

- remote operations possible, saving lots of travelling time and cost
- rapid response in case of servicing requirements - fast solution and high customer satisfaction
- integrated web server is license-free, in contrast to PC-based solutions which are generally liable to licensing costs
- integrated web server makes extra installation effort obsolete – fastest commissioning
- ABB's impressive new Control Panel series CP600-Web is a snap to connect
- human machine interfaces made possible with CP600-Web make operations safer, more stable and far more predictable.
- no more costs for proprietary HMI devices

FTP

Configuration is fully integrated in PS501 Control Builder Plus.

Your advantages at a glance:

- data can be distributed to other systems, as well as world-wide via the web
- access via most internet browsers or one of the many FTP clients

SMTP

sends emails and up to ten attachments.

Your advantages at a glance:

- alarm messages with pre-defined text and attachments showing conditions of the machine
- enable rapid reaction to overcome critical situations

SNTP

for time synchronization of machines where AC500 acts as client (user) or master (distributor). Timing signal sources can be GPS, DCF77, MSF or WWV, WWVB und WWVH. For DCF77, ABB offers an application description and sample.

Your advantages at a glance:

- always identical time in any part of the machine
- all manufacturing steps can have precise time stamps for straightforward analysis
- predictive maintenance routines in PLC use same time as analysis tools in operations center
- precise timing let events be assigned to position of machine elements and execution

Telecontrol: IEC60870

IEC60870-5-104 for substation automation.

Your advantages at a glance:

- efficient supervision of energy installations
- standard enables combination of best devices to match precisely your requirements

Internet test and advanced setup included
HTTP – FTP – SMTP – SNTP – DHCP – BOOTP – DNS – PING

DHCP-BOOTP
Automatic assignment of IP addresses for PLC AC500 and AC500-eCo.

Your advantages at a glance:

- effortless IP address assignments saves time
- perfect integration with commercial IT systems running internet protocol IP

PING
PING is a widely used tool when diagnosing communication links based on internet protocol IP. It enables analysis of correct connection, of link speed and response time.

When the PLC is answering on PING messages, operators are able to determine connection quality to the individual PLC.

Sending PING requests to other systems, the PLC can monitor the peripherals like HMI for presence in the network, the remote I/O availability and simply can supervise other equipment. This can be from discrete manufacturing, manufacturing execution systems, enterprise resource planning and commercial IT as well. So the PLC becomes part of the quality assurance.

Your advantages at a glance:

- broken communication can be detected before machines become damaged severely
- dumb peripherals become part of the self-analysis of the machine control system, controlled by PLC
- testing of machine control system‘s communication by standard personal computer saves cost for special network test equipment
- predictive maintenance support
- communication bottleneck detection shortens commissioning time and costs

DNS
The PLC can request from a domain name server a unique name for this PLC. From now on, all PLC in an IP network – when using DNS – can be accessed by a uncomplicate name instead of a bewildering number.

Lets have a look to a brewery. Operators can check the bottle wash station by „botwash“ instead of 192.168.0.69. The beer case wash may get the name „caswash“ instead of 192.168.0.96.

Your advantages at a glance:

- uncomplicated management access to PLC allow error-free supervision for perfect quality and productivity
- PLC having a name automatically present their location and function without further tools, saving investment and operations cost
- when IP address is changed in case of repair exchange, the name remains the same

Internet protocol made easy
HTTP – FTP – SMTP – SNTP – DHCP – BOOTP – DNS – PING

7 IP configuration example for onboard Ethernet port. Double-click on the item you want to configure.

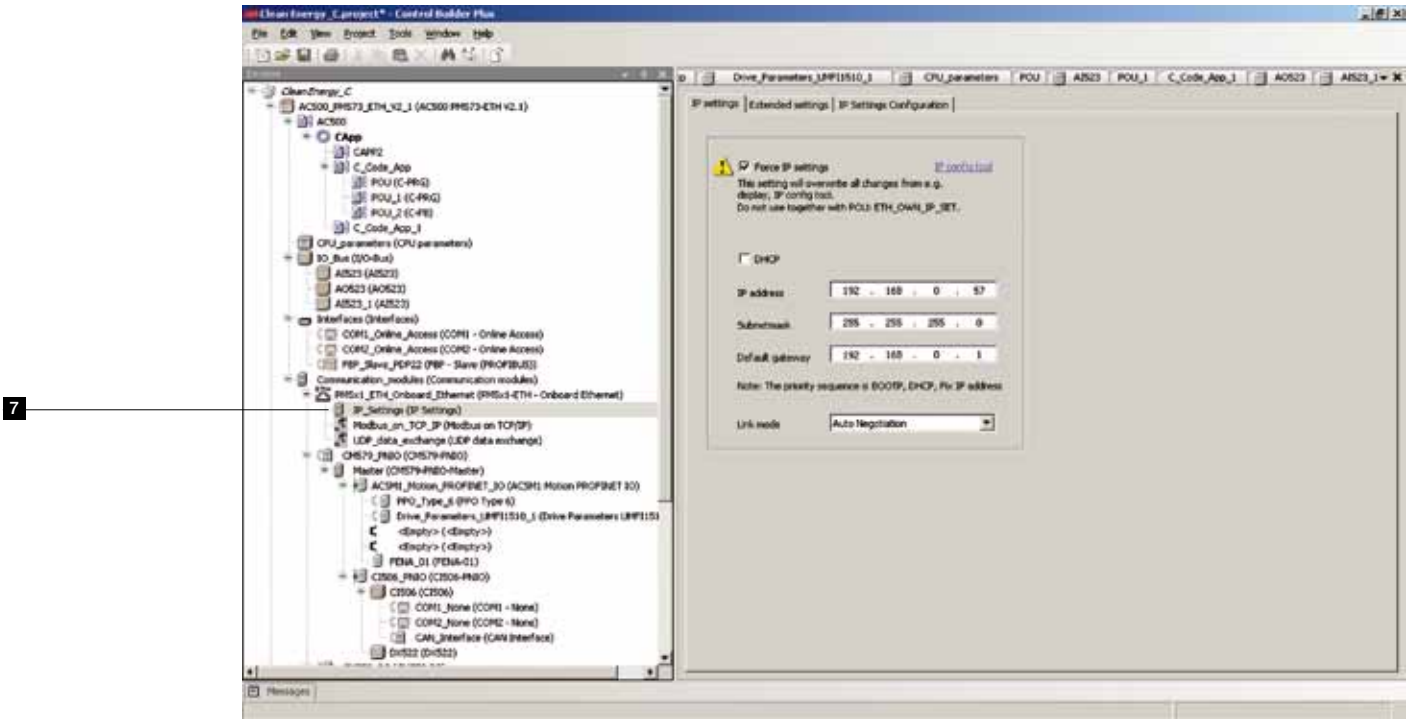
The typical IP configuration of modern devices - everything is crisp-clear.

