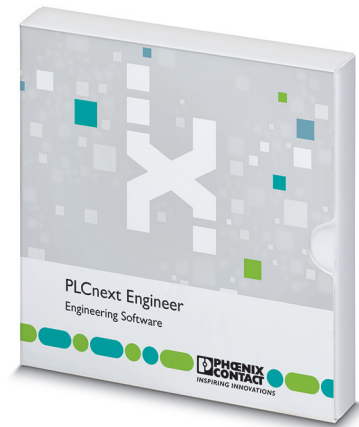# PLCNEXT ENGINEER - CHANGE NOTES

**PLCnext Engineer –
Change notes at a glance**

© Phoenix Contact 2024-08-20

1   Introduction

Configure, diagnose and visualize your entire automation solution with the PLCnext Engineer software. Furthermore, you can use PLCnext Engineer to program your application according to IEC 61131-3.

In addition or as an alternative to the programming languages specified in IEC 61131-3, you can also use the C++ or MATLAB® Simulink® programming languages. The individual programs or program parts can be programmed in any development environment (e.g. Eclipse®, Microsoft® Visual Studio®, etc.). These programs or program parts must then be imported into PLCnext Engineer as a library. This application note provides an overview of the added functions and changes.

2   Structure of the application note

This application note contains all changes made between the first released version 7.2 of PC Worx Engineer and the current version PLCnext Engineer 2024.6.

---

i | Make sure you always use the latest documentation.
It can be downloaded at phoenixcontact.net/products.

i | Windows 95, Windows 98, Windows NT, Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8, Windows 8.1 and Windows 10 are trademarks of Microsoft Corporation.

All other product names used are trademarks of the respective organizations.

PHOENIX CONTACT

INSPIRING INNOVATIONS

3   Table of contents

4 PLCnext Engineer 2024.0.4 LTS

4.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2024.0.4 LTS and the previously released version PLCnext Engineer 2024.0.3 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).

4.2 Security

Information on CVE numbers can be found at:

https://nvd.nist.gov/vuln

Information on the Phoenix Contact "PSIRT" can be found at:

https://www.phoenixcontact.com/psirt

The below listed security updates are implemented in this release.

Microsoft .NET

– CVE-2024-30105
– CVE-2024-38095
– CVE-2024-30105
– CVE-2024-38095

OPC Foundation
OPCFoundation.NetStandard.Opc.Ua.Core

– CVE-2024-33862

4.3 Fixed errors and limitations

– When only project changes have been sent to a controller and the function blocks GET_LANG_STRING, GET_LANG_WSTRING or AR_STATISTIC_ITERATE from the library PLCnext Controller were used in the project this could result in a stop of the controller.
– Using the function block TLS_SOCKET_2 led to a significantly increased CPU load. Additionally the function block did not detect connection losses reliably.
– In sporadic cases data lists couldn't be loaded when a project was opened.

4.4 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
– When a library has the same name as the project where it is referenced the compile fails but no errors are reported.
– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.
– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.
– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.
– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as

erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infra-structure component besides the actual project control-ler to be programmed.

– A new version of the library PLCnext Controller.pcwlx is integrated in the installation. This new version is only compatible with projects which contain controllers with firmware version 2021.0 LTS or later. If projects with older firmware versions are opened, the automatically loaded new library needs to be replaced by the old ver-sion of the library which is also included in the installa-tion in the path INSTALLATION PATH\Libraries\pre21.0.

– Copying a controller from a project opened in a restrict-ed instance of PLCnext Engineer into a non-restricted instance is an unsupported function. Nevertheless the corresponding buttons and hotkeys are active. When trying to copy a controller the restricted PLCnext Engineer instance crashes.

– If process data items are assigned to single elements of a structure the connections are visible in the data list of the node IEC 61131-3 in the group "Connected Fields". If elements of the structure are renamed in this group no compiler error is reported but the project cannot be downloaded anymore.

– If the name of a structure of which single elements are connected to process data items is renamed using the refactoring function then the single elements are not changed in group "Connected Fields" of the data list.

– When a controller is replaced, assignments of process data items to single elements of a structure are deleted.

5 PLCnext Engineer 2024.6

5.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2024.6 and the previously released version PLCnext Engineer 2024.0.3 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).

5.2 Configuration

– Controllers with a firmware version since 2024.6 have an integrated Modbus/TCP client, which can be configured using PLCnext Engineer. For that the library "Modbus" needs to be referenced which is included in this installation. The library contains two types of Modbus clients that have to be instantiated by drag and drop from the components tree to the controller node of the plant tree. Subordinated the server connections and their registers can be configured.
– In the settings of the PROFINET controller the user can select whether an MRP configuration shall be generated. It is deselected by default. By deselection an existing MRP configuration maintains unchanged but is not sent to the controller.
– When a connection is added to the OPC UA PubSub configuration the default network address is now opc.udp://239.0.1.1:4840. The default address in previous releases 239.0.0.1 is a reserved multicast address.
– The timeout limit for writing I&M data is increased to 5 seconds.
– The editor for the configuration of alarms now offers filter functionalities and supports cut, copy and paste as well as multi-selection and search and replace.
– Data lists and port lists now provide import and export functions for csv files. With the import into a data list of a device, new process data assignments can be added.

5.3 Programming

– Defined constants can now also be used to set the length of a user-defined string.
– In the programming editors a tooltip in the IntelliSense shows the datatype of structure elements.
– Arrays and user-defined strings can now be defined directly in a variable worksheet of a local POU and in the list of global variables. A definition in a separate datatype worksheet is not necessary anymore.

– The documentation of local function blocks can now be opened in the browser via the help command of the context menu or the shortkey "shift"+"F1".
– SFC function blocks can have multiple code worksheets.
– The format of online values can be set for every single variable separately. The setting is synchronized between code and variables worksheet as well as the WATCHES window and the FORCELIST. All changes can be reset to the default format via the "Options" menu.
– In all programming editors the subeditor "Variable Properties" can be opened via the context menu or toolbar. All properties of a selected variable can be defined here without switching to the variables worksheet.
– The user can switch to debug mode even if the name of the currently opened project in PLCnext Engineer differs from the name of the project running on the connected controller.

5.4 HMI

– For lines there are three different types of end caps available now:
 – square
 – flat
 – rounded
– The library "Symbols-Schematic" is extended by further symbols.
– Actions for sorting and commenting of alarms are available now.

5.5 Safety

– Safety-related parameters can now be printed.

5.6 Security

Information on CVE numbers can be found at:

https://nvd.nist.gov/vuln

Information on the Phoenix Contact "PSIRT" can be found at:

https://www.phoenixcontact.com/psirt

The below listed security updates are implemented in this release.

Microsoft .NET

– CVE-2024-30105
– CVE-2024-38095

OPC Foundation
OPCFoundation.NetStandard.Opc.Ua.Core

– CVE-2024-33862

5.7   Fixed errors and limitations

– When a controller was replaced, assignments of process data items to single elements of a structure were deleted.
– If process data items are assigned to single elements of a structure the connections are visible in the data list of the node IEC 61131-3 in the group Connected Fields. If elements of the structure were renamed in this group the project could not be downloaded anymore.
– Copying a controller from a project opened in a restricted instance of PLCnext Engineer into a non-restricted instance is an unsupported function. Nevertheless the corresponding buttons and hotkeys are active. When trying to copy a controller the restricted PLCnext Engineer instance could crash.

5.8   Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
    If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
– When a library has the same name as the project where it is referenced the compile fails but no errors are reported.
– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.
– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.
– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.
– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.
– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.
– A new version of the library PLCnext Controller.pcwlx is integrated in the installation. This new version is only compatible with projects which contain controllers with firmware version 2021.0 LTS or later. If projects with older firmware versions are opened, the automatically loaded new library needs to be replaced by the old version of the library which is also included in the installa-

tion in the path
INSTALLATION PATH\Libraries\pre21.0.

– If the name of a structure of which single elements are connected to process data items is renamed using the refactoring function then the single elements are not changed in group Connected Fields of the data list.

– In the debug view of a safety-related code worksheet the yellow coloring of safety-related variables might not be displayed. This only occurs when the debug mode of the standard controller is activated before the debug mode of the safety-related controller.

– When an existing project is opened that was created with a previous version and which contains an MRP configuration then the MRP configuration is not sent to the controller when the project is downloaded. The generation of an MRP configuration has to be activated by the user. For that the controller needs to be replaced by a controller of the same type but different firmware version and then replaced back again to the version used before. With this the setting to activate the MRP configuration becomes visible below the PROFINET node. The user only needs to activate the checkbox. The configuration data from the original project is maintained.

6 PLCnext Engineer 2024.0.3 LTS

6.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2024.0.3 LTS and the previously released version PLCnext Engineer 2024.0.2 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).

6.2 Fixed errors and limitations

– When the GSDML file of a Siemens ET 200SP device was imported, an error was reported that the import failed due to a checksum deviation. The calculation of the checksum was corrected.

– When a communication connection was aborted that was established using the TLS_*_2 function blocks, the function block TLS_RECEIVE_2 could remain in an error state that could only be reset by a warm start of the controller.

– Parameters in an HMI application that used a variable path to an array as source value only received a valid value once during runtime. An updated value was not taken over afterwards.

– Text inputs in HMI applications that should be invisible on a background layer were always visible in the foreground during runtime.

6.3 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.

– Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compile fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– A new version of the library PLCnext Controller.pcwlx is integrated in the installation. This new version is only compatible with projects which contain controllers with firmware version 2021.0 LTS or later. If projects with older firmware versions are opened, the automatically loaded new library needs to be replaced by the old version of the library which is also included in the installa-

tion in the path
INSTALLATION PATH\Libraries\pre21.0.

– Copying a controller from a project opened in a restrict-
ed instance of PLCnext Engineer into a non-restricted
instance is an unsupported function. Nevertheless the
corresponding buttons and hotkeys are active. When
trying to copy a controller the restricted
PLCnext Engineer instance crashes.

– If process data items are assigned to single elements of
a structure, the connections are visible in the data list of
the node IEC 61131-3 in the group "Connected Fields".
If elements of the structure are renamed in this group,
no compiler error is reported but the project cannot be
downloaded anymore.

– If the name of a structure of which single elements are
connected to process data items is renamed using the
refactoring function then the single elements are not
changed in the group "Connected Fields" of the data
list.

– When a controller is replaced, assignments of process
data items to single elements of a structure are deleted.

7 PLCnext Engineer 2024.0.2 LTS

7.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2024.0.2 LTS and the previously released version PLCnext Engineer 2024.0 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).

7.2 Configuration

Controllers as of firmware version 2024.0 LTS now have an Alarm Server, which can be used to monitor values from the control program and trigger an alarm when the values are out of a defined range. The alarms can be visualized by the HMI application. To configure the properties of the alarms a new editor is implemented that is opened via double-click on the Alarm Server node. In the task configuration the user has to add a program of type "AlarmProgram" to a cyclic task.

7.3 HMI

The user can now configure the time a client waits for a response of the HMI webserver with the new parameter "Data timeout" in the settings of the HMI webserver.

7.4 Fixed errors and limitations

Using the function block TLS_SOCKET_2 could result in exceeding the watchdog time of a task. A new version of the function block prevents this.

7.5 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:

  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
– When a library has the same name as the project where it is referenced the compile fails but no errors are reported.
– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.
– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.
– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.
– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.
– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.
– A new version of the library PLCnext Controller.pcwlx is integrated in the installation. This new version is only compatible with projects which contain controllers with firmware version 2021.0 LTS or later. If projects with older firmware versions are opened, the automatically loaded new library needs to be replaced by the old ver-

sion of the library which is also included in the installation in the path
INSTALLATION PATH\Libraries\pre21.0.

– Copying a controller from a project opened in a restricted instance of PLCnext Engineer into a non-restricted instance is an unsupported function. Nevertheless the corresponding buttons and hotkeys are active. When trying to copy a controller the restricted PLCnext Engineer instance crashes.

– If process data items are assigned to single elements of a structure, the connections are visible in the data list of the node IEC 61131-3 in the group "Connected Fields". If elements of the structure are renamed in this group, no compiler error is reported but the project cannot be downloaded anymore.

– If the name of a structure of which single elements are connected to process data items is renamed using the refactoring function then the single elements are not changed in the group "Connected Fields" of the data list.

– When a controller is replaced, assignments of process data items to single elements of a structure are deleted.

8 PLCnext Engineer 2024.0 LTS

8.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2024.0 LTS and the previously released version PLCnext Engineer 2023.9. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).

8.2 Application

– The progress indication is now capable of showing the state of multiple processes running in parallel individually and displaying a pop-up dialog if a blocking process is running that prevents further commands from being executed on the user interface.

– When two projects are compared, the details list in the Cross Function Area now shows the results in a structured tree view and additionally indicates the type of result by coloring. When selecting a result from the list the corresponding instance in the Plant tree is highlighted, too.

– Controller simulations from firmware version 2024.0 LTS and later are started in a wrapper software and the state of the simulation can be persisted when the project is closed. At a later time the state can be reloaded and testing can be continued. A corresponding dialog asks the user whether the state shall be persisted.

8.3 Configuration

– If enumerations are used for settings of device parameters and the corresponding text does not fit into the textbox the whole text is now shown in a tooltip.

– An additional validation during device replacement assures that a parameter is kept when the structure of the parameter block in the device description file is identical.

8.4 Programming

– When variables are forced and a "Write and Start Project" command is executed the user is asked whether all forced variables shall be unforced or the operation shall be canceled.

– "Write and Start Project Changes" while keeping the force state is possible when the usage, the data type and the value allow forcing. Otherwise a dialog is displayed asking the user whether the "Write and Start Project Changes" operation shall be continued after unforcing all variables or the operation shall be canceled.

– "Write and Start Project Changes" is also possible when the project contains SFC code but the SFC code was not changed.

– The initial action has been removed from the template of an SFC code worksheet. So the selection for a coded action or a boolean action is more comfortable.

– POUs and data types can be imported and exported according to the standard IEC 61131-10. Corresponding commands and selection dialogs are available via the "File" menu. Single POUs and data type worksheets can also be imported via context menu in the "Programming" section of the "Components Area".

8.5 HMI

– The new symbol library Symbols-Schematic.pcwlx provides standard symbols for industrial process visualization. The design is based on the standards defining P&ID schematics.

– The object "Animation Timer" allows animation of symbols without assigning a variable from the IEC code.

8.6 Safety

– Triangular connections between non-safety-related variables, safety-related variables and process data items can be rewired more easily by changing the process data item and keeping the other connections.

– While assigning the F destination address of a device the allowed range which is defined in the device description file is now checked.

8.7 Security

The default directories for the storage of projects, libraries, binaries and parameterizations in the options dialog are changed from the public documents folder to the documents folder of the logged in user.

8.8 Fixed errors and limitations

– When a MIN or MAX function was called within the assignment of values to parameters of another MIN or MAX function, this could lead to an erroneous result.

– When an array index was calculated within the assignment of a value to the corresponding array element, the calculated index result could have been erroneous.

8.9 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compile fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– A new version of the library PLCnext Controller.pcwlx is integrated in the installation. This new version is only compatible with projects which contain controllers with firmware version 2021.0 LTS or later. If projects with older firmware versions are opened, the automatically loaded new library needs to be replaced by the old version of the library which is also included in the installation in the path INSTALLATION PATH\Libraries\pre21.0.

– Copying a controller from a project opened in a restricted instance of PLCnext Engineer into a non-restricted instance is an unsupported function. Nevertheless the corresponding buttons and hotkeys are active. When trying to copy a controller the restricted PLCnext Engineer instance crashes.

– If process data items are assigned to single elements of a structure, the connections are visible in the data list of the node IEC 61131-3 in the group "Connected Fields". If elements of the structure are renamed in this group, no compiler error is reported but the project cannot be downloaded anymore.

– If the name of a structure of which single elements are connected to process data items is renamed using the refactoring function then the single elements are not changed in the group "Connected Fields" of the data list.

– When a controller is replaced, assignments of process data items to single elements of a structure are deleted.

– After online reading of an Axioline configuration that contains AXL SE slot covers, the modules are not added to the Plant tree.

9 PLCnext Engineer 2023.9

9.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2023.9 and the previously released version PLCnext Engineer 2023.6. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963). The installation on single core systems is not supported.

9.2 Configuration

– The port for the communication with an online connected controller can be set in the Cockpit. This is also possible for a communication path using an ad-hoc IP address.

– Projects with shared devices can now have safety-related deactivated modules configured below a non-safety-related controller type.

– All log entries from import or export functions are moved from the project log to a separate log now to provide a better overview of the changes logged for the project.

– Data types that have been created automatically based on the device description file of instantiated devices are now visible in a read-only data type worksheet.

– The import and export of data based on AutomationML APC files support the left-alignable INTERBUS master AXC F XT IB now.

9.3 Programming

– The order of the editors of a POU is changed to: Variables, Code, Description, Resources, Settings.

– Individual elements of a structure can now be connected with ports of elementary data type.

9.4 Security

Information on CVE numbers can be found at:
https://nvd.nist.gov/vuln

Information on the Phoenix Contact "PSIRT" can be found at:
https://www.phoenixcontact.com/psirt

The below listed security updates are implemented in this release.

WIBU-SYSTEMS CodeMeter Runtime

– CVE-2023-3935

– CVE-2023-4701

9.5 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:

  – Check the status by entering the following command in the command line shell: „sc query npcap"

  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.

  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:

  – Uninstall PLCnext Engineer.

  – Uninstall the Npcap software.

  – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compile fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– Previous versions of PLCnext Engineer used the BinaryFormatter class for interprocess communication between different applications or different PLCnext Engineer instances. The BinaryFormatter class had to be replaced due to security reasons. With the new implementation it is not possible to run an instance of PLCnext Engineer 2023.6 at the same time an instance of an older PLCnext Engineer is running.

– When an array index is calculated within the assignment of a value to the corresponding array element, the calculated index may be erroneous. Please calculate the index outside of the assignment and save the result in a separate variable.

– When a MIN or MAX function is called within the assignment of values to parameters of another MIN or MAX function, this could lead to an erroneous result. Please call the nested MIN or MAX function outside of the parameter assignment and save the result in a separate variable.

10   PLCnext Engineer 2023.0.5 LTS

10.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2023.0.5 LTS and the previously released version PLCnext Engineer 2023.0.4 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).
The installation on single core systems is not supported.

10.2   Security

Information on CVE numbers can be found at:

https://nvd.nist.gov/vuln

Information on the Phoenix Contact "PSIRT" can be found at:

https://www.phoenixcontact.com/psirt

The below listed security updates are implemented in this release.

