



DOCUMENTATION SERIES PAC120 AND PACHC

Package and firmware migration V 2.0.0.4

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Hydraulic Valve Systems Division Europe

Industrial Applications

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1. Safety information



IMPORTANT: Please read this information
BEFORE installing the equipment.

1.1. Personnel

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

1.2. Application risk

The specifications, processes and circuitry described herein are for guidance only and may need to be adapted to the user's specific application. We cannot guarantee the suitability of the equipment described in this Manual for individual applications.

1.3. Risk assessment

Under fault conditions, power loss or unintended operating conditions, the drive may not operate as intended.

In particular:

- Stored energy might not discharge to safe levels as quickly as suggested, and can still be present even though the drive appears to be switched off
- The cylinder direction of travel might not be controlled
- The cylinder speed might not be controlled
- The cylinder might be energized

A cylinder is a component within a hydraulic system that may influence its operation or effects under a fault condition.

Consideration must be given to:

- Stored energy
- Supply disconnects
- Sequencing logic
- Unintended operation

2. Changes

2.1 CODESYS Package

2.1.1. Version 2.0.0.4

- All necessary updates for PAC120, PACHC and PACIO for Codesys SP19 Patch 7 as in version 1.0.0.4 including
 - Device descriptions
 - Libraries (PKR_PAC120_System, PKR_PACHC_System)
 - Templates for axis control, multi axis control, synchronized movement
- Used for PAC120 with serial number > 250825000234 or units with manually upgraded firmware package 1.28.6
- Note: In case of sandbox utilization (cf. chapters 2.2) package 2.0.0.4 is already included

2.1.2. Version 1.0.0.4

- Optimization task handling of PACHC EtherCAT slave device
- PACHC EtherCAT state available in program code
- Correction of page switching and button visibility in Setup-Mode
- Correction of configuration download using Homing Modes -1 or -2
- Added output "Done" at function blocks for fieldbus initialization
- Update Application Templates
- Package installation selectable for PACIOs
- Updates to the latest PKR libraries
- Updates to the latest device descriptions for PAC120 and PACHC

2.1.3. Version 1.0.0.3

- Additional Homing Modes -1 for movement to extended and -2 for retracted position
- Deadband compensation type 1 for constant zero and type 2 for straight line in the deadband
- Possibility of movement in opposite direction after SW Limit error
- Test movement position and pressure/force
- Colour signalization Sent Button on parameter change
- Change configuration of encoder feedback resolution to [mm]
- Correction of current valve command signal configuration
- Error handling for up- and download of configuration
- Improvement of Error History
- Added function block for EtherNet/IP initialization
- New Application Template for EtherNet/IP
- Package installation selectable for PAC120/PACHC variants
- Updates to the latest PKR libraries
- Updates to the latest device descriptions for PAC120 and PACHC

2.1.4. Version 1.0.0.2

- Error handling for a missing axis input in all function blocks
- Monitoring and reset of EBUS error
- Outputs for EtherCAT valves added to cyclic EtherCAT default mapping
- Disturbance Offset Force added to cyclic EtherCAT default mapping
- Default EtherCAT mapping for command and control words optimized
- Acceleration filter for position controller added to optimization
- Constant pressure in configuration of the pressure transducers
- Languages France, Italian and Chinese
- Added function block for pressure/force sine, rectangle or triangle profile
- Added function blocks for position and force controller adaption for sine profiles with adjustable frequencies

- New Application Templates
- Saving configured "*Application type*"
- Saving configured "*Force/Pressure Ctrl.*" mode
- Saving configured "*No. of Cylinders*"
- Updates to the latest PKR libraries
- Updates to the latest device descriptions for PAC120 and PACHC

2.1.5. Version 1.0.0.1

- Added update rate for SSI position feedbacks
- Reading HW and FW version in PACHC CoE Online
- Added objects for position and pressure/force reached for each axis
- Added function blocks for 2 and 4 axes position calculation
- Differentiation between unipolar and bipolar current signal valves
- Time out handling for configuration upload and download
- Reset of PACHC errors with Reset warm in CoDeSys
- No compiler errors in Simulation Mode
- Updates to the latest PKR libraries
- Updates to the latest device descriptions for PAC120 and PACHC

2.2. CODESYS Sandbox

2.2.1. Version 1.0.0.0

- Codesys SP19 Patch 7 Sandbox including package 2.0.0.4 (cf. 2.2.1)

2.3. PACHC firmware

2.3.1. Version 2.1.19

- Eliminated analogue output peaks with configuration download

2.3.2. Version 2.1.18

- Optimization of position profile generation to avoid not finishing movements with low jerk
- Bugfix Velocity Threshold I-Part position controller

2.3.3. Version 2.1.16

- Adjusted I-Part position and pressure/force controller matching to unit -
- Delete Homing Offset with Encoder feedbacks

2.3.4. Version 1.1.15

- Added update rate for SSI position feedbacks
- Eliminated analogue output peaks at application stop and start

2.4. PAC120 firmware

2.4.1. Version 1.28.6

- Update for Codesys Runtime SP19 Patch 7

2.4.2. Version 1.25.1

- Check and signalization of PLC start with under voltage
- Integration PAC120-Mxx variants

2.4.3. Version 1.25.0

- Standard use of RETAIN and PRESIDENT variables
- EtherNet/IP Adapter option

3. Installation

Note:

- Package 2.0.0.4 needs PACHC firmware V 2.1.19 or higher and PAC120 firmware V1.28.6 or higher
- Package 1.0.0.4 needs PACHC firmware V 2.1.19 or higher and PAC120 firmware V1.25.1 or higher
- Package 1.0.0.3 needs PACHC firmware V 2.1.18 or higher and PAC120 firmware V1.25.1 or higher
- Package 1.0.0.2 needs PACHC firmware V 2.1.16 or higher and PAC120 firmware V1.25.0 or higher
- Package 1.0.0.1 needs PACHC firmware V 1.1.15 or higher

To avoid compatibility problems, uninstall recent package versions first.