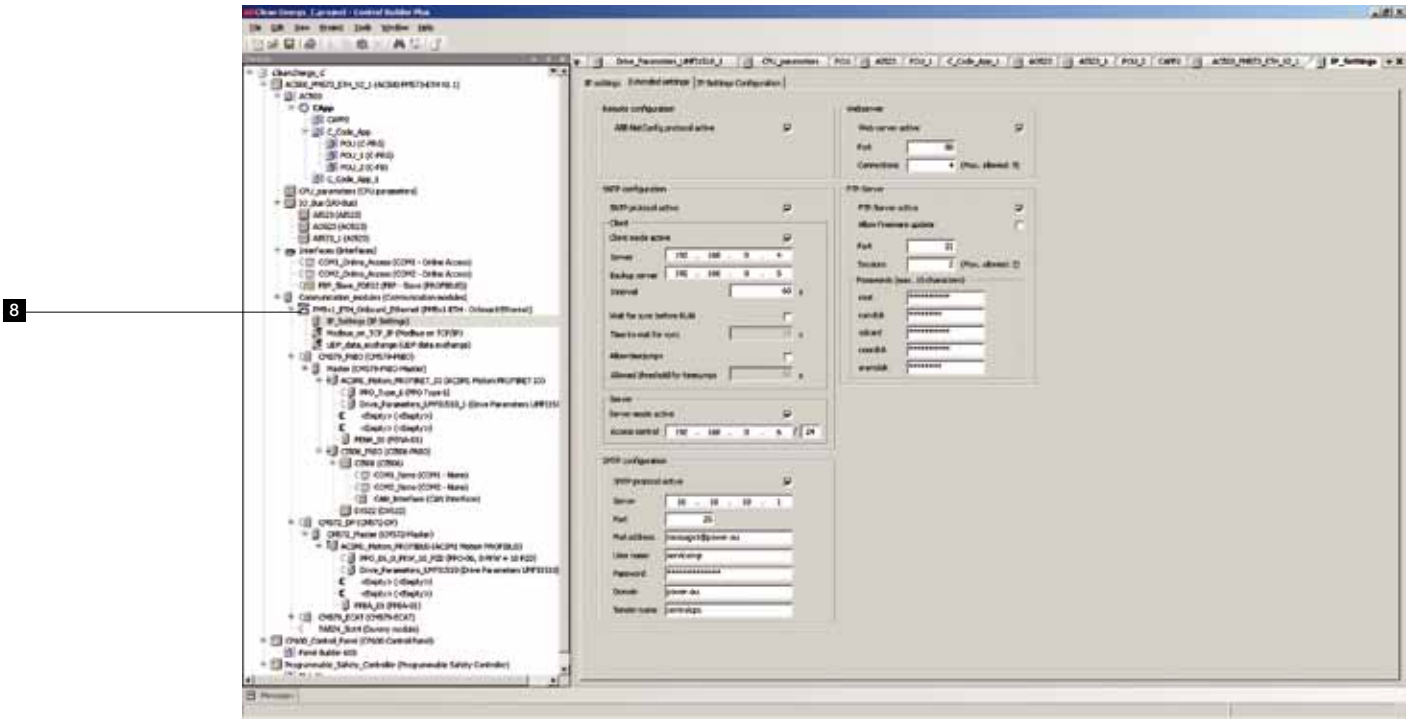
8 The tab “IP Settings Configuration” is either for internet enthusiasts or for rare situations - most can leave it as it is.

Is it difficult to setup a powerful web server?

Not at all. Below is all you need to know - it is fun to setup the web server with PS501 Control Builder Plus!

By the way – the FTP and other servers share this great simplicity of configuration.





Easiest setup of PROFIBUS DP
For a new world of automation

Because drive and PLC are connected via PROFIBUS DP, the PC used for configuration or diagnostics has direct access to the drive and the PLC. This works with PROFINET IO RT the same manner.

Single-point-of-access.

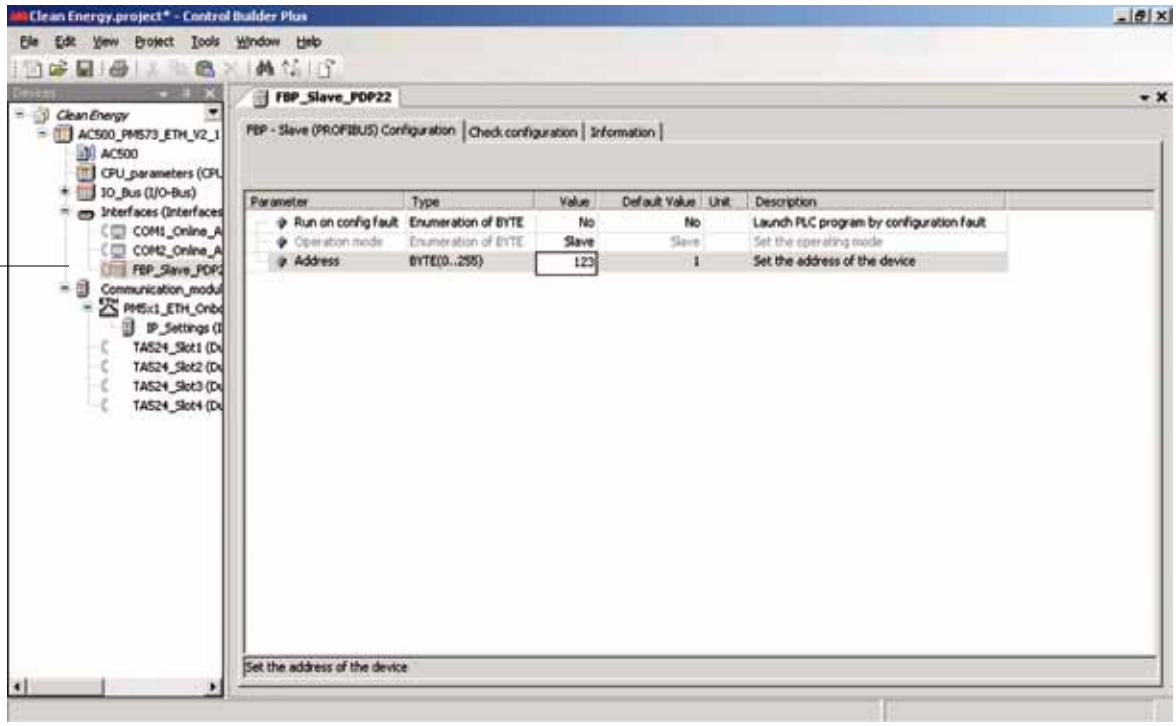
Here we introduce the PROFIBUS DP slave configuration, because we will use this for the ABB drives configuration.

9 PROFIBUS DP slave configuration – straightforward, quick, easy. Remember – right-click with mouse is all you need to start!

10 Aficionados can tailor the PROFIBUS DP behavior.

From PROFIBUS DP to drive configuration – easy!

11 Remember the double-click and the context-sensitive menu using mouse right-click. There is not so much to do here – ABB makes life easy.



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Easiest integration ABB drive with PROFIBUS DP
For a new world of automation