LibGit2Sharp

– CVE-2018-11235
– CVE-2019-1387
– CVE-2019-1348
– CVE-2019-1349
– CVE-2019-1350
– CVE-2019-1351
– CVE-2019-1352
– CVE-2019-1353
– CVE-2019-1354
– CVE-2022-24765
– CVE-2022-29187

10.3   Fixed errors and limitations

– In the graphical editor for safety-related function blocks automatically created redundant connection lines could be created resulting in an error of the second compiler.
– An exception is caught that could occur when a recording of the LOGIC ANALYZER was started.
– When a project with a safety-related part was opened, sometimes it was not possible to switch to debug mode because the file that lists the addresses of the safety-related process data was missing or had no content.

10.4   Known errors and limitations

– Applications with local safety-related Axioline modules result in a SF failure.
This applies to the controllers AXC F 2152 or AXC F 3152 in combination with a left-alignable safety-related controller AXC F XT SPLC 1000 or AXC F XT SPLC 3000.
– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.
– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the con-

troller with the SPLC extension. The tooltip provides the information about the controller variant.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– The IntelliSense list of jump labels can be incomplete.

11 PLCnext Engineer 2023.6

11.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2023.6 and the previously released version PLCnext Engineer 2023.3. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963). The installation on single core systems is not supported.

11.2 Configuration

– After replacing a controller, previously created configurations of the OPC UA Server, the OPC UA Client and the Data Logger Sessions are retained.

– A search functionality is added to the "Physical Topology" view which contains a local search toolbar and also provides results to the global search.

– Several notifications that PLCnext Engineer receives from a connected controller are now shown as a snackbar message, e.g. a failed download of changes.

– The maximum number of concurrent sessions of the OPC UA server can be defined in its settings editor.

– For controllers with integrated UPS the task configuration provides two new event task types: "Power Down" and "Stop And Power Down".

11.3 Programming

– In the "Options" dialog in the section "Auto Increment" the user can select whether an incrementing number is added to newly created or copied variables.

– Functions and function blocks with two unconnected formal parameters at the same height can be dropped on existing connection lines. The connection line is then automatically connected to the corresponding in- and outputs. In the free-graphical editor the "shift" key needs to be hold while dragging.

– The user can define namespaces and assign programs, function blocks, functions and data types to them. Identical names can then be used in different namespaces without getting a compiler conflict. Namespaces can be defined in data type worksheets, in the component tree when naming POUs and in dedicated settings editors of the POU itself. They prefix the name of the element separated by a dot.

– The new function block NETLOAD_LIMITER_STATISTIC provides information of a specified Ethernet connection and the new function GET_MICROSECONDS returns a high resolution time stamp of the system time.

– The code generation for the functions CONCAT, TO_STRING, MUX, MIN and MAX has been optimized to reduce and stabilize the data memory consumption to avoid rarely occurring task watchdogs.

11.4 HMI

– Via an image list the background image of a button can be changed depending on a variable value. Each image list element is assigned to a certain value or value range.

– The write value of an image list element can be written into a variable with a click action.

11.5 Safety

– When activating the debug mode only the project CRC is checked and not the project name anymore because the check of the project name fails when the project has been renamed.

– Copy-and-paste of safety-related POUs between two PLCnext Engineer instances is possible now. The data of the worksheets is checked during pasting and only when the verification was successful the POUs are sealed.

– The binary files for the safety-related controller are now consistently named by the compiler with capital letters only.

11.6 Security

Information on CVE numbers can be found at:

https://nvd.nist.gov/vuln

Information on the Phoenix Contact "PSIRT" can be found at:

https://www.phoenixcontact.com/psirt

The below listed security updates are implemented in this release.

LibGit2Sharp

– CVE-2018-11235
– CVE-2019-1387
– CVE-2019-1348
– CVE-2019-1349
– CVE-2019-1350
– CVE-2019-1351
– CVE-2019-1352
– CVE-2019-1353
– CVE-2019-1354
– CVE-2022-24765
– CVE-2022-29187

11.7 Fixed errors and limitations

– Applications with controllers of type AXC F 2152 or AXC F 3152 in combination with a left-alignable safety-related controller AXC F XT SPLC 1000 or AXC F XT SPLC 3000 and local safety-related Axioline modules resulted in a failure of the safety-related controller.

– When a safety-related controller was replaced then variable assignments to process data were listed as disconnected in the project protocol although the connections were automatically reconnected and all assignments were maintained.

– TLS_SOCKET_2 function blocks in server mode kept sockets alive even if any connected TLS_SOCKET_2 function block in client mode was deactivated.

11.8 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:

   – Check the status by entering the following command in the command line shell: „sc query npcap"

   – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.

   – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

   If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:

   – Uninstall PLCnext Engineer.

   – Uninstall the Npcap software.

   – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported. When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– Previous versions of PLCnext Engineer used the BinaryFormatter class for interprocess communication between different applications or different PLCnext Engineer instances. The BinaryFormatter class had to be replaced due to security reasons. With the new implementation it is not possible to run an in-

stance of PLCnext Engineer 2023.6 at the same time an instance of an older PLCnext Engineer is running.

12 PLCnext Engineer 2023.0.4 LTS

12.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2023.0.4 LTS and the previously released version PLCnext Engineer 2023.0.3 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).
The installation on single core systems is not supported.

12.2 Fixed errors and limitations

– An optimization of the connection lines in the graphical programming editor could result in compile errors of the second compiler in code worksheets of safety-related function blocks. The optimization has been deactivated for safety-related code worksheets.

12.3 Known errors and limitations

– Applications with local safety-related Axioline modules result in a SF failure.
  This applies to the controllers AXC F 2152 or AXC F 3152 in combination with a left-alignable safety-related controller AXC F XT SPLC 1000 or AXC F XT SPLC 3000.
– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.
– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.
– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.
– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.
– When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.
– INTERBUS devices cannot be exported in an AML file.
– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.
– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are

added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– The IntelliSense list of jump labels can be incomplete.

13 PLCnext Engineer 2023.0.3 LTS

13.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2023.0.3 LTS and the previously released version PLCnext Engineer 2023.0.1 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).
The installation on single core systems is not supported.

13.2 Fixed errors and limitations

–   Copying and pasting HMI symbol actions did not work in some circumstances.
–   Unconnected coils in ladder diagram could cause an internal error in the compiler.
–   Opening PLCnext Engineer projects which are created on Chinese operating systems could cause an unexpected exception.

13.3 Known errors and limitations

–   Applications with local safety-related Axioline modules result in a SF failure.
    This applies to the controllers AXC F 2152 or AXC F 3152 in combination with a left-alignable safety-related controller AXC F XT SPLC 1000 or AXC F XT SPLC 3000.
–   In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
–   If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    –   Check the status by entering the following command in the command line shell: „sc query npcap"
    –   If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    –   To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
    If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    –   Uninstall PLCnext Engineer.
    –   Uninstall the Npcap software.
    –   Install PLCnext Engineer again.

–   If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
–   If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
–   It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
–   If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
–   When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.
–   When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
–   When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.
–   After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.
–   Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.
–   When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.
–   INTERBUS devices cannot be exported in an AML file.
–   If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.
–   If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are

added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infra-structure component besides the actual project control-ler to be programmed.

– The IntelliSense list of jump labels can be incomplete.

14 PLCnext Engineer 2023.3

14.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2023.3 and the previously released version PLCnext Engineer 2023.0.1 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).
The installation on single core systems is not supported.

14.2 Application

–   The dialog to import items from another project now provides a search function and additionally supports the import of local devices from a project or a library.

–   The editor group "Version Information" for the global project, local functions and function blocks and HMI objects is renamed in "Description".

–   For the creation of HTML descriptions for local functions and function blocks templates are added. An additional button in the editor is available to use them. User-created templates can also be imported into the project. The descriptions can be embedded into released libraries.

–   An additional consistency check during project archive generation can be activated in the options dialog. A report about data consistency is created when the option is activated.

14.3 Configuration

–   PROFINET devices that were imported using a GSDML file show the ID of each module and submodule in the corresponding settings editor behind the name of the GSDML file.

–   Settings editors to configure an OPC UA client that is integrated on a controller are available.

14.4 Programming

For the release of a library it is possible to select single POUs to be integrated in the library. Dependencies between the different POUs need to be resolved by the user.

14.5 Safety

–   A new library containing safety related function blocks is installed with PLCnext Engineer. The function blocks can be used to write values from the user application into files in the safety related controller, read these val-

ues and delete the data. With this an applicative recipe handling can be realized.

–   The refactoring function is now also available for safety related variables and function blocks.

–   Before the settings for creation of PROFIsafe diagnostic variables can be edited the user is asked to authenticate now. Without authentication the editor remains in a read-only state. In previous releases of PLCnext Engineer changes without authentication didn't become effective.

–   The error message for safety violations of safety related device parameters now show the whole instance path of the device.

14.6 Fixed errors and limitations

–   The IntelliSense list of jump labels could be incomplete.

–   When a controller was replaced in a project and the current language of the user interface was different to the language during the last change of the project then some data of the project was not loaded completely. The corresponding editors remained empty.

14.7 Known errors and limitations

–   Applications with local safety-related Axioline modules result in a SF failure.
    This applies to the controllers AXC F 2152 or AXC F 3152 in combination with a left-alignable safety-related controller AXC F XT SPLC 1000 or AXC F XT SPLC 3000.

–   In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

–   If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:

    –   Check the status by entering the following command in the command line shell: „sc query npcap"

    –   If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.

    –   To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

    If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:

    –   Uninstall PLCnext Engineer.

    –   Uninstall the Npcap software.