Any application built with outdated packages can be updated to the actual version.

3.1. Version $\geq$ 2.0.0.4

3.1.1. CODESYS Installer

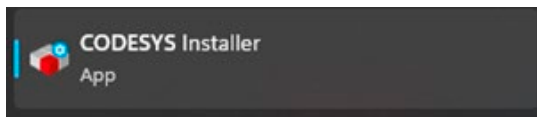
Codesys changed from package manager to the Codesys Installer as standalone application handling not only package addons but also the main codesys installation process. It is not mandatory but strongly recommended to install the application available from Codesys Store.

3.1.2. Package installation

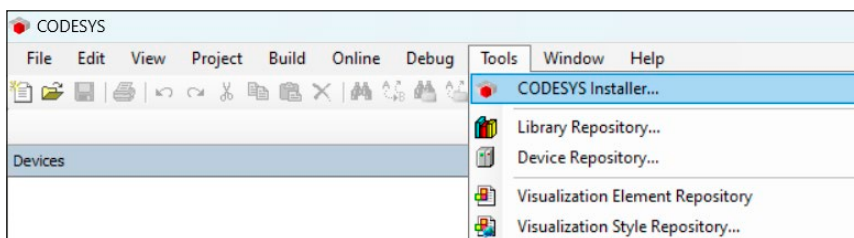
If the CODESYS Installer application is used (cf. chapter 3.1.1) the procedure is as follows (otherwise refer to chapter 3.2).

1) Start Codesys Installer from Windows Menu (a) or within Codesys (b)

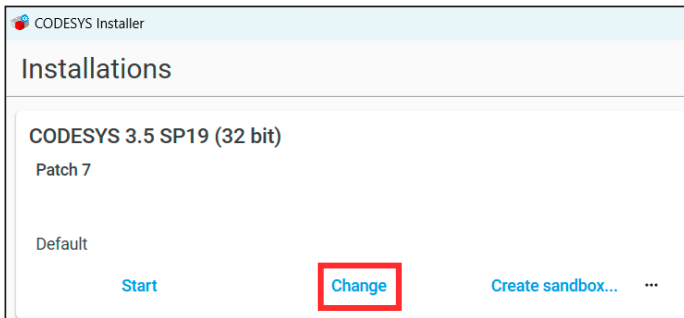
a Windows Menu



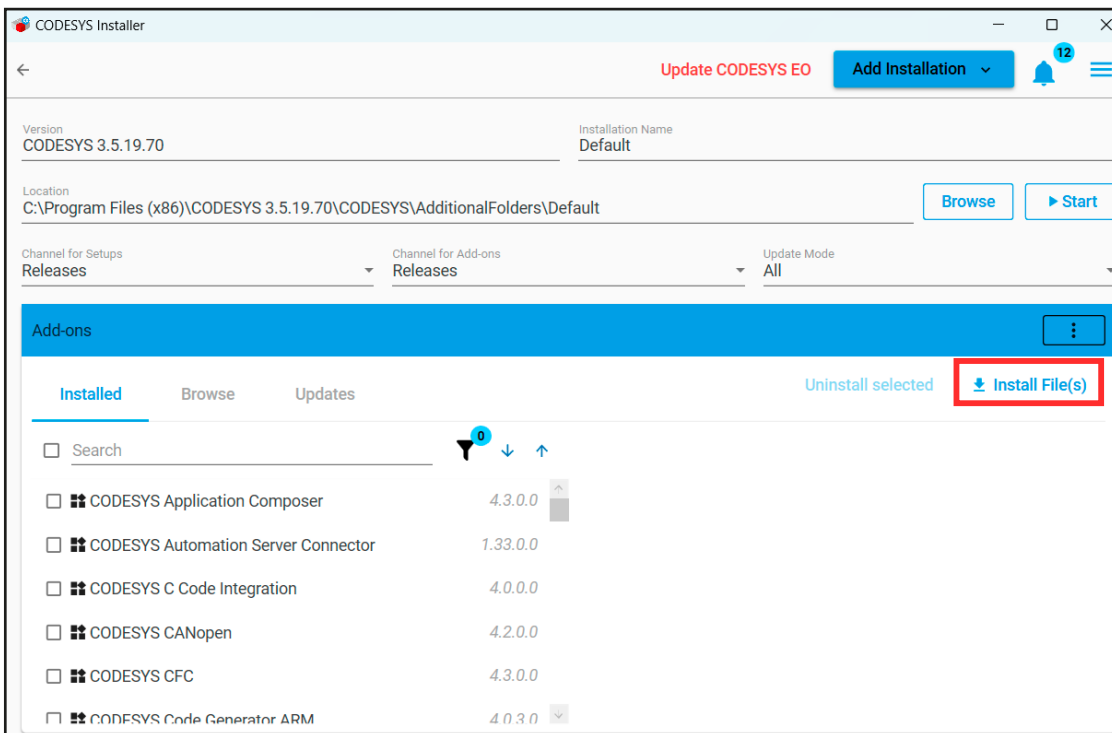
b Within Codesys



2) Choose the corresponding Codesys Installation and click on “Change”



3) Click “Install File(s)”, select the Codesys Package archive and follow the installation wizard.