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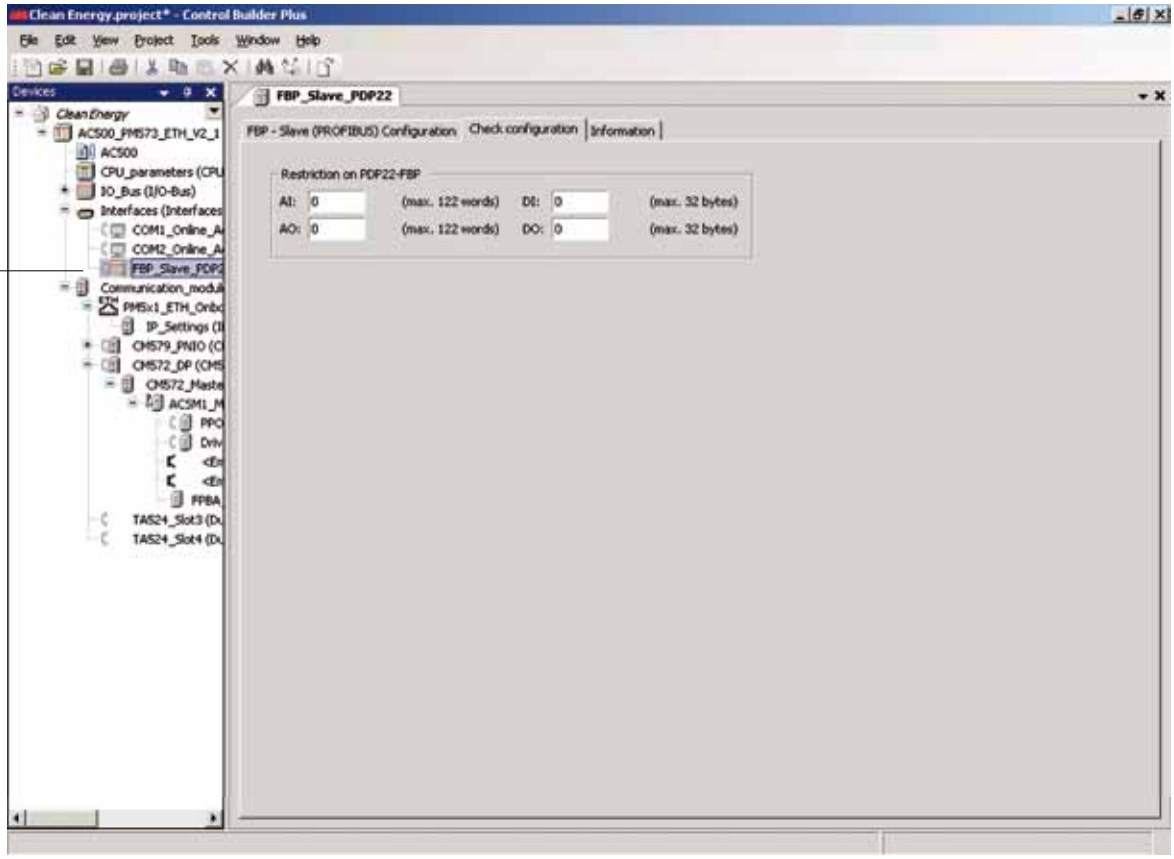

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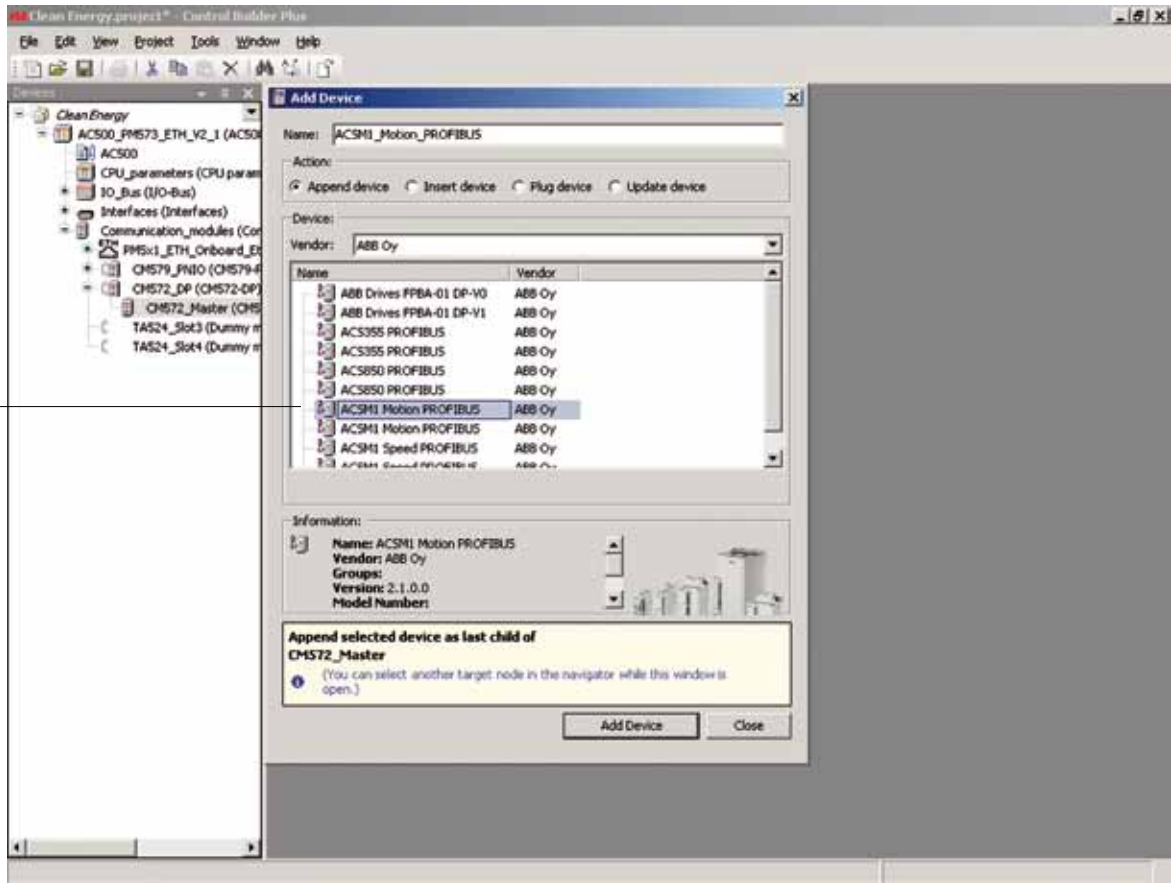


Effortless – drives configuration as well as visualization
For a new world of automation

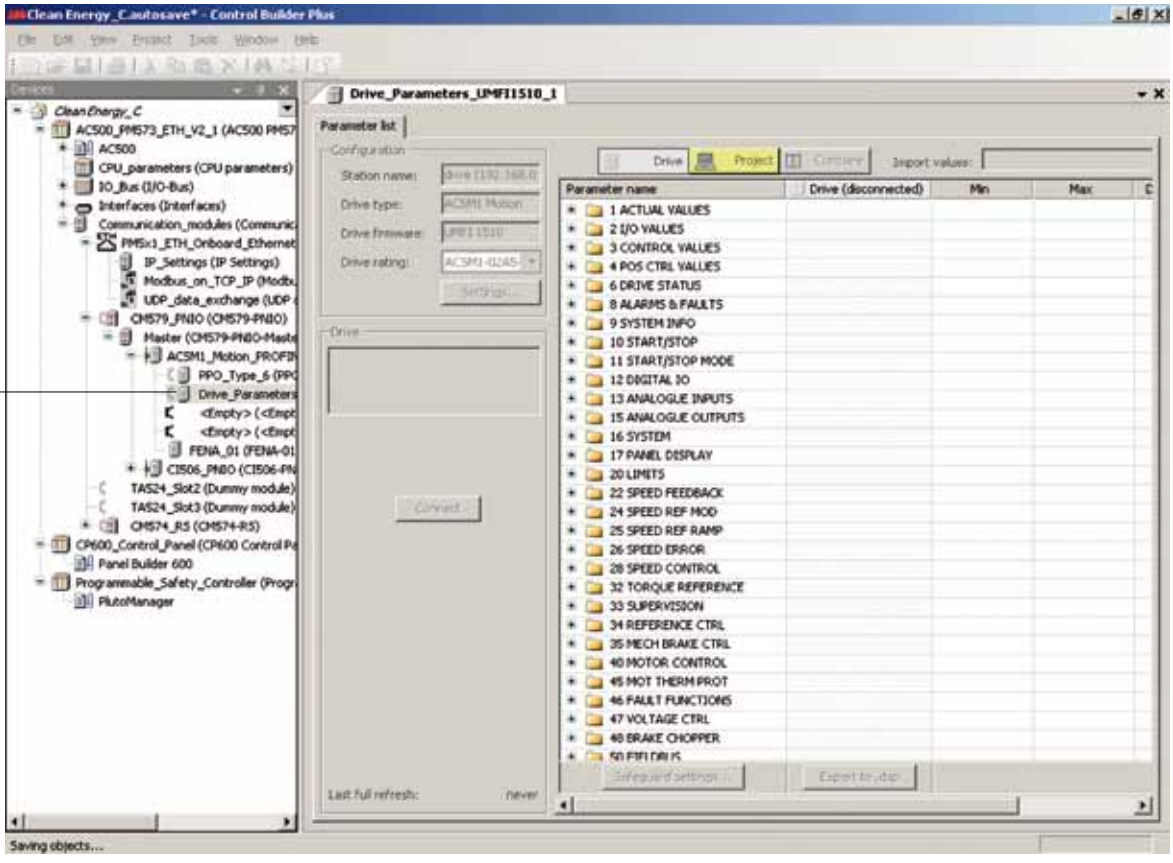
12 Here our drives enthusiasts may delve to the last bits and bytes of ABB drives.