    –   Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– When a safety-related controller is replaced, variable assignments to process data are listed as disconnected in the project protocol. The connections are automatically reconnected. So all assignments are maintained. The process data CRC remains unchanged, too.

15 PLCnext Engineer 2023.0.1 LTS

15.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2023.0.1 LTS and the previously released version PLCnext Engineer 2023.0 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963).
The installation on single core systems is not supported.

15.2 Application

The user can select for which functions and methods additional debug code is generated. With this the required memory can be reduced to a minimum.

15.3 Configuration

– For the controller types AXC F 2152 and AXC F 3152 the new left-alignable safety related controller AXC F XT SPLC 3000 is supported.
– For each of the controller types RFC 4072S and BPC 9102S with firmware version 2023.0 LTS there are two types available in the components area. One supports the safety-related firmware version 2.00, the other one supports the safety-related firmware version 2.10.

15.4 Fixed errors and limitations

– Sending of e-mails was limited by an error of a function block from the library "Extended.pxclx" which is included in the PLCnext Engineer installation.
– Changes to the symbols "Two State Slide Button" and "Three State Slide Button" were reverted. They now correspond to the ones included in the versions before PLCnext Engineer 2023.0 LTS.
– When a controller was replaced in a project and the language of the user interface was different to the language during the last change of the project, some data of the project was not loaded completely.

15.5 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
    If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.
– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the sub-

module list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

– The IntelliSense list of jump labels can be incomplete.

16   PLCnext Engineer 2023.0 LTS

16.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2023.0 LTS and the previously released version PLCnext Engineer 2022.9. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit and Windows 11 (as of build 22621.963). The installation on single core systems is not supported.

16.2   Application

–   In the "Options" menu ("Extras", "Options") the user can select warnings that should not be displayed in the MESSAGES window any more. The selected warnings are also not counted in the compiler result summary.

–   The firmware service that calculates the memory utilization (RAM) of a controller which is also used to display the current memory utilization in the cockpit has interpreted memory used by buffered data, that is released by the operating system if needed, as unavailable. Therefore the memory utilization has been stated higher than it actually has been. Firmware versions as of 2023.0 LTS calculate differently and interpret memory that is released if needed as available.

16.3   Configuration

–   The import and export of AutomationML APC files now contains safety-related variables and their process data assignments.

–   The export of AutomationML APC files now contains further PROFINET-specific attributes.

–   A domain with an unlimited number of levels can be set for the whole project. The total length of the domain must not exceed 240 characters.

–   The selection between manual and automatic IP assignment mode is removed. When a device is now added to the project it gets the first free IP address from the IP address range of the project. Afterwards it can be adjusted by the user manually.

16.4   Network

–   From the context menu of a process data item in a data list, a variable can be added to the global data list of the controller or the safety-related controller. The naming of the variable is done automatically.

–   During project comparison the instantiated devices including their settings, data lists and port lists are also analyzed now. For that the result view is extended by the PLANT tree which shows overlay icons to highlight the differences. After double-clicking an element in the

tree, the corresponding editors are shown in a side-by-side view with a detailed labeling of the differences.

–   In the editor of the physical topology view, statistical information of the network communication and the PROFINET connection can be collected via the context menu of a device. Each collection generates a separate data set to allow historical analyses of the data. The data can also be exported in csv and xlsx format.

16.5   Programming

–   Constants that are defined in the global data list of the controller or the local variables list of a POU can be used as initial values for other variables defined in the same list. Constants defined in the global data list of the controller can furthermore be used as initial values and array boundaries in data type worksheets.

–   The function block UPS_DIAGNOSTICS had to be renamed to READ_UPS_DIAGNOSTICS, since the name was already used for a system variable which led to conflicts. Apart from that, the function block is unchanged.

–   With GET_WCHAR a new function is available which returns the UTF-8 code of a character from a WSTRING character string.

–   DEVICE_INFO is a new function block that can be used to retrieve specific information about the controller from the application program.

–   Several format specifiers for date and time values have been added to the TO_STRING function.

–   The help for a function or function block can now also be called in debug mode from the context menu of the function block in the programming editor.

–   In the programming editor of a method of a function block, a local variable of the calling function block can now be generated via the context menu of a non-declared variable.

–   The refactoring function can now also be used to change the type of function module calls.

–   The CROSS REFERENCES window provides the option "Goto type definition" in the context menu of arrays, structures and function blocks that have been defined in the currently opened project. For arrays and structures, this opens the data type worksheet in which the type was defined and marks the corresponding location. For function blocks, this opens the first code worksheet.

–   When releasing libraries, initial values and comments of user-defined data types are transferred to the library.

–   When importing elements from another project or library, the user can define a destination folder. A folder with the selected name is then created under each sec-

tion of the component tree into which elements are imported.

16.6 Safety

When a safety-related controller is in "Safety Debug Mode" this is clearly displayed in the lower status bar as well as on top of each currently opened safety-related editor by a red/yellow coloring.

16.7 Security

The data integrity of projects is checked with checksums to detect manipulations of project data that could be a potential security risk for the user. Different protection levels for the check can be set in the "Options" menu.

16.8 Fixed errors and limitations

– When code in Structured Text language was compared during project comparison, the marked differences could be arranged unclear or were even incomplete.

– Differences of referenced libraries were not reliably detected when two projects were compared.

– When a controller from the AXC F type family without an extension module AXC F XT SPLC 1000 was replaced by one with AXC F XT SPLC 1000 an incomplete configuration could occur if safety modules were added by drag-and-drop in the Axioline bus in the PLANT tree.

– After the installation of several previous PLCnext Engineer versions the software was not set as default to open project files by double-click from the file explorer. A windows dialog requested the selection of the software from the user.

– If PLCnext Engineer was closed while being connected to a controller in debug mode and after that the same project was opened, the debug mode was not available before the automatic compile was finished. It was reported that a different project was loaded to the controller.

– When the Reverse Connect mode was activated for the OPC UA Server and a URL was entered and enabled in the corresponding editor, this URL was not deleted from the configuration even if the client was disabled afterwards. The URL needed to be deleted from the input box before the client was disabled.

– If a referenced library directly created an instance of a PLCnext component in the PLANT tree, "download changes" was rejected by the controller. A complete project download had to be executed.

– In FOR loops, the control variable, its initial and final value could be of different data types. If the memory reserved for the control variable was smaller than the memory which could be written by the initial or final value, the controller could crash during operation. A data

type check is now implemented which results in an error message when the data types differ.

16.9 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any po-

sition in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– When a controller is replaced in a project and the current language of the user interface is different to the language during the last change of the project then some data of the project is not loaded completely. The corresponding editors remain empty. The project needs to be saved, closed and reopened to get all data loaded.

– When comparing two projects, additional controllers are not detected that were added to the project as infrastructure component besides the actual project controller to be programmed.

17 PLCnext Engineer 2022.9

17.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2022.9 and the previously released version PLCnext Engineer 2022.6. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.
The installation on single core systems is not supported.

17.2 Application

– The LOGIC ANALYZER provides a selection between time stamp, passed time and number of samples for the values on the horizontal axis.

– On a curve of recorded data in the LOGIC ANALYZER, single points can be selected to display their horizontal and vertical values along with the differences between the values.

– When recorded data is exported from the LOGIC ANALYZER into a single csv file, for some time stamps no value can be assigned for certain variables. This is caused by different task assignments of the different variables. With this version the additional export format *.splitted.csv can be selected which generates separate files where the variable set is combined in a way that for each variable a value is assigned to every time stamp.

– The configuration of the LOGIC ANALYZER including the recorded data is now saved in the project and will also be available after reopening the project.

– The configuration of the WATCHES window is now saved in the project and will also be available after reopening the project.

– A new export function allows the generation of a PLCnext Engineer Software Package. The package contains all files that would be downloaded to the controller. An additional metadata file contains information about the project version. User defined key-value-pairs can be added in the Version Information editor of the project node. The package can be used to transfer projects to a controller without the use of PLCnext Engineer. Only projects without safety-related devices are supported.

17.3 Configuration

For PLCnext Control devices with a firmware version 2022.9 or later the OPC UA server can be set to Reverse Connect mode. In this mode a connection is initiated by the server to defined clients only.

17.4 Network

When an imported GSDML defined the attribute "UseAsBits = true", the bits were imported in a wrong byte order. The byte order has been corrected according to the PROFINET specification. The import can be changed to the former behavior by a configuration file entry.

17.5 Safety

– Copy and paste of safety-related devices is now possible which also contains all safety-related parameter settings.

– Device templates can now also be created from instances of safety-related devices.

17.6 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:

    – Check the status by entering the following command in the command line shell: „sc query npcap"

    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.

    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:

– Uninstall PLCnext Engineer.

– Uninstall the Npcap software.

– Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– When code in Structured Text language is compared during a project comparison, the marked differences might appear not clearly arranged or incomplete.

– Differences of referenced libraries are not reliably detected when two projects are compared.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a controller from the AXC F type family without an AXC F XT SPLC 1000 module is replaced by one with an AXC F XT SPLC 1000, an incomplete configuration might occur if safety modules are added by drag-and-drop in the Axioline bus in the Plant tree. In this case compare the Plant tree with the device list and add missing devices there.

– When a POU has an output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

– If the autosave function is activated, the autosave project is not only saved in the set interval but the original project is overwritten at the same time.