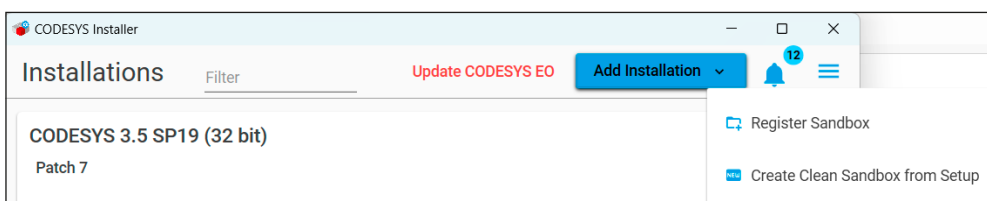
3.1.3. Optional: Codesys Sandbox usage

Besides the standard procedure to install addons as described in 3.1.1, there is also a sandbox archive available that contains all necessary Codesys files with the content of package version 2.0.0.4.

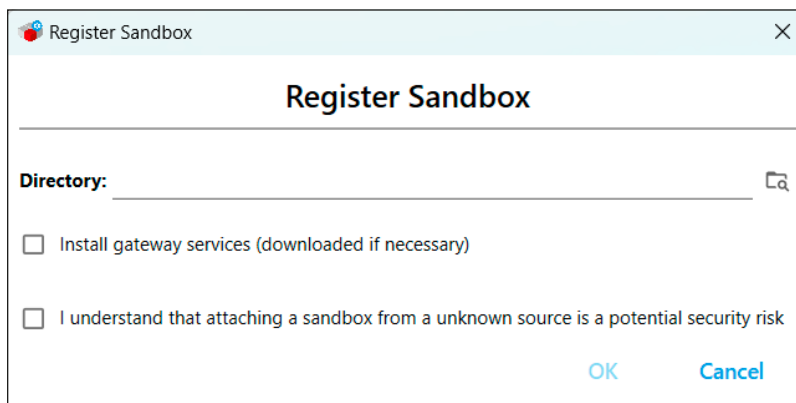
To integrate it into the Codesys installer sandbox you need to:

1) Click on “Add Installation” → “Register Sandbox” and choose the folder where the Sandbox files are stored.

Note: The installation path needs to be “C:\Codesys 3.5.19.70\..”. If the path is different, the internal references (e.g., device repository, library repository, visual profiles, templates, etc.) need to be changed manually.



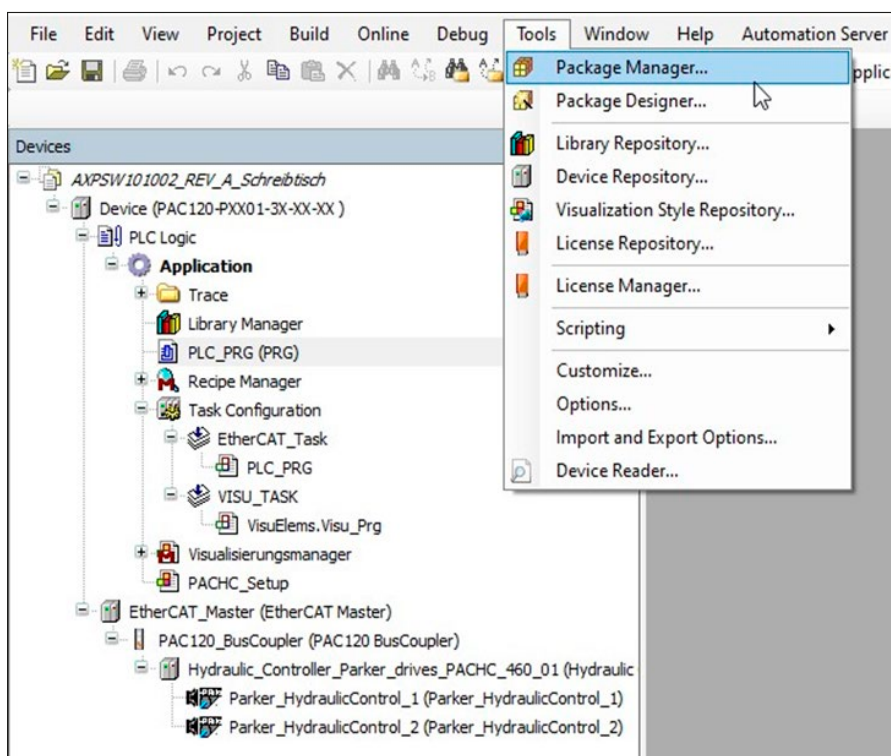
Furthermore, the gateway service can be installed (mandatory if there is no other Codesys SP19 installation on the machine) and the user needs to accept the potential security risk if the sandbox comes from an unknown source.