Yes, now we have much-needed parameters all over. Everything comes handy by well-sorted tabs, clear tree structure and dialogs.

AC500, AC500-eCo and PS501 Control Builder Plus support different kinds of visualizations:

- integrated CoDeSys visualization
  used from the CoDeSys platform when user is online
- standalone CoDeSys visualization
  used from PC with CoDeSys with protection of code
- CoDeSys Web visualization
  based on the CoDeSys visualization and the integrated web server user can have access to the AC500 via standard web browser like Internet Explorer or Firefox. Additionally the new CP600-Web panels can be used.
- CP600 operator panels
  with the optional PB610 Panel Builder 600 software users can build their own visualizations for the CP600 series panels. Access to AC500 via Modbus or CoDeSys ETH drivers
- OPC
  using standard HMI or SCADA clients running at a PC by communicating via OPC server

Application example made for HMI panel CP400 series



12

Perfect visualization right from start
Sophisticated HMI with ABB panels

HMI panel CP600 series, example of a virtual machine.

Importing the PS501 Control Builder Plus tags from AC500 programs into CP610 Panel Builder 600 to build a standardized system is really easy.

Perfect visualization right from start
From PC display to web server via www

Those who want to use the PC display as an HMI, will find a complete design studio and configuration tool inside PS501 Control Builder Plus.

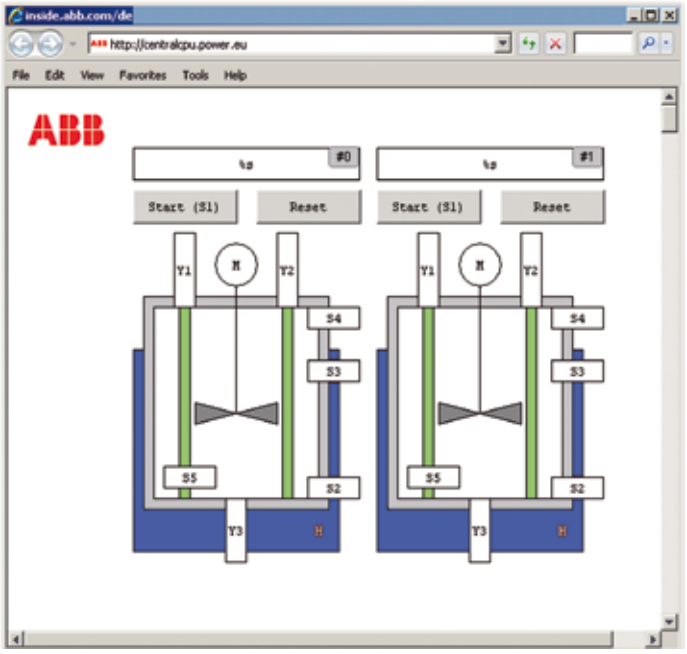
It is the basis for web visualization, too.

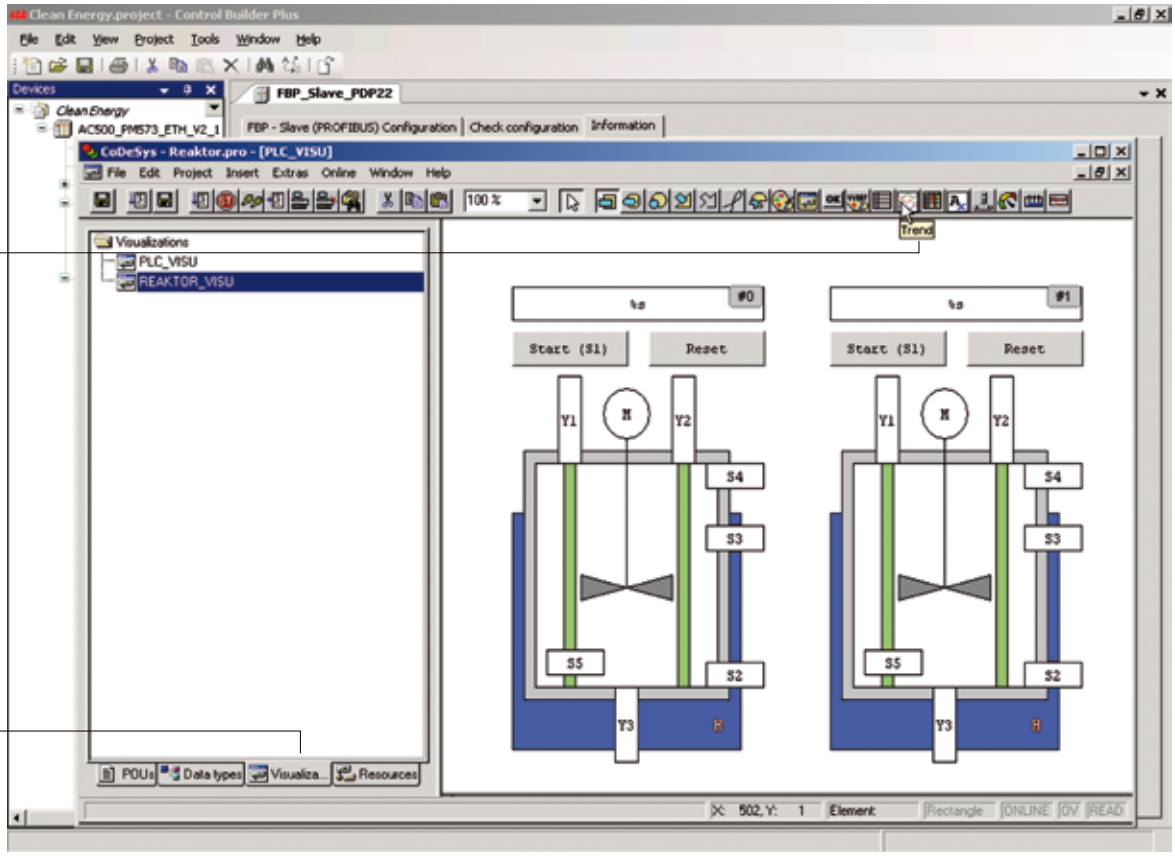
13 The ideal start for visualization is the CoDeSys-built editor. Tens of thousands of users worldwide are used to create meaningful, helpful HMIs.

Putting the visualization into built-in web server of AC500 and AC500-eCo goes by – mouse-clicks only! Just enable the web visualizations in the target settings of CoDeSys.

14 There are many graphical and active elements provided for meaningful visualizations, whether on PC or device running an internet browser.

Did you recognize the balloon help at the mouse pointer? Useful help is always available to maximize efficiency!