– After the installation of this PLCnext Engineer version it is not set as default software to open project files by double click from the file explorer. A windows dialog requests the selection of the software from the user.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– If PLCnext Engineer is closed while connected to a controller in debug mode and after that the same project is opened, the debug mode is not available before the automatic compile has finished. It is reported that a different project is loaded to the controller.

– When the Reverse Connect mode is activated for the OPC UA server and a URL has been entered and enabled in the corresponding editor, the URL is not deleted from the configuration even if the client is disabled afterwards. The URL needs to be deleted from the input box before the client is disabled.

– If a referenced library directly creates an instance of a PLCnext component in the PLANT tree, "Download changes" is rejected by the controller. A complete project download has to be executed.

18 PLCnext Engineer 2022.0.4 LTS

18.1 General notes

This section describes changes made between version of PLCnext Engineer 2022.0.4 LTS and version PLCnext Engineer 2022.0.3 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.
The installation on single core systems is not supported anymore.

18.2 Fixed errors and limitations

After an update of the .NET framework to version 4.8.1 PLCnext Engineer could crash when a tooltip has been displayed in an Intellisense drop-down list. The tooltips were removed from the affected lists to prevent the crash.

18.3 Known errors and limitations

- In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
- If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    - Check the status by entering the following command in the command line shell: „sc query npcap"
    - If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    - To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    - Uninstall PLCnext Engineer.
    - Uninstall the Npcap software.
    - Install PLCnext Engineer again.
- If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
- If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
- If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.
- It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
- If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
- When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.
- When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
- If a controller is configured to operate in redundancy mode and the IP assignment is manual, the IP settings are set back to default values when the controller is replaced.
- When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.
- After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.
- When code in Structured Text language is compared during a project comparison, the marked differences might appear not clearly arranged or incomplete.
- Differences of referenced libraries are not reliably detected when two projects are compared.
- PLCnext Engineer is unresponsive for longer time if a long port list is printed.
- When global variables which are connected to ports are renamed, the GDS configuration is not recreated. The project cannot be downloaded to the controller. The ports need to be disconnected and reconnected with the renamed variables.

19   PLCnext Engineer 2022.0.3 LTS

Important note for all versions of PLCnext Engineer except 2022.6:

After an update of the .NET framework to version 4.8.1, PLCnext Engineer can crash when a tooltip has been displayed.

19.1   General notes

This section describes changes made between version of PLCnext Engineer 2022.0.3 LTS and version PLCnext Engineer 2022.0.2 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.
The installation on single core systems is not supported anymore.

19.2   Programming

– The maximum number of worksheets per POU is increased to 100.
– A corrected version of the function block TLS_SOCKET_2 now supports the connection using a bind port.

19.3   Network

When an imported GSDML file defined the attribute "UseAsBits = true" then the bits were imported in a wrong byte order. The byte order has been corrected according to the PROFINET specification. The import can be changed to the former behavior by a configuration file entry.

19.4   Fixed errors and limitations

– During the replacement of a controller the process data assignment could have changed.
– PLCnext Engineer could crash when the editor group was changed while a network comment was edited in a graphical worksheet.
– When an HMI symbol that had the same name as an already existing one was imported, the content of the imported symbol could get lost.
– Multiple crashes during the automated generation of HMI pages have been fixed.

19.5   Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
– Uninstall PLCnext Engineer.
– Uninstall the Npcap software.
– Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.
– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.
– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.
– If a controller is configured to operate in redundancy mode and the IP assignment is manual, the IP settings

are set back to default values when the controller is replaced.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– When code in Structured Text language is compared during a project comparison, the marked differences might appear not clearly arranged or incomplete.

– Differences of referenced libraries are not reliably detected when two projects are compared.

– PLCnext Engineer is unresponsive for longer time if a long port list is printed.

– When global variables which are connected to ports are renamed, the GDS configuration is not recreated. The project cannot be downloaded to the controller. The ports need to be disconnected and reconnected with the renamed variables.

20 PLCnext Engineer 2022.6

20.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2022.6 and the previously released version PLCnext Engineer 2022.3. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.
The installation on single core systems is not supported.

20.2 Application

The Cross Function Area offers a notification logger view which shows status messages received from a connected controller. The list of notifications can be filtered by severity, archive, sender and time span.

20.3 Configuration

Device templates can be created from the context menu of instantiated devices in the PLANT area. The templates are stored including the parameter settings in the "Local" folder of the network section in the COMPONENTS area.

20.4 Network

– In the physical topology editor the PROFINET view provides a graphical representation of application relations (AR). For each connection a separate color can be configured and different icons indicate PROFINET controllers and devices.
– The web-based management (WBM) of a connected device can be accessed from a command in the PLCnext Engineer. The command is available in the toolbar and the context menu in the physical topology view, the online controllers editor and the online devices editor.

20.5 Programming

– The maximum number of worksheets per POU is increased to 100.
– In the Structured Text editor all occurrences of a text selection are highlighted.
– When text is selected in the Structured Text editor and the search and replace toolbar is opened by "ctrl" + "F" or "ctrl" + "H" the selected text is automatically copied into the search field.
– The tooltip on a variable in the Structured Text editor now shows the corresponding data type and the comment from the variables worksheet.

– PLCnext Engineer now supports escape sequences for string literals. The following sequences are supported:

Character	Escape Sequence
Back Slash	\\
New Line	\n or \N
Tab	\t or \T
Single Quote (for STRING only)	\'
\Double Quote (for WSTRING only)	\"

Initial values in existing projects will be converted accordingly.

– The context menu of a function block instance in the PLANT area provides a command to jump to the location where the instance is called.

20.6 HMI

– Dynamics can be copied from one HMI object to another one.
– Refactoring is now also supported for HMI tags and symbols. The name, the type and the comment can be refactored.

20.7 Safety

The safety-related program can now be downloaded together with the non-safe program with a single command. For that the context menu of the controller instance in the PLANT area as well as the toolbar commands in the cockpit and in the "Fast Edit Mode" section were extended.

20.8 Fixed errors and limitations

– Replacing a device was never finished when there was an empty slot for which a default module was defined. The error has been fixed.
– When a project including safety components was managed within a version control system and changes were reverted then the project was not reloaded correctly by PLCnext Engineer. When components were deleted after the revert action the project could not be saved in the same path anymore. The error has been fixed.

20.9 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– When code in Structured Text language is compared during a project comparison the marked differences might appear not clearly arranged or incomplete.

– Differences of referenced libraries are not reliably detected when two projects are compared.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a controller from the AXC F type family without AXC F XT SPLC 1000 is replaced by one with AXC F XT SPLC 1000, an incomplete configuration might occur if safety modules are added by drag-and-drop in the Axioline bus in the PLANT tree. Compare the PLANT tree with the device list and add missing devices there if necessary.

– When a POU has and output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

– If the autosave function is activated, not only the autosave project is saved in the set interval but the original project is overwritten at the same time.

– After the installation of this PLCnext Engineer version it is not set as default software to open project files by double click from the file explorer. A windows dialog requests the selection of the software from the user.

– If a referenced library is replaced by an updated version in which the data type of ports has been changed, existing port connections in the project are not updated automatically. The existing port connection is marked as erroneous and the ports with changed data type are added to the port list without a connection. The port connection has to be reworked by the user.

– If PLCnext Engineer is closed while connected to a controller in debug mode and after that the same project is opened, the debug mode is not available before the automatic compile has finished. It is reported that a different project is loaded to the controller.

– If a referenced library directly creates an instance of a PLCnext component in the PLANT tree, "Download changes" is rejected by the controller. A complete project download has to be executed.

21 PLCnext Engineer 2022.3

21.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2022.3 and the previously released version PLCnext Engineer 2022.0.1 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is not supported.

21.2 Application

– The icon of PLCnext Engineer was updated.
– For every currently available licensable add-in a trial license is provided in the folder "Licenses" of the installation path. The respective feature can be activated once for 14 days by means of the Phoenix Contact Activation Wizard which is also part of the standard installation.
– Chinese can be selected as language of the user interface via the "Options" menu.
Additionally characters from the UTF16 character set can be used in the project. The safety-related area is still limited to the ASCII character set.
– The recently opened projects are now listed in a submenu under "File". By this a longer file path can be displayed.
– With the licensable add-in PLCnext ENG VCS, Git and Subversion repositories can be created and coupled. Changes between the local working copy and different revisions of the centrally managed project are displayed and can be synchronized. The project has to be saved in the uncompressed format .pcwef.
– In the "WATCHES" window multiple views can be added in which different sets of variables can be collected. A set value can be assigned to each variable. The different views can be saved in a file outside of the project including the set values allowing the storage of a defined parameter set.

21.3 Programming

– The variable editor for local POU components is extended by an export and import function of csv files.
– In text editors multiple lines and columns can be selected when the "Alt" key is pressed during selection. The selected area can be overwritten all at once by entering new text.

21.4 HMI

– The new Droplist object allows the selection of an element from a referenced text list.
– The Chart object is now able to show multiple variables from one DataLogger session in one chart and to define different line colors for each variable.

21.5 Safety

The dialog for log in into the safety area was redesigned and now shows an "OK" and a "Cancel" button.

21.6 Fixed errors and limitations

– If a library which is referenced in a project could not be found in the stored path, it was not possible to replace it with a library of the same name from another path. The error has been fixed.
– If a controller was configured to operate in redundancy mode and the IP assignment was manual, the IP settings were set back to default values when the controller was replaced. The error has been fixed.
– PLCnext Engineer was unresponsive for longer time if a long port list was printed. The error has been fixed.
– When global variables which were connected to ports were renamed, the GDS configuration was not recreated. The project could not be downloaded to the controller. The error has been fixed.