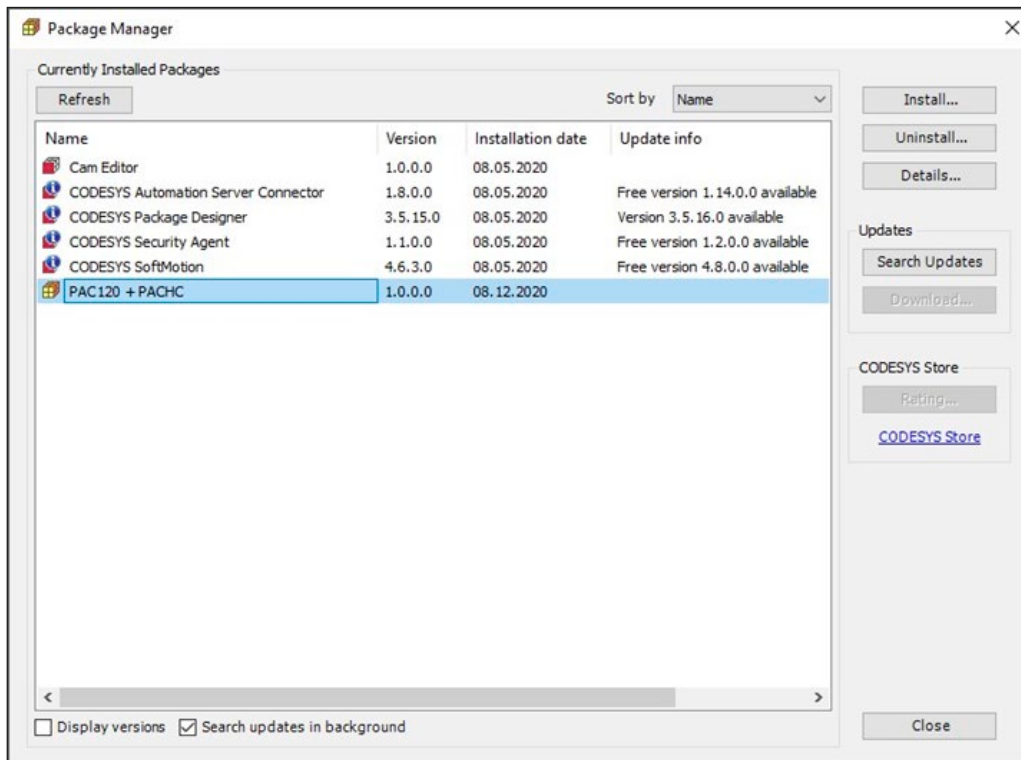
3.2. Version <=1.0.0.4

To change the package installation, use the Package Manager.