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13

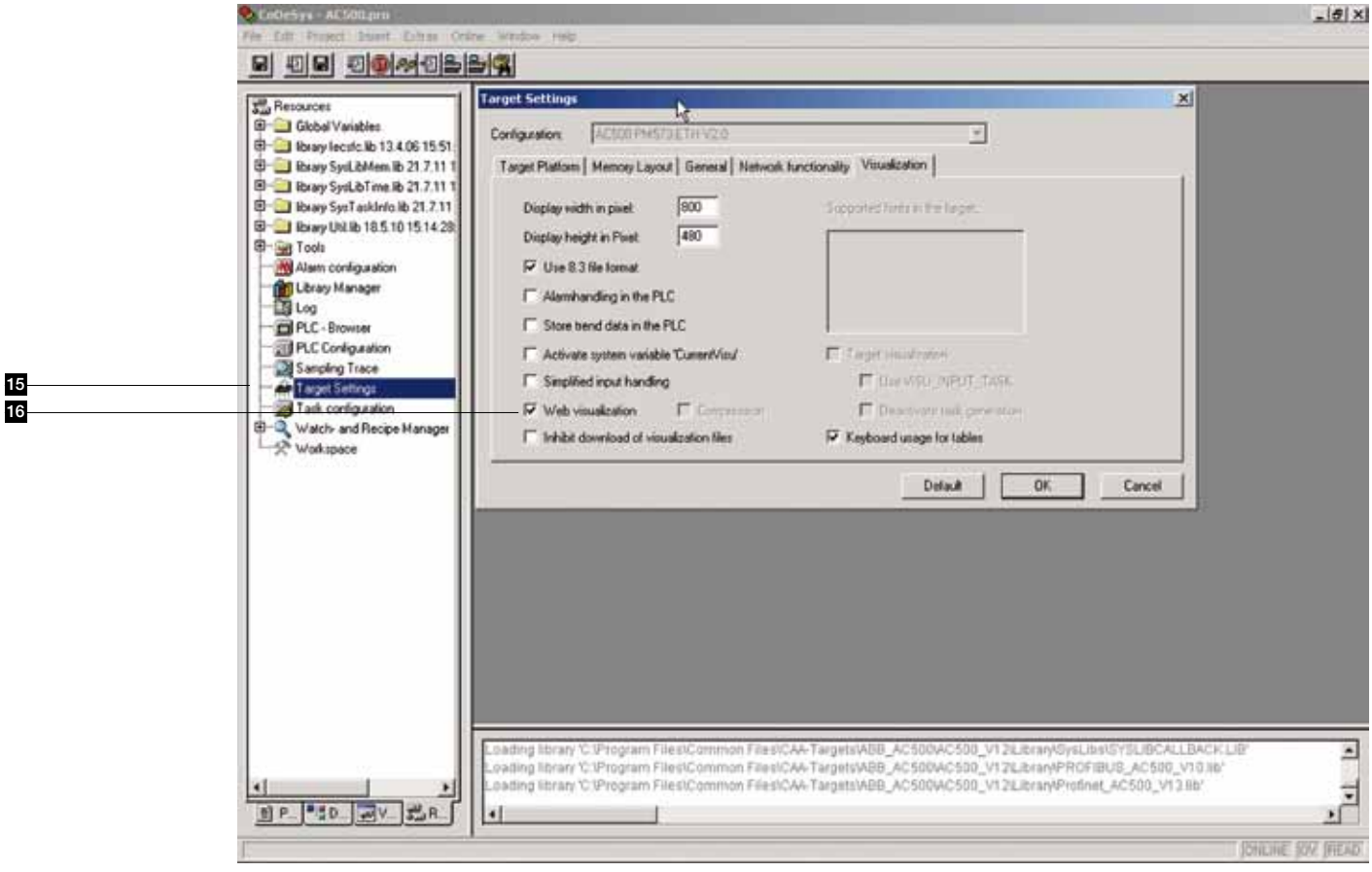
Perfect visualization right from start
Web server activation by just one tick!

15 This will download the web visualization to CPU memory.

16 Once the web server is activated in the configurator, your web visualization is ready to go!

Your advantages at a glance:

- the many visualization possibilities allow optimal performance-to-cost ratio
- only one configuration tool necessary- PS501 Control Builder Plus
- deep integration of visualization allows direct, fast, error-free access to the variables
- web visualization configured easily for the web server of most AC500 and AC500-eCo CPU
- the visualization supports diagnostic and debugging
- web visualization free of charge



Seven ways to programmer's heaven
IEC61131-3 CoDeSys offers five plus…

IEC61131-3

PS501 Control Builder Plus complies with the IEC61131-3 CoDeSys de-facto standard offering all five IEC programming languages.

1. Function block diagram	FBD
2. Instruction list	IL
3. Ladder diagram	LD
4. Structured text	ST
5. Sequential function chart	SFC

Number 6 is another de-facto standard, greatly supported by PS501 Control Builder Plus:

6. Continuous function chart	CFC

Number 7 is C. It is available for specific projects. Please contact your local ABB sales organization.

As you would expect from the world's leading provider of automation and drive solutions, ABB has designed its new engineering software around IEC61131-3 – the global standard for programming in automation. As a result, PS501 Control Builder Plus represents the consequent implementation of this standard in the automation engineering world. All five standard languages are implemented to deliver the ultimate in functionality and flexibility for your automation project and a host of features that genuinely leaves nothing to be desired. For example, you can make use of the vast library support available – such as PLCopen, as well as extensive pre-existing solutions made available from numerous trusted sources.

ABB – the clear choice

Naturally, choosing ABB PS501 Control Builder Plus also ensures straightforward recruitment and reduces training costs due to the fact that the vast majority of educational facilities worldwide focus on IEC61131-3 right from the outset. Consequently, the chances are high that your newly recruited engineering staff will not only be well acquainted with the software – they have probably used very little else. Moreover, its CoDeSys basis provides the power and convenience for unbelievable efficiency in daily operation.

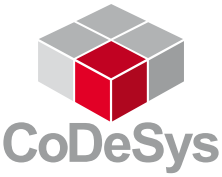
Your advantages at a glance:

- make use of the vast library support available – such as PLCopen
- worldwide focus on IEC61131-3 right from the outset leads to straightforward recruitment opportunities and reduced training costs
- CoDeSys basis provides the power and convenience for unbelievable efficiency in daily operation
- the familiar user interface and concept supports ease of use
- slim software architecture ensures easy and fast installation and updates
- ABB's renowned technical support in over 40 countries worldwide
- user interface configurable for German, English, Spanish, Italian, French as well as simplified Chinese

The new, extended tool comes with extensive function block libraries, a powerful embedded visualization feature and interfaces for extension by other tools.

Extensive libraries inside PS501 Control Builder Plus – highly efficient programming for top quality

- file/directory management
- ZIP archive functions
- ASCII
- Ethernet
- PROFIBUS DP
- PROFINET IO RT
- DeviceNET
- CANopen
- EtherCAT
- FieldBusPlug
- Modbus
- IEC60870-5-104
- RTC
- diagnostics
- high-availability
- CS31 remote I/O
- RCOM
- serie90, compatible with predecessor AC31
- counters and more