21.7 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
– Uninstall PLCnext Engineer.
– Uninstall the Npcap software.
– Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– When code in Structured Text language is compared during a project comparison the marked differences might appear not clearly arranged or incomplete.

– Differences of referenced libraries are not reliably detected when two projects are compared.

– Replacing a device is never finished when there is an empty slot for which a default module is defined.

– When a project including safety components is managed within a version control system and changes are reverted then the project is not reloaded correctly by PLCnext Engineer. When components are deleted after the revert action, the project cannot be saved in the same path anymore.

– Chinese characters in a password for the login into the safety area can be displayed incorrectly and it might not be possible to delete the entry.

– When a controller from the AXC F type family without AXC F XT SPLC 1000 is replaced by one with AXC F XT SPLC 1000, an incomplete configuration might occur if safety modules are added by drag-and-drop in the Axioline bus in the PLANT tree. Compare the PLANT tree with the device list and add missing devices there if necessary.

– When a POU has and output parameter of a user defined string type which is longer than 80 characters and this output parameter is connected to an input of a following POU, the compiler reports an error. Please save the value of the output parameter in a variable and connect the variable to the input of the following POU.

– INTERBUS devices cannot be exported in an AML file.

22   PLCnext Engineer 2022.0.2 LTS

22.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2022.0.2 LTS and the previously released version PLCnext Engineer 2022.0.1 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is not supported.

22.2   Fixed errors and limitations

–   A communication connection that was established using the function blocks TLS_*_2 could not reconnect automatically. The function blocks have been fixed.

–   Projects that have been archived in PLCnext Engineer 2021.9 could get damaged during unpacking. The error has been fixed.

–   Changing the language of the user interface of PLCnext Engineer could lead to inconsistent process data names between the GDS configuration and the network configuration. The error has been fixed.

–   Unpacking project archives could generate duplicates of F-address variables when the language of the user interface of PLCnext Engineer was set to German. The error has been fixed.

–   Deleting a library reference could cause a crash of PLCnext Engineer. The error has been fixed.

–   Replacing a safety-related PLC could result in damaged projects because of manipulated indices in a project file. The error has been fixed.

22.3   Known errors and limitations

–   In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

–   If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
   –   Check the status by entering the following command in the command line shell: „sc query npcap"
   –   If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
   –   To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
   –   Uninstall PLCnext Engineer.
   –   Uninstall the Npcap software.
   –   Install PLCnext Engineer again.

–   If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

–   If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

–   If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.

–   It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

–   If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

–   When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

–   When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

–   If a controller is configured to operate in redundancy mode and the IP assignment is manual, the IP settings are set back to default values when the controller is replaced.

–   When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

–   After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

- When code in Structured Text language is compared during a project comparison, the marked differences might appear not clearly arranged or incomplete.
- Differences of referenced libraries are not reliably detected when two projects are compared.
- PLCnext Engineer is unresponsive for longer time if a long port list is printed.
- When global variables which are connected to ports are renamed, the GDS configuration is not recreated. The project cannot be downloaded to the controller. The ports need to be disconnected and reconnected with the renamed variables.

23   PLCnext Engineer 2022.0.1 LTS

23.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2022.0.1 LTS and the previously released version PLCnext Engineer 2021.9. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is not supported anymore.

23.2   Application

– PLCnext Control devices can now be simulated. With the simulation, projects can be tested without the configured hardware. The feature is enabled by default for the controller type AXC F 1152. Further controller types require an additional license. For each controller type the corresponding simulation environment has to be installed. It is available for download on the Phoenix Contact website.

– If multiple versions of PLCnext Engineer are installed, the user can select a particular version for opening project files (.pcwef, *.pcwex, *.pcweax) from the context menu in the file system.

– The design of messages has been refactored completely. In the Cross Function Area the tab MESSAGES now summarizes the error messages and all logs. The desktop alerts in the lower right corner of the user interface are removed. Messages in a snackbar design and pop-ups which require user confirmation were added.

– If a global search and replace operation is canceled, a status message reports the cancellation.

– The global search is now able to find names of worksheets except those having fixed names like "variables".

– PLCnext Control devices can now have the status "System Error". If this status is reported to PLCnext Engineer it will be visualized with newly defined icons and in the existing status monitoring views. In this state only a restart of the controller is allowed. A project download is not possible.

– The file format of the integrated help is changed to html. The content is now shown in the standard browser.

23.3   Configuration

– The new redundancy controller RFC 4072R is supported by PLCnext Engineer.

– In the cockpit of a controller, a new editor called Ad-hoc IP address is now available. An IP address different to the one in the project settings can be entered as communication path. The project is not changed by the configuration of an Ad-hoc IP.

– If the device description file of a controller defines a maximum number of tasks per ESM then PLCnext Engineer will check this limit. So far only the maximum number of tasks per controller was defined.

– The configuration of a communication using OPC UA PubSub (Publisher/Subscriber) is now possible.

23.4   Network

– An INTERBUS network can be configured in the PLANT tree when the extension module AXC F XT IB is activated with logical addressing. It is also possible to set parameters and assign process data.

– Device instances in the network below the controller can be copied and pasted. The parameter settings of the copied devices and all modules are taken over. Devices can be copied within a project as well as from a restricted PLCnext Engineer instance to an unrestricted one. Copying controllers and safety related devices is not permitted.

– PLCnext Engineer now checks whether a suitable Pcap driver installation is available. The driver is needed for scanning the network. When no Pcap driver is available or the configuration is not suitable for PLCnext Engineer, a corresponding message is shown.

– When the device description file of an instantiated device is missing, it can be replaced by a different device type from the COMPONENTS area.

– If an IODD file of an IO-Link device defines multiple versions of the device, the user can select the versions to be imported.

– For IO-Link devices the parameters defined in the corresponding IODD file can be set. An additional setting defines if the parameters shall be loaded to the device during startup.

– PROFINET devices which were imported using a GSDML file show the name of the utilized file in the settings editor.

23.5   Programming

– An opened project can now be compared to another project on the local computer or with a project on a connected controller if it has been downloaded with sources. The project comparison in this version shows differences of code and variables worksheets of IEC code.

– The functions BUF_TO_* and *_TO_BUF now support the data types LTIME, LDATE, LTOD and LDT.

– The new function block GET_LANG_WSTRING is able to find strings of data type WSTRING in a resource editor for project localization.

– The new function block GET_MODULE_DIFF_BLOCK is able to receive diagnosis information from the PROFINET controller when the configured modules differ from the connected ones.

– The graphical programming editors show with different colors and icons whether a function or function block from the local project, a user library or a default PLCnext Engineer library is used.

– An exported .csv file uses the separator from the regional settings of the operating system.

– When invalid data is detected during a .csv file import, the import is not canceled any more. Only the invalid line is skipped and the error is reported in the log.

– The REFACTORING window now provides a button to refresh the location list.

– By using the import function, IEC code components can also be imported from libraries (*.pcwlx) into the project.

– IN and OUT Ports of a program can now be created from the code worksheet via context menu or inline button.

– EN/ENO parameters are reimplemented for functions. The behavior was changed compared with the version PLCnext Engineer 2021.0 LTS. When EN = FALSE then ENO is set FALSE and the outputs keep the value from the last valid processing of the function. ENO is also set FALSE when the values at the input parameters cannot be processed correctly. The corresponding output values for these cases can be found in the integrated help for the particular function.

23.6   HMI

– A new system variable stores the currently logged in user.

– A new action is available which allows the logged in user to change his password.

– An HMI generator configuration can now have an attribute which defines whether a symbol is overwritten when the HMI content is generated a second time.

23.7   Safety

– The compilers check the program file size. If it exceeds the maximum allowed file size for the safety-related controller an error message will be displayed.

23.8   Fixed errors and limitations

– If a program, function or function block was named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g.

AUX, NUL, COM0, LPT1) then the project could not be saved correctly in the uncompressed format .pcwef. The usage of keywords is now prevented by PLCnext Engineer. The error cannot occur anymore.

– If multiple actions on data were defined in an HMI object that all affected one HMI page, then changing of source values of one action also changed the values for the other actions. Therefore all actions on data of this object had the same source values. The error has been fixed.

– When a project was changed in PLCnext Engineer and a project archive (*.pcweax) was opened, the currently opened project was closed without saving the changes. The error has been fixed.

– If the value for the update time of the I/O data was not specified by the user when configuring a PROFINET device, an update time of 8 ms was configured for this device. Communication with devices that do not support an update time of 8 ms could not be established. The error has been fixed. If the user does not define an update time the correct default value from the device description file will be used.

– Instantiating a controller of the type BPC 9102S after it has been found online after a network scan could corrupt the project. The error has been fixed.

23.9   Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:

– Check the status by entering the following command in the command line shell: „sc query npcap"

– If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.

– To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:

– Uninstall PLCnext Engineer.

– Uninstall the Npcap software.

– Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– If a controller is configured to operate in redundancy mode and the IP assignment is manual the IP settings are set back to default values when the controller is replaced.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– After importing a GSDML file of a Siemens ET200 SP, saving the project could take several minutes.

– When code in Structured Text language is compared during a project comparison the marked differences might appear not clearly arranged or incomplete.

– Differences of referenced libraries are not reliably detected when two projects are compared.

– PLCnext Engineer is unresponsive for a longer time if a long port list is printed.

– When global variables which are connected to ports are renamed, the GDS configuration is not recreated. The project cannot be downloaded to the controller. The ports need to be disconnected and reconnected with the renamed variables.