4) Start the Package Manager

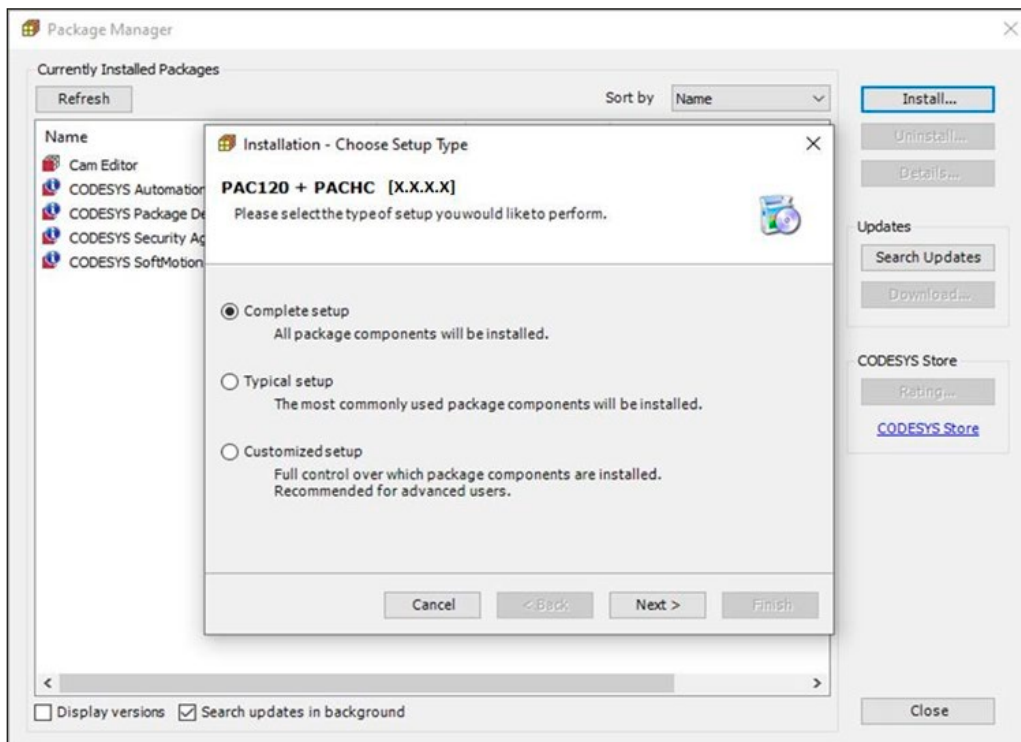


5) Uninstall recent package version



6) Restart CoDeSys

7) Install new package version with the Package Manager



8) Restart CoDeSys

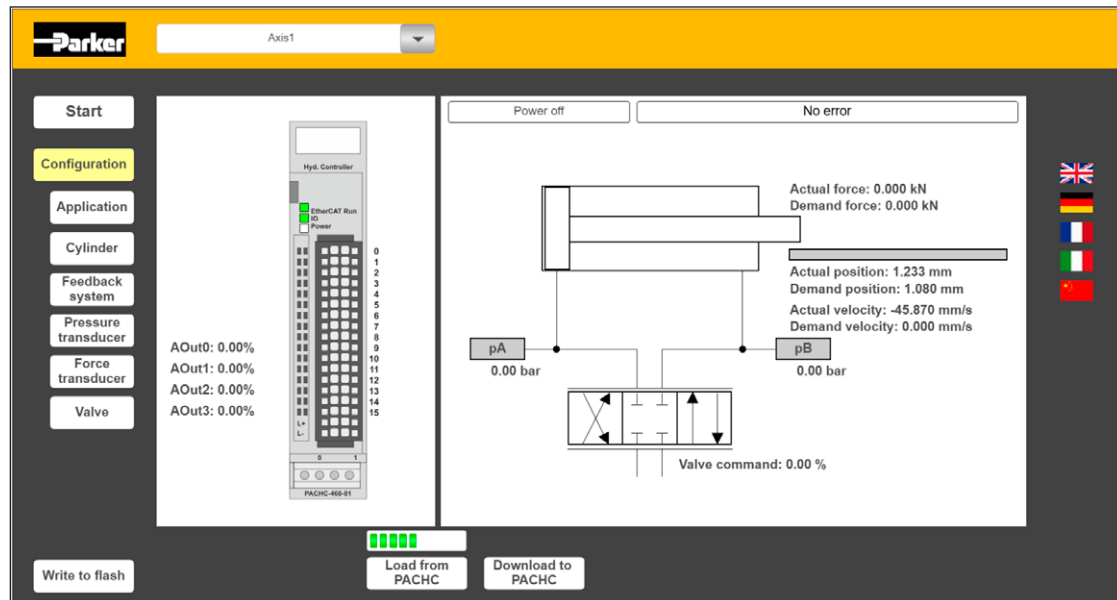
4. Firmware & Application Update

4.1. PACHC firmware update

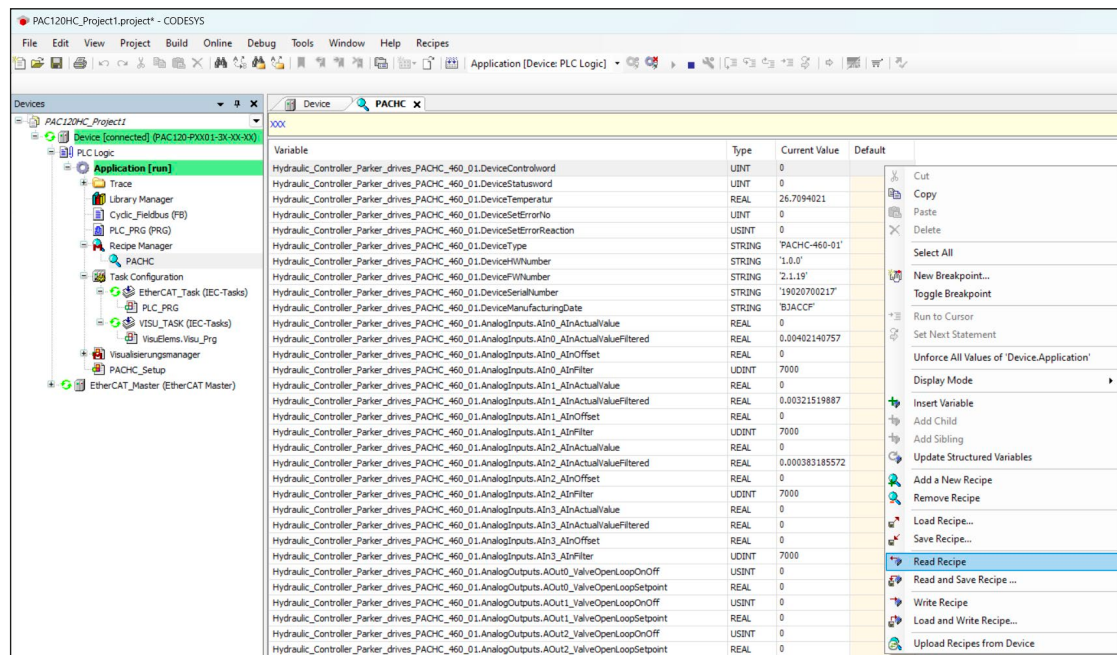
To update the firmware on the PACHC, the device must be connected with the PAC120 via the E-bus and your computer must be connected online to the PAC120.

Note: Updating the PACHC firmware will erase the actual saved PACHC configuration and parameters from the flash!

1) Load configuration from PACHC



2) Read and optional save recipe from PACHC



3) Select the PACHC in the device tree and open the corresponding page with double click

4) Activate the expert settings

The screenshot shows the 'Expert Process Data' configuration window for EtherCAT. The left sidebar lists various settings categories. The main area is divided into sections: 'Address' (AutoInc address: -1, EtherCAT address: 1002), 'Additional' (Enable expert settings: checked, Optional: unchecked), 'Distributed Clock', 'Startup Checking', 'Timeouts', 'DC Cyclic Unit Control: Assign to Local µC', 'Watchdog', 'Identification' (Disabled: selected, Configured station alias (ADO 0x0012): Value 1002, Explicit device identification (ADO 0x0134), Data Word (2 Bytes): ADO (hex) 16#0), and the 'EtherCAT' logo.

5) Switch PACHC to status "Init" first and then to "Bootstrap"

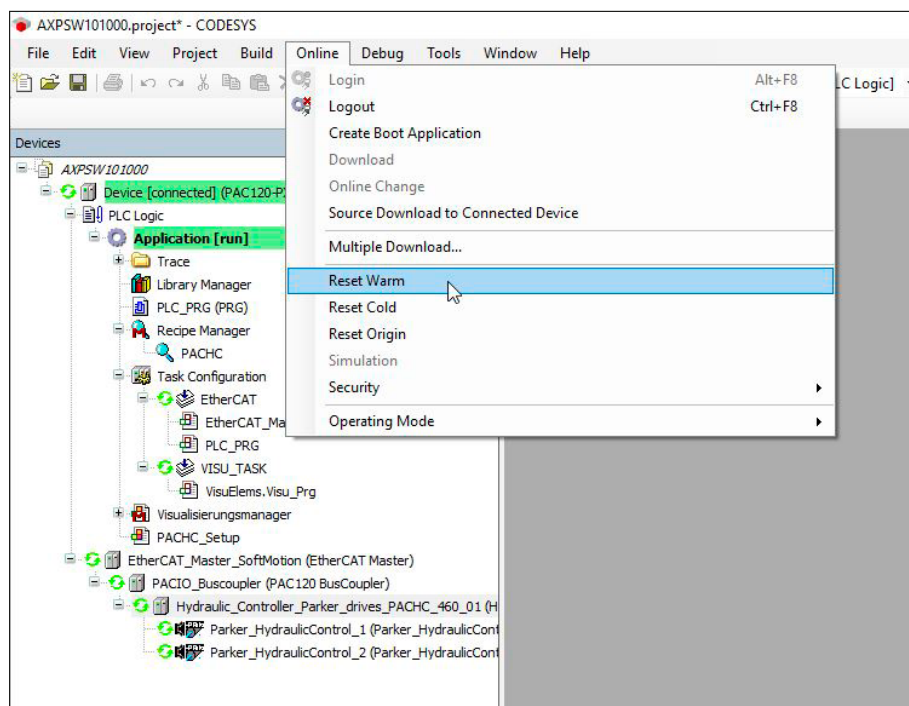
The screenshot shows the 'State Machine' configuration window. The left sidebar lists various settings categories. The main area shows the 'State Machine' section with buttons for 'Init', 'Bootstrap', 'Pre-Op', 'Safe-Op', and 'Op'. The 'Current state' and 'Requested State' are both set to 'Operational'. Below this is the 'File access over EtherCAT' section with 'Download...' and 'Upload...' buttons. At the bottom is the 'E2PROM Access' section with 'Write E2PROM...', 'Read E2PROM...', and 'Write E2PROM XML' buttons.