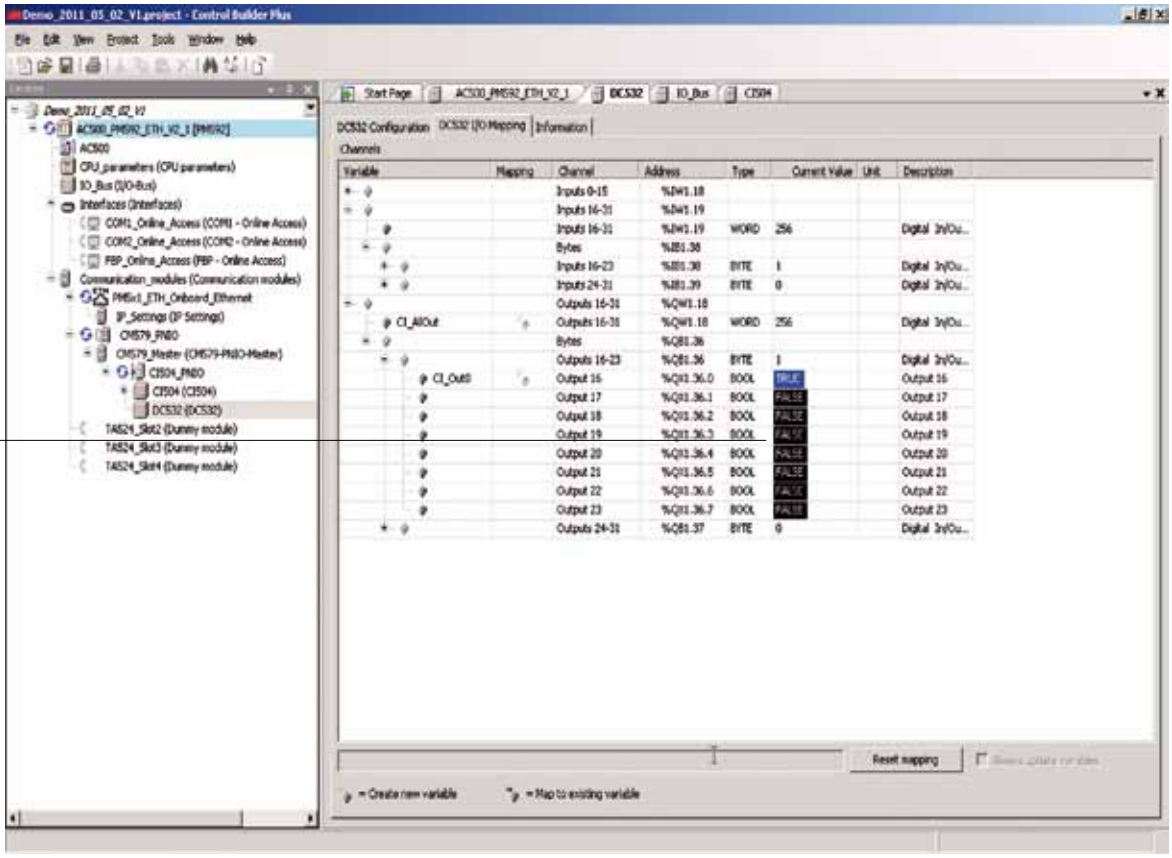
Amazing diagnostics & debugging
Total insight to any I/O over all busses

PROFINET IO RT

The configuration dialogs present every detail clear and complete. The input data is self-explaining, so documentation use becomes very rare and engineering time is used efficiently.

17 Prior to PS501 Control Builder Plus, setting up for diagnostics and debugging of a machine-specific visualization with panels or test instruments could be a time-consuming and frustrating process. The I/O states of the PLC triggered the state of the visualization elements, but all such visualizations were lost when a new machine was created. Thankfully, PS501 Control Builder Plus now makes this a thing of the past. Each I/O state can be checked directly in the I/O configuration. This feature alone can save engineers hours of valuable time during the diagnostics and debugging process. The unique feature is intrinsic to PS501 Control Builder Plus.

Of course, the I/O states are visible in CoDeSys, too. Whether analog or digital, everything is transparent.



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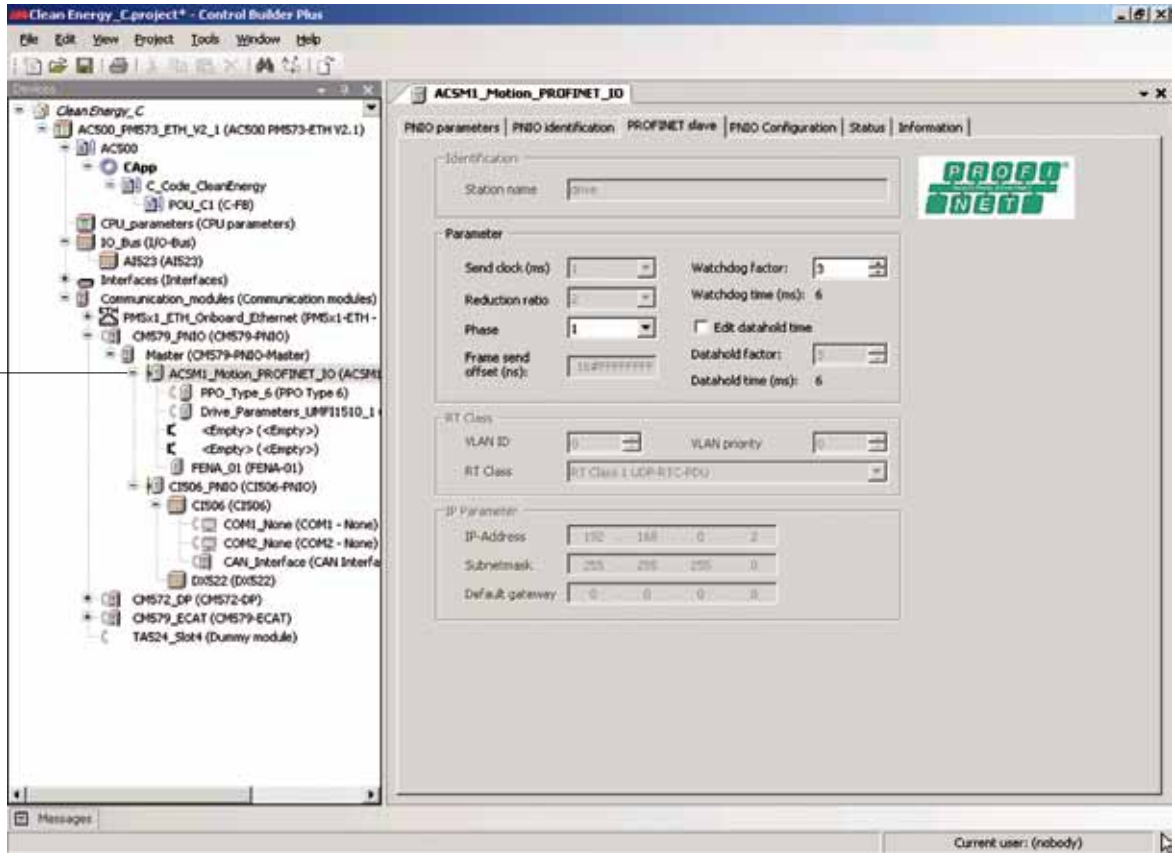
Amazing diagnostics & debugging
Total insight to any I/O over all busses