24   PLCnext Engineer 2021.9

24.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2021.9 and the previously released version PLCnext Engineer 2021.6.2. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

24.2   Application

PLCnext Engineer now supports the high performance controller BPC 9102S.

24.3   Configuration

When configuring a DataLogger session of type TSDB the parameters sampling interval, publishing interval and buffer capacity can now be adjusted.

24.4   Network

The GSDML converter supports the GSDML specification versions 2.2 to 2.42.

24.5   Safety

During the import of GSDML files of safety related devices an additional checksum for the safety related process data is checked. This provides an increased protection against manipulated files.

24.6   Known errors and limitations

–   In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

–   If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:

  –   Check the status by entering the following command in the command line shell: „sc query npcap"

  –   If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.

  –   To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:

  –   Uninstall PLCnext Engineer.

  –   Uninstall the Npcap software.

  –   Install PLCnext Engineer again.

–   If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

–   The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

–   If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

–   After replacing a controller in a user application, it is not possible to switch to DEBUG mode and view online values. The online values are shown after the project was closed and opened again.

–   When a project archive containing a library with program organization units is opened, errors can be reported that program organization units of the same name already exist. When PLCnext Engineer is closed and the project is reopened afterwards, the errors do not appear.

–   Internet Explorer version 11 does not render SVG images in the HMI.

–   Loading an autosaved project after an exception can result in an unhandled exception.

–   If an existing project is opened which has been build using EN/ENO parameters, these parameters will be automatically deleted from the variables worksheet and a compiler error is generated. Attention: The project will already be changed in that moment. Please store a backup before the conversion.

–   If a program, function or function block is named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g. AUX, NUL, COM0, LPT1) then the project cannot be saved correctly in the uncompressed format .pcwef.

–   If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.

–   It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

–   If multiple actions on data are defined in an HMI object that all affect one HMI page then changing of source values of one action also changes the values for the

other actions. Therefore all actions on data of this object will have the same source values.

– With the function block TLS_SOCKET_2 used in server mode a connection can only be established to a single client.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– Moving PROFINET devices or modules in the PLANT tree of a project can cause a discrepancy of the order of devices in the plant tree and in the device list. But the functional capability of the devices is not affected by this.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during network scan a dialog will be displayed offering two identical options for each controller. One option represents the standard controller the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

– When a project is changed in PLCnext Engineer and then a project archive (*.pcweax) is opened the currently opened project is closed without the user being asked to save the changes. Unsaved changes are lost.

– If a controller is configured to operate in redundancy mode and the IP assignment is manual the IP settings are set back to default values when the controller is replaced.

– If the value for the update time of the IO data is not specified by the user when configuring a PROFINET device, an update time of 8 ms is configured for this device. The default value displayed in the user interface is not adopted. Communication with devices that do not support an update time of 8 ms cannot be established. Values entered manually are always adopted, even if they correspond to the preset default value.

– When inserting IO-Link devices into subslots of an IO-Link master, the devices cannot be inserted at any position in the plant tree using drag-and-drop. They can only be dropped on the master node and are then automatically inserted in the first free subslot. In the submodule list of the master, the devices can be inserted at any free position.

– Instantiating a controller of the type BPC 9102S after it has been found online after a network scan can corrupt the project. Please instantiate this controller type only from the COMPONENTS area.

25   PLCnext Engineer 2021.6.2

25.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2021.6.2 and the previously released version PLCnext Engineer 2021.6.1. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

25.2   New supported hardware

– The left-alignable safety-related controller extension AXC F XT SPLC 1000 is supported with the controllers AXC F 2152 and AXC F 3152.

25.3   Fixed errors and limitations

– Multiple memory leaks were fixed.

25.4   Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– After replacing a controller in a user application, it is not possible to switch to DEBUG mode and view online values. The online values are shown after the project was closed and opened again.
– When a project archive containing a library with program organization units is opened, errors can be reported that program organization units of the same name already exist. When PLCnext Engineer is closed and the project is reopened afterwards, the errors do not appear.
– Internet Explorer version 11 does not render SVG images in the HMI.
– Loading an autosaved project after an exception can result in an unhandled exception.
– If an existing project is opened which has been build using EN/ENO parameters, these parameters will be automatically deleted from the variables worksheet and a compiler error is generated. Attention: The project will already be changed in that moment. Please store a backup before the conversion.
– If a program, function or function block is named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g. AUX, NUL, COM0, LPT1) then the project cannot be saved correctly in the uncompressed format .pcwef.
– If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.
– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.
– If multiple actions on data are defined in an HMI object that all affect one HMI page then changing of source values of one action also changes the values for the

other actions. Therefore all actions on data of this object will have the same source values.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– Moving PROFINET devices or modules in the plant tree of a project can cause a discrepancy of the order of devices in the plant tree and in the device list. But the functional capability of the devices is not affected by this.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– The command "Replace" in the context menu of the device list is always inactive. For replacing a device it must be deleted and the new one needs to be added.

– Inserting copied devices in the device list using the context menu command "Paste" or the shortcut <ctrl>+<v> is not possible.

– If an Action on Data of an HMI object executes the command "Open project" then another Action on Data of the same HMI object can only execute the command "Close application".

– When controllers of type AXC F 2152 or AXC F 3152 with firmware version 2021.9 are found during a network scan, a dialog will be displayed offering two identical options for each controller. One option represents the standard controller, the other option represents the controller with the SPLC extension. The tooltip provides the information about the controller variant.

26   PLCnext Engineer 2021.6.1

> **i**   As of version 2019.6 of PLCnext Engineer, an error when moving devices within the Axioline local bus in the plant tree of a project can lead to an inconsistency between the representation in the plant tree and the device list. This could lead to a wrong assignment of process data and thus to an erroneous behavior of the inputs and outputs. The error is fixed in this version.

26.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2021.6.1 and the previously released version PLCnext Engineer 2021.6. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

26.2   Application

– Several measures to improve the performance in Fast Edit Mode were implemented.
– The performance for compiling the network and HMI application is improved.
– The download of projects to a controller was accelerated.

26.3   Fixed errors and limitations

– An erroneous conversion of GSDML files to FDCML files caused internal errors at compile time.

26.4   Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.

– To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– After replacing a controller in a user application, it is not possible to switch to DEBUG mode and view online values. The online values are shown after the project was closed and opened again.
– When a project archive containing a library with program organization units is opened, errors can be reported that program organization units of the same name already exist. When PLCnext Engineer is closed and the project is reopened afterwards, the errors do not appear.
– Internet Explorer version 11 does not render SVG images in the HMI.
– Loading an autosaved project after an exception can result in an unhandled exception.
– If an existing project is opened which has been build using EN/ENO parameters, these parameters will be automatically deleted from the variables worksheet and a compiler error is generated. Attention: The project will already be changed in that moment. Please store a backup before the conversion.
– If a program, function or function block is named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g. AUX, NUL, COM0, LPT1) then the project cannot be saved correctly in the uncompressed format .pcwef.
– If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another

path. The referenced library has to be deleted from the project and added to from the new path.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If multiple actions on data are defined in an HMI object that all affect one HMI page then changing of source values of one action also changes the values for the other actions. Therefore all actions on data of this object will have the same source values.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– Moving PROFINET devices or modules in the plant tree of a project can cause a discrepancy of the order of devices in the plant tree and in the device list. But the functional capability of the devices is not affected by this.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– The command "Replace" in the context menu of the device list is always inactive. For replacing a device it must be deleted and the new one needs to be added.

– Inserting copied devices in the device list using the context menu command "Paste" or the shortcut <ctrl>+<v> is not possible.

– If an Action on Data of an HMI object executes the command "Open project" then another Action on Data of the same HMI object can only execute the command "Close application".

27   PLCnext Engineer 2021.0.5

> ℹ️ As of version 2019.6 of PLCnext Engineer, an error when moving devices within the Axioline local bus in the plant tree of a project can lead to an inconsistency between the representation in the plant tree and the device list. This could lead to a wrong assignment of process data and thus to an erroneous behavior of the inputs and outputs. The error is fixed in this version.

27.1   General notes

This section describes changes made between the version of PLCnext Engineer 2021.0.5 and the earlier released version PLCnext Engineer 2021.0.4. All parts of the earlier released version are included in the new version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

27.2   Fixed errors and limitations

– PLCnext Engineer could crash when background page templates were used in an HMI application.

– The function blocks TLS_SEND, TLS_RECEIVE and TLS_SOCKET could trigger a watchdog on the controller if the communication partner was not available. The function blocks are replaced by corrected ones.

27.3   Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
  If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.

– Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.

– After replacing a controller in a user application, it is not possible to switch to DEBUG mode and view online values. The online values are shown after the project was closed and opened again.

– When a project archive containing a library with program organization units is opened, errors can be reported that program organization units of the same name already exist. When PLCnext Engineer is closed and the project is reopened afterwards, the errors do not appear.

– Internet Explorer version 11 does not render SVG images in the HMI.

– Loading an autosaved project after an exception can result in an unhandled exception.

– If an existing project is opened which has been build using EN/ENO parameters, these parameters will be automatically deleted from the variables worksheet and a compiler error is generated. Attention: The project will already be changed in that moment. Please store a backup before the conversion.

– If a program, function or function block is named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g. AUX, NUL, COM0, LPT1) then the project cannot be saved correctly in the uncompressed format .pcwef.