6) Select Download and then the firmware file *.efw. Password is 1234.

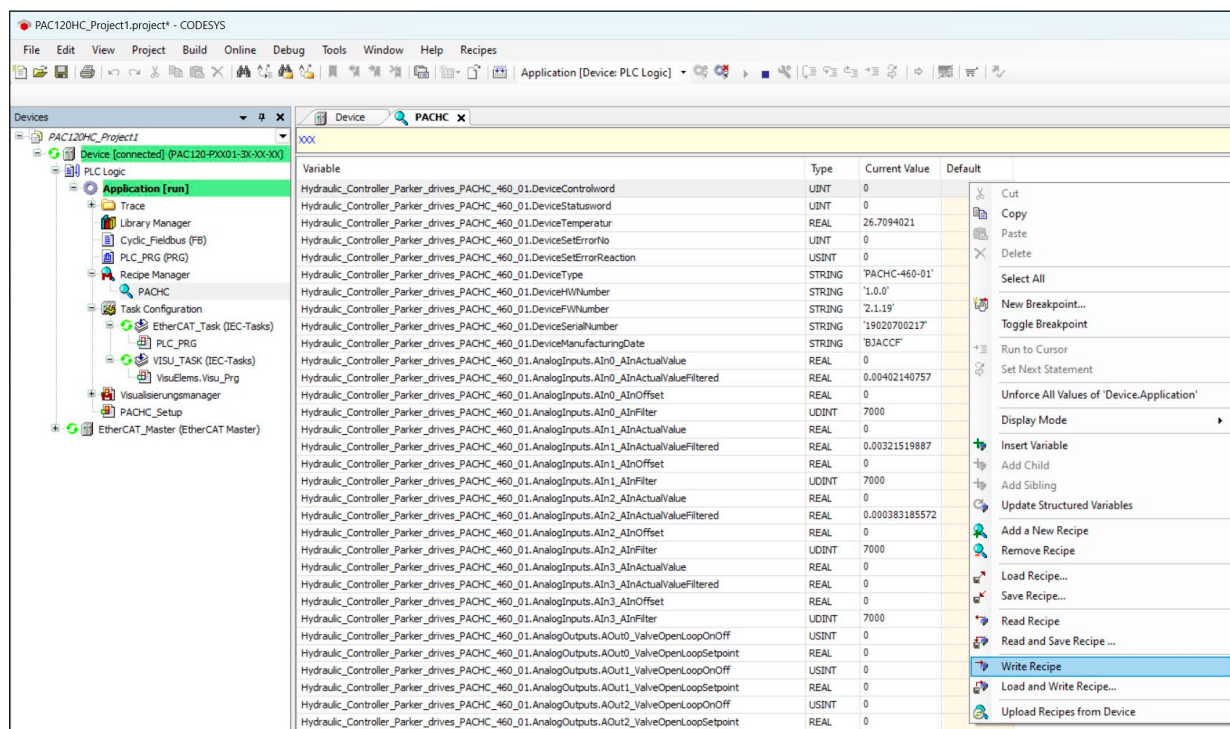
The screenshot shows the 'State Machine' configuration window with the 'Download...' button highlighted. A dialog box titled 'Edit FoE Name' is open, showing the 'String' field with 'FW_PACHC-460-01_VX-X-XX' and the 'Password (hex:)' field with '1234'. The 'OK' and 'Cancel' buttons are at the bottom of the dialog box. The background window shows the 'State Machine' section with buttons for 'Init', 'Bootstrap', 'Pre-Op', 'Safe-Op', and 'Op'. The 'Current state' and 'Requested State' are both set to 'Bootstrap Mode'. Below this is the 'DLL Status' section with 'Port A', 'Port B', 'Port C', and 'Port D' status indicators. The 'File access over EtherCAT' section has 'Download...' and 'Upload...' buttons. At the bottom is the 'E2PROM Access' section with 'Write E2PROM...', 'Read E2PROM...', and 'Write E2PROM XML' buttons.

Wait until the progress bar indicates that the download is completed!

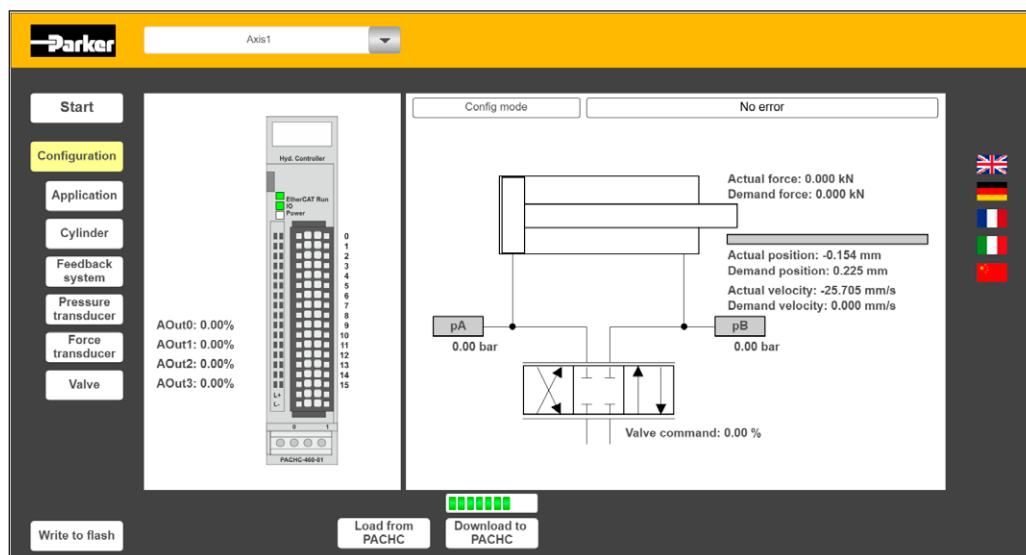
7) Restart device with "Reset warm".