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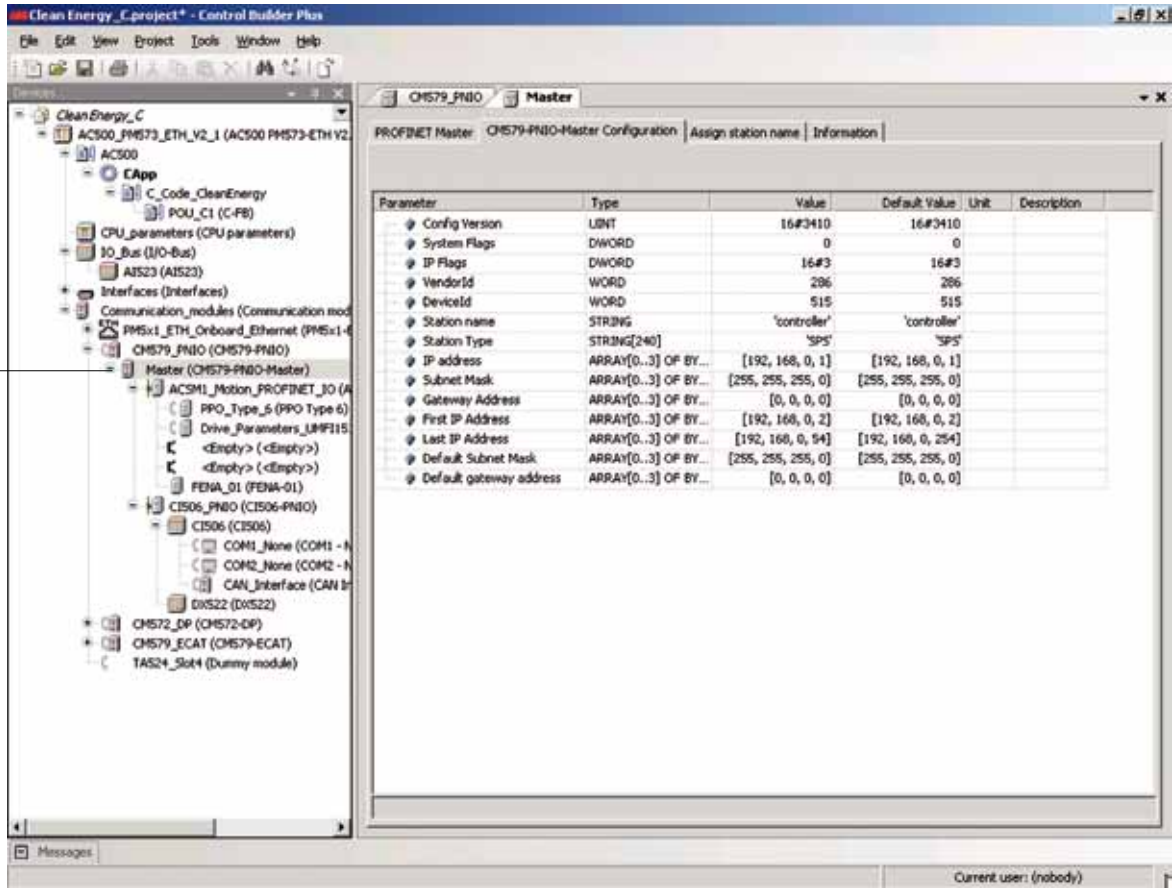


18

Amazing diagnostics & debugging
Total insight to any I/O over all busses

18 The data input sequences are in logical order. Data entered previously is copied to the next steps automatically. Please see the graphics sequence below.

Your advantages at a glance:

- migration from PROFIBUS DP to PROFINET IO RT becomes easy
- use PROFINET exclusively or in parallel to classic networks and busses

PS501 Control Builder Plus manages diagnostics for remote I/O in same manner as for local I/O.

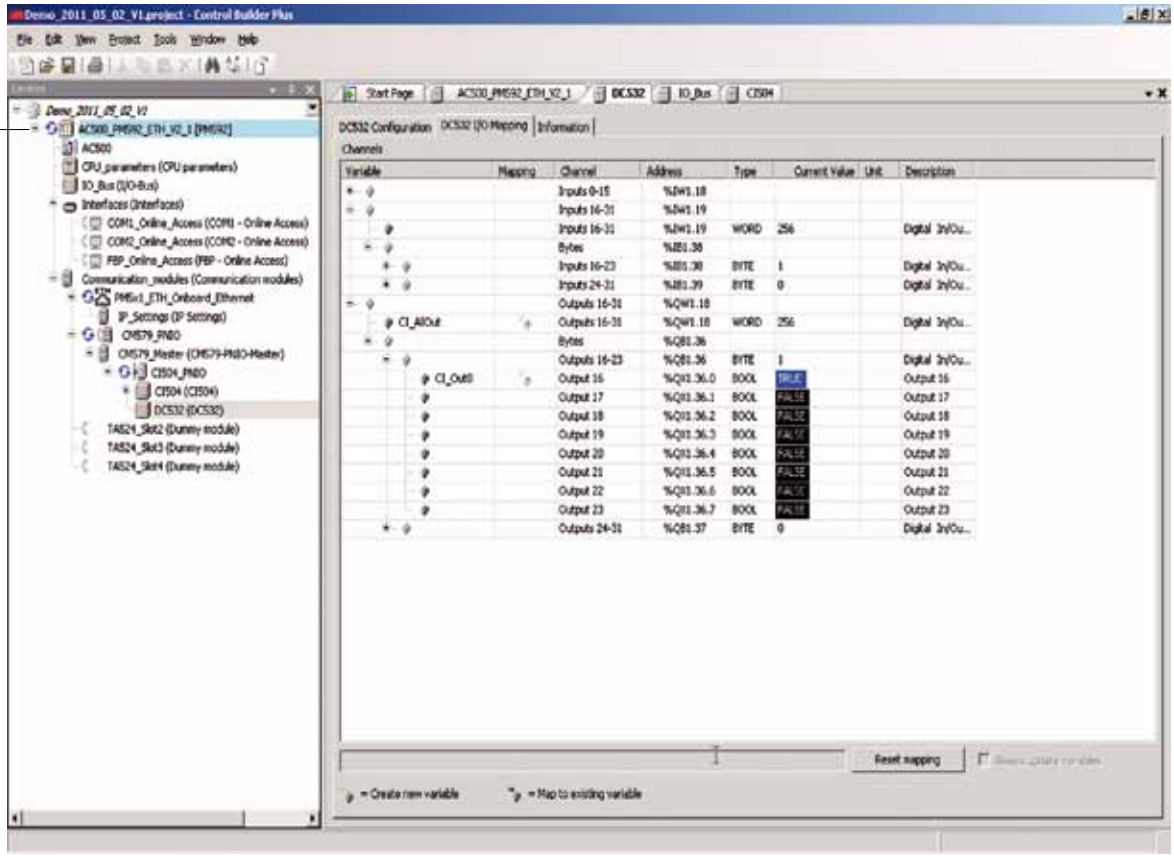
This includes:
- any variable is displayed, either in digital or analog
  - digital means “True” or “False” are presented directly
  - analog provides the value with continuous update when online
- watch list to be defined by the user with complete freedom how and where
  - see a variable in a window? OK, just do right-click with mouse and follow dialog
  - multiple watch list for superior overview and for customized tasks

19 Where transparent diagnostics over busses is possible, it is signaled to the user by blue symbols on left of the bus node.

Your advantages at a glance:

- smart online diagnostics and debugging
- diagnostic setup is automatically
- alarm handling for enhanced maintenance and commissioning
- built-in diagnostics with same look and feel across every view – a massive boost for teamwork support
- fast commissioning saves time and money
- greatly reduced training requirements
- the new PROFINET gateways CI504-PNIO and CI506-PNIO offer serial interfaces, CAN or CANopen. The diagnostic system tunnels the serial or CAN diagnostics through network and fieldbus.
- an additional benefit is that diagnostics for the local interfaces are identical with the remotely connected interfaces.
- no more external diagnostic tools needed, saving purchasing and training costs
- rapid commissioning saves money
- one universal engineering tool for all your requirements

19



Amazing diagnostics & debugging
Multiple watch list for easy debugging

20 Multiple watch list allow debugging with specific scenarios. The variables to be observed can be collected in watch list.

The appropriate watch list is then called when the specific scenario is needed.

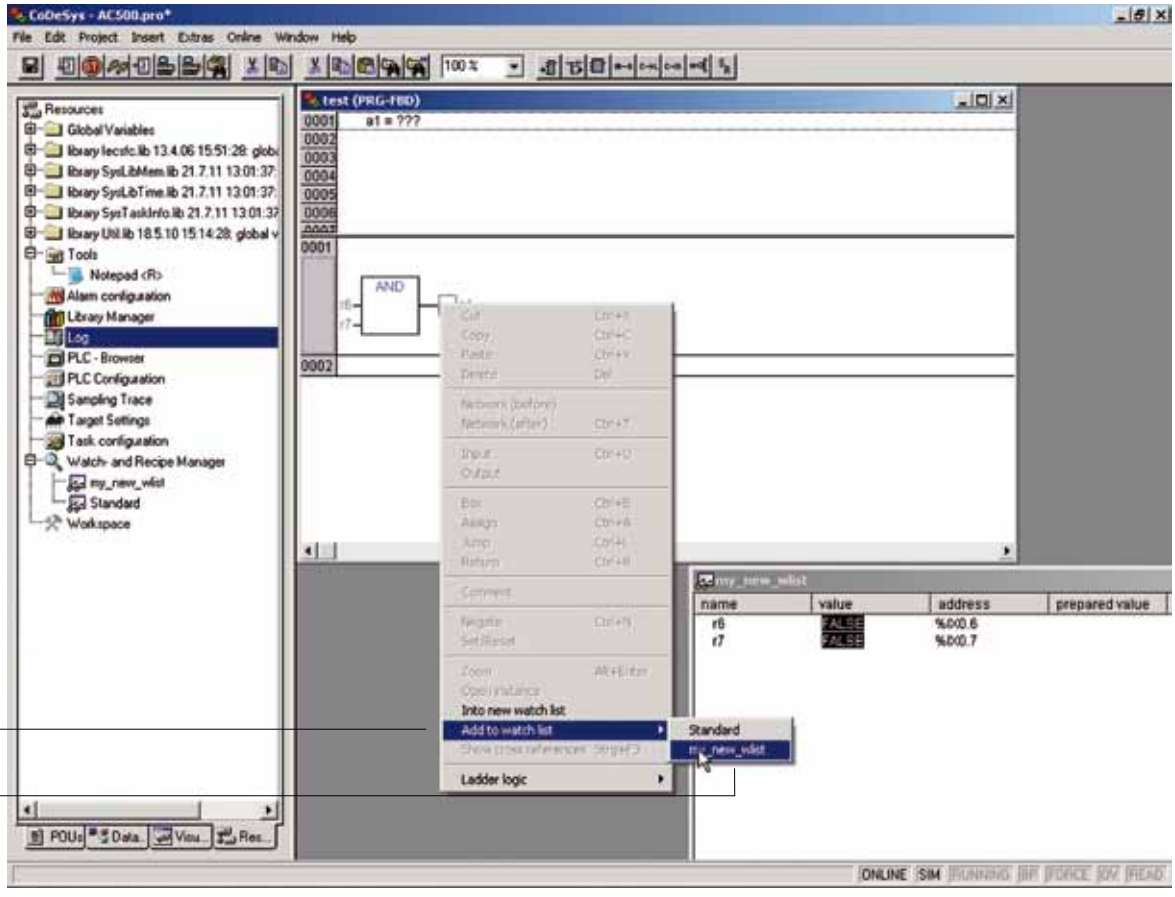
Your advantages at a glance

- define watch list content – the variables – in every editor
- in distributed development teams members can easily agree to use specific watch list, so errors are minimized and work continues rapidly
- works over busses down to the ports – transparently
- it is sufficient to know the variable – the hardware behind does not matter

The good stories continue. Working in another editor? No worries, mates!

Right-click in a text editor of CoDeSys onto a variable, and the easy context-sensitive menu comes up, too.

21 Select your watch list – and go!



Amazing diagnostics & debugging
Extra measurement devices obsolete – ABB's sample trace is effortless

Sampling trace

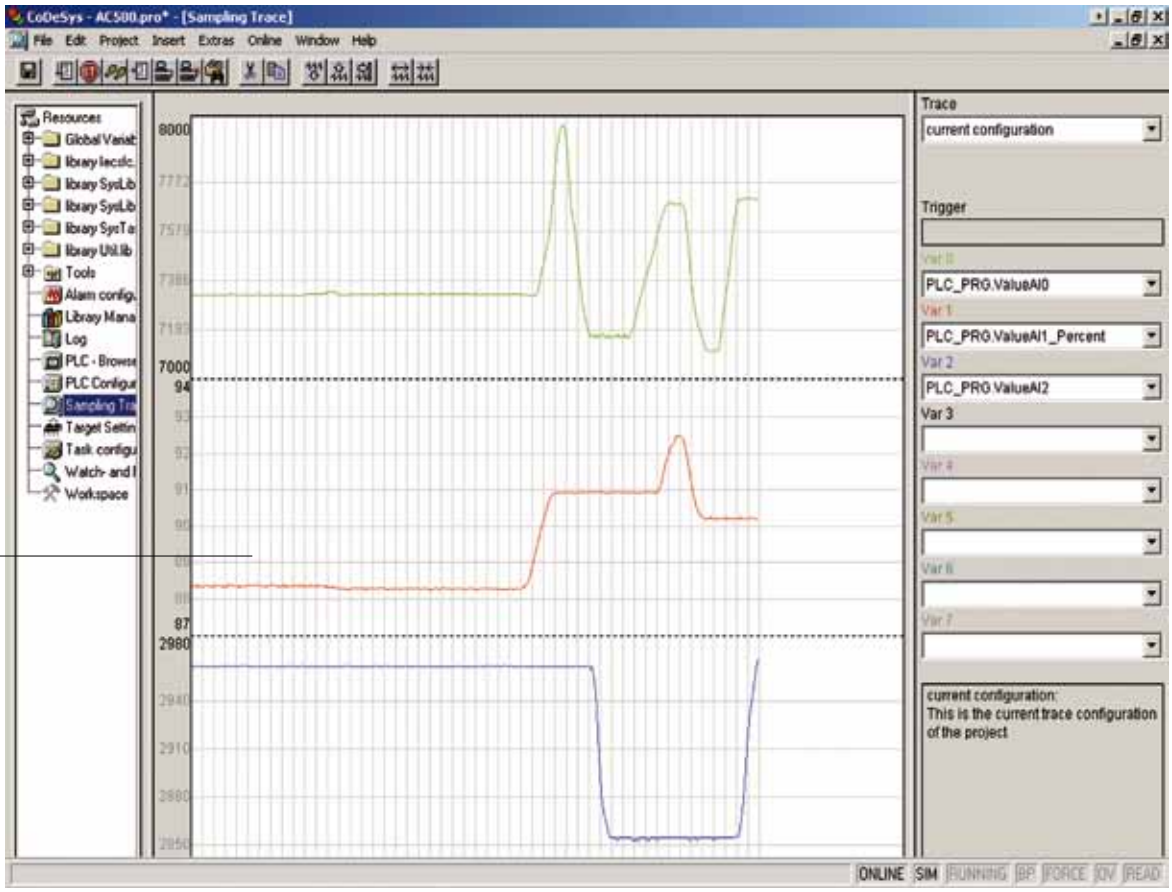
PS501 Control Builder Plus features sample tracing to enable the progression of values for variables to be traced over a certain time frame. These values are written in a ring buffer (trace buffer) with event trigger.

22 Different colors can be used for various signals and recording makes debugging and diagnostics extremely productive.

Multiple choices for trigger, sample rate and duration offer excellent fine-tuning of the tracing to the user's needs.

Your advantages at a glance:

- with sampling trace, you have the functionality of a digital oscilloscope integrated in your programming tool
- changes in process variables that happen in milliseconds can be recorded in real-time and then investigated in detail on the screen
- the ultimate help for effective debugging of your application programs



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Order Number 2CDC 123 018 B0201 printed in Germany (10/11-5-NOD)

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