8) Write recipe



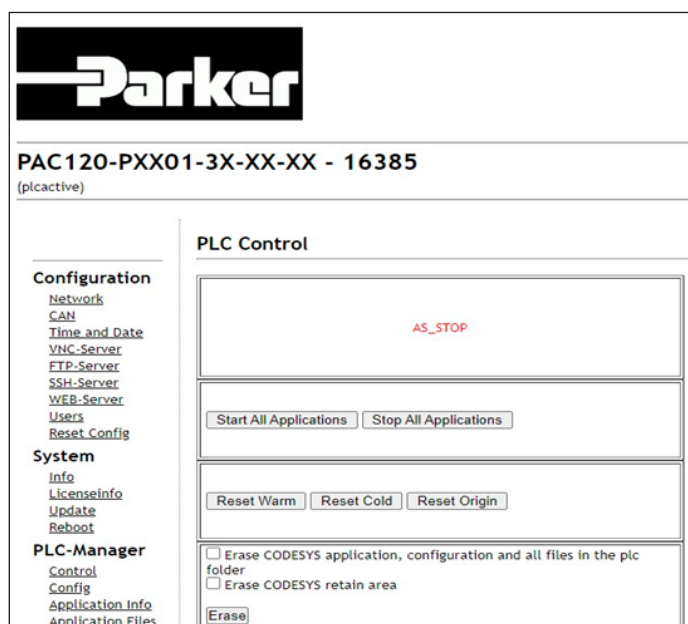
9) Download configuration to PACHC



4.2. PAC120 firmware update

To update the firmware on the PAC120, use the web configuration page, after the device is connected to your computer.

- 1) Stop the PLC via the S/R button on the PAC120 front, or in the web configuration at "PLC-Manager → Control → Stop All Applications"



2) Select firmware file *.tgz at “System → Update → File select” and send to PLC via “Send”

3) Start firmware download and wait until the Package installation is finished

4) Reboot the device “System → Reboot”

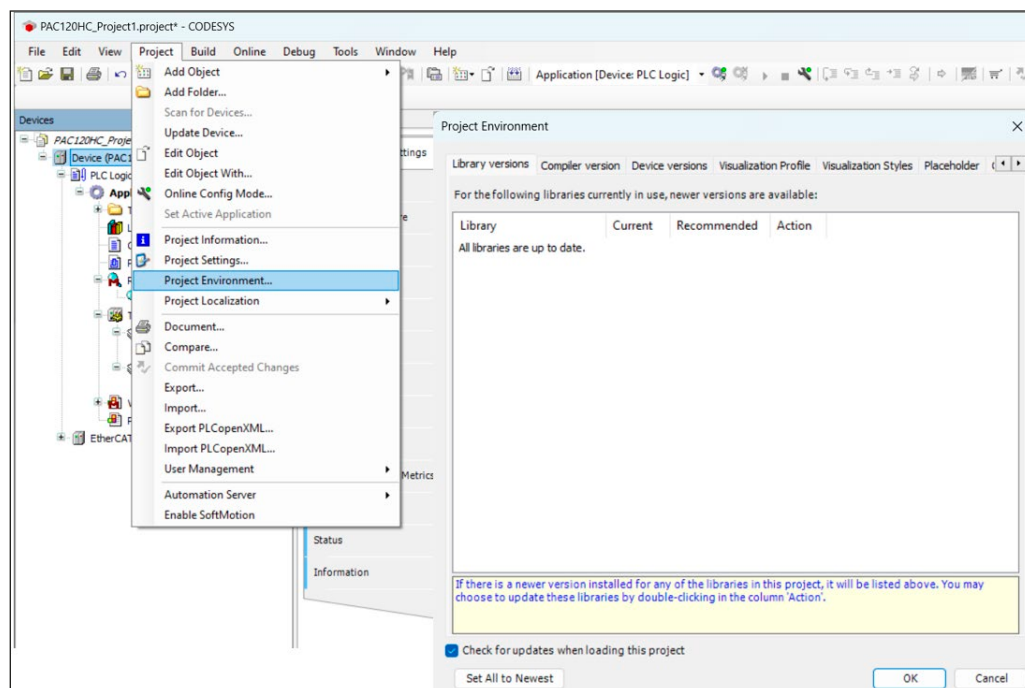
4.3. PAC120 firmware downgrade

Besides updating the firmware as described in 4.2 the firmware can also be downgraded. Due to changes in the runtime the downgrade via admin pages cannot be performed successfully skipping major versions. Hence, it is recommended to utilize a USB stick or SD card containing the appropriate files and follow the instruction described in chapter 5.4.4 “Update functions” in the PAC120 documentation (available on <http://www.parker.com/PAC120>)

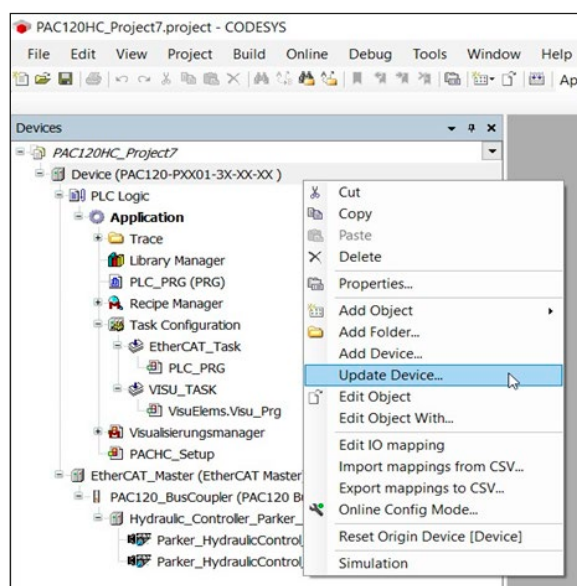
Note: The SD card and USB stick respectively need to have a maximum size of 32Gb and be formatted in FAT.

4.4. Update applications

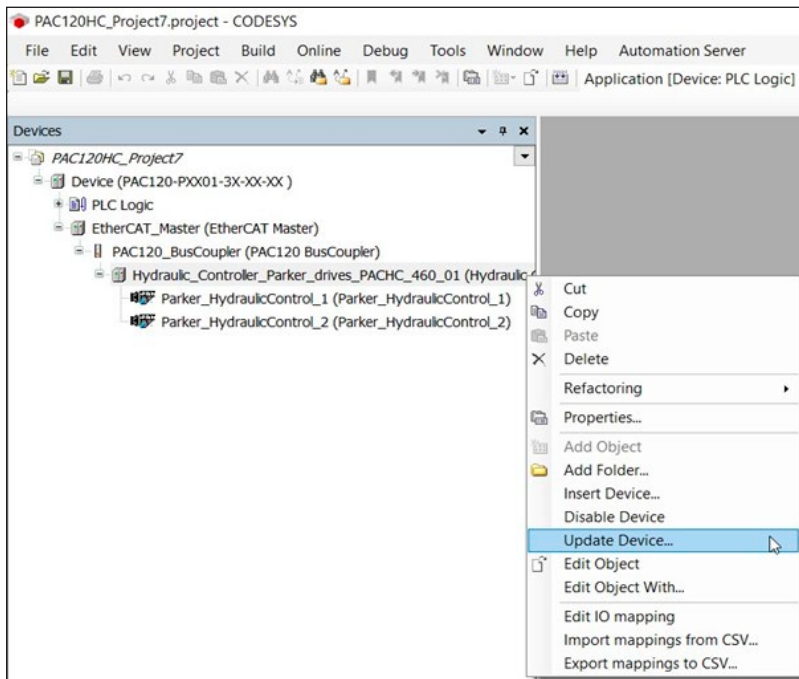
To use existing applications with updated package, PAC120 and PACHC libraries and devices must be updated in the project.



1) Update PKR_PAC120_System and PKR_PACHC_System in Project Environment screen, when opening the application



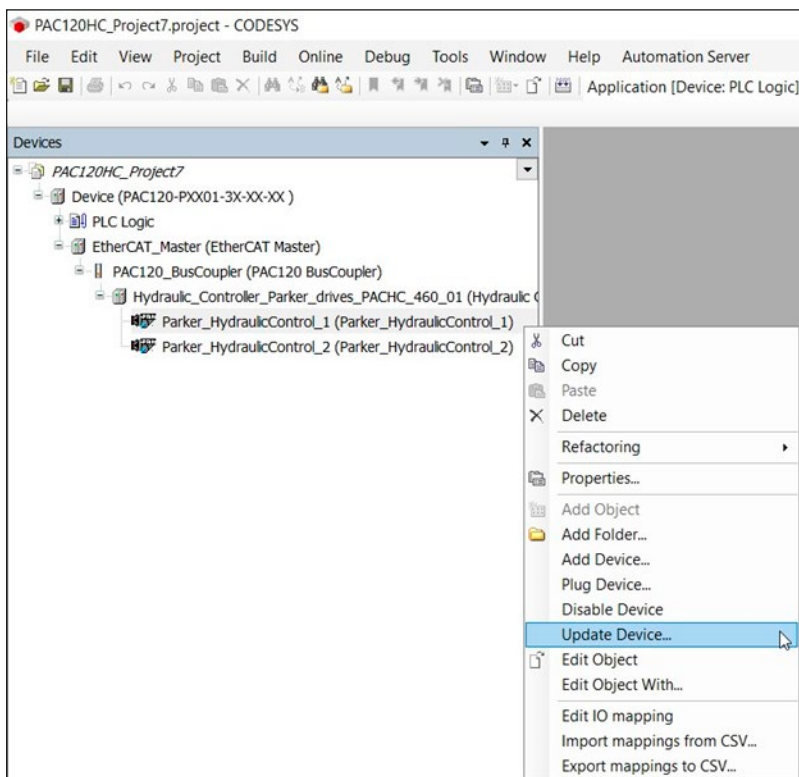
2) Update PLC PAC120-PXX01-3X-XX-XX in the device tree



3) Update PACHC Hydraulic Controller Parker drives (PACHC-460-01) in the device tree

Note: Updating the PACHC Hydraulic Controller Parker drives (PACHC-460-01) could change the EtherCAT I/O mapping and erase the actual defined variables in the mapping!

4) Update PACHC axes Parker_HydraulicControl_1 and Parker_HydraulicControl_2 in device tree



[illegible]

This image shows a full page of blank, lined paper. It features approximately 30 horizontal blue or grey lines spaced evenly apart, typical of notebook paper. The lines extend across the entire width of the page, leaving small margins at the top and bottom. There are no vertical lines, text, or other markings on the page.