– If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If multiple actions on data are defined in an HMI object that all affect one HMI page then changing of source values of one action also changes the values for the other actions. Therefore all actions on data of this object will have the same source values.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

– Moving PROFINET devices or modules in the plant tree of a project can cause a discrepancy of the order of devices in the plant tree and in the device list. But the functional capability of the devices is not affected by this.

– When a library has the same name as the project where it is referenced the compiling process fails but no errors are reported.

– Inserting copied devices in the device list using the context menu command "Paste" or the shortcut <ctrl>+<v> is not possible.

28 PLCnext Engineer 2021.6

28.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2021.6 and the previously released version PLCnext Engineer 2021.3.1. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

28.2 Application

– The text fields of the „Search & Replace" toolbar are now enlarged and scaled automatically depending on the width of the editor.

– When the utilized controller has a firmware version 2021.6 or later, the assignment of BYTE arrays to process data items with elementary data type (e.g. Octet-String8 or BitString16) is possible if the overall data size matches.

28.3 Programming

– Constants can now be defined in data type worksheets. These constants can only be used within the worksheet in which they are defined. They can be used as boundaries for arrays or in a user-defined structure for example.

– Formal parameters of function blocks and functions show the parameter comment in the tool tip additionally to the data type.

28.4 IEC 61131-3 functions and function blocks

Name	Note
TO_WSTRING	Additional types: NUM, BYTE, TIME
WSTRING_TO_BUF, BUF_TO_WSTRING, RTC_WS	New function blocks
LEN	Extension by ANY_STRING and WSTRING
STRING_COPY, TO_NUM, IM, MIN, MAX, MUX, SEL, MOVE, TO_TIME, TO_LTIME, SIZEOF	Extension by WSTRING

28.5 Network

– In the topology viewer a label can show additional information about the connection like the media type or the cable length if it is provided by the utilized protocol.

– Scanning the network for online controllers is now also possible when PLCnext Engineer is already connected to a controller.

– The result of a network scan now shows the revision of each controller that was found.

– On the Axioline F node in the plant tree a scan for connected Axioline devices can be initiated in the context menu.

28.6 HMI

– The HMI generator offers additional functions like generating folders and folder structures, empty pages, additional trigger conditions for the page generation structure and generating symbols without a trigger. Additionally symbols can now be overwritten or deleted by the generation process.

– The trend chart object now offers the new action to reset the zoom.

– Page templates can be added to the local HMI components via context menu.

– Local symbols can now have tags.

– Text lists are now supported in HMI.

28.7 Safety

– The safety task editor offers the possibility to change the cycle time, the watchdog time and comments.

– The possible connections for input formal parameters can be limited. It can be defined for input formal parameters of safety-related function blocks whether only variables, only constants or both can be connected to them.

28.8   Fixed errors and limitations

– In ESM configurations with a SafetyProxyTask, no other task with the priority 0 could be created.
– The function STRING_TO_BUF could not be used with firmware versions 2020.0 LTS and older. A compile error during code generation was reported.
– During writing application changings to the controller, the force list was cleaned.
– Importing a faulty data list CSV file could result in a corrupted project.
– The status icons on safety resources are now shown correctly.
– Replacing Axioline devices in the local bus or at PROFINET devices could result in a wrong order in the project tree.
– Deleting the one and only method of an IEC 61131-3 function block removed the complete program organization unit from the component area.
– Comments of variables with the type "VAR_INSTANCE" were removed by the system when opening the user application.
– Reading the application sources from a controller is now again available.
– Downloading application changes were occasionally not possible caused by corrupt Axioline configurations.
– CASE statements with UDINT variables were not executed correctly.
– The online view in worksheets showed the index value of an ARRAY instead of the value of a certain ARRAY field. This behavior was misleading and has been eliminated to the effect that no value is displayed on the worksheet. Those data types can be viewed in the watch window without limitation.

28.9   Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a wrong npcap configuration. In this case, proceed as follows:
    – Check the status by entering the following command in the command line shell: „sc query npcap"
    – If anything other than "4 RUNNING" is displayed in the line "STATE", the configuration has to be changed.
    – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".
– If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.
– If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
– After replacing a controller in a user application, it is not possible to switch to DEBUG mode and view online values. The online values are shown after the project was closed and opened again.
– When a project archive containing a library with program organization units is opened, errors can be reported that program organization units of the same name already exist. When PLCnext Engineer is closed and the project is reopened afterwards, the errors do not appear.
– Internet Explorer version 11 does not render SVG images in the HMI.
– Loading an autosaved project after an exception can result in an unhandled exception. If an existing project is opened which has been build using EN/ENO parameters, these parameters will be automatically deleted from the variables worksheet and a compiler error is

generated. Attention: The project will already be changed in that moment. Please store a backup before the conversion.

– If a program, function or function block is named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g. AUX, NUL, COM0, LPT1) then the project cannot be saved correctly in the uncompressed format .pcwef.

– If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If multiple actions on data are defined in an HMI object that all affect one HMI page then changing of source values of one action also changes the values for the other actions. Therefore all actions on data of this object will have the same source values.

– With the function block TLS_SOCKET_2 used in server mode a connection can only be established to a single client.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

29 PLCnext Engineer 2021.0.4 LTS

29.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2021.0.4 LTS and the previously released version PLCnext Engineer 2021.0.3 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

29.2 Fixed errors and limitations

– A change of the data type of a variable at a standalone function on a code worksheet was only executed after another change of the code or a complete rebuild by the compiler.

– Opening projects with libraries with long names could result in the error message "Integrity breach detected". The reason was a wrong interpreted new line in the data of the library.

29.3 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a wrong npcap configuration. In this case, proceed as follows:
  – Check the status by entering the following command in the command line shell: „sc query npcap"
  – If anything other than "4 RUNNING" is displayed in the line „STATE", the configuration has to be changed.
  – To do this, enter the command "sc config npcap start=auto" followed by the command "sc start npcap".

– If there are still no online devices found, Npcap has to be reinstalled. To do this, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– The processing of LREAL literals without the prefix „LREAL#" cannot be used.

– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++ programs and components is currently not supported by the controller firmware.

– Opening projects from a network drive can take a long time.

– The icons showing the connection status between PLCnext Engineer and a safety-related controller are missing.

– After renaming a safety-related variable with the refactoring function the verification of the variable needs to be confirmed. However the corresponding context menu item is inactive then. The project needs to be closed and reopened. After that the item is available.

– If an HMI page shows more than one variable in a Chart object, incorrect values may be displayed.

– When a visualization client is connected to the integrated HMI webserver, the memory consumption increases continuously.

– Vector graphics from the integrated HMI webservers are displayed incorrectly in Internet Explorer 11.

– When a controller is replaced in the project there are no online values displayed in the debug mode. The project has to be closed and reopened first.

– The online help for the HMI generator is not yet available in PLCnext Engineer 2021.0. It will be integrated in one of the next versions. However the HMI generator is fully functional and can be enabled by an AddIn license.

– If a relative path is set as default library path and an archive which contains a library is saved to the standard project path it will not be possible to save the archive a second time to a different location. The library will not be loaded in that case.

– When a project archive containing a library with program organisation units is opened, errors can be reported that program organisation units of the same name already exist. When PLCnext Engineer is closed and

the project is reopened afterwards the errors do not appear.

– Internet Explorer version 11 does not render SVG images in the HMI.

– Loading an autosaved project after an exception can result in an unhandled exception.

– User task in a ESM configuration with a SafetyProxy task must have a priority configured >=1.

30   PLCnext Engineer 2021.3.1

> In the previous versions of PLCnext Engineer 2021.0 LTS, 2021.0.1 LTS, 2021.0.2 LTS and 2021.3 an error while saving projects could in rare cases result in incorrectly stored data. This could irreparably damage the projects. The error has been fixed with this version.

30.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2021.3.1 and the previously released version PLCnext Engineer 2021.3. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.
The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

30.2   Fixed errors and limitations

–   Multiple improvements to accelerate the compile process are implemented.
–   Multiple memory leaks are closed.
–   Incorrect addressing of PROFIsafe variables could lead to passivation of devices.
–   If a port and an external variable of a function block were named identically, this could result in an internal compile error.
–   User defined variables of STRING data types within a structure were exported erroneous during release of a library.
–   A connection could not be established with the function block TLS_SOCKET_2. Subsequently also receiving data with TLS_RECEIVE_2 and sending data with TLS_SEND_2 was not successful.
–   When the function block UDP_SOCKET_2 was used, an exception occurred on the controller.
–   The ADD function could calculate wrongly rounded results if an input variable was initially declared as data type INT and then changed to REAL. The wrong calculation only occurred when no other change and no complete project rebuild was done after changing the data type.

30.3   Known errors and limitations

–   In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
–   If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    –   Uninstall PLCnext Engineer.
    –   Uninstall the Npcap software.
    –   Install PLCnext Engineer again.
–   If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
–   The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.
–   If you link a port variable with the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types via ports of programs and components is currently not supported by the controller firmware.
–   The icons showing the connection status between PLCnext Engineer and a safety-related controller are missing.
–   When a project archive containing a library with program organization units is opened, errors can be reported that program organization units of the same name already exist. When PLCnext Engineer is closed and the project is reopened afterwards the errors do not appear.
–   Internet Explorer version 11 does not render SVG images in the HMI.
–   Loading an autosaved project after an exception can result in an unhandled exception.
–   User task in a ESM configuration with a SafetyProxy task must have a priority configured >=1.
–   If an existing project is opened which has been built using EN/ENO parameters these parameters will be automatically deleted from the variables worksheet and a compiler error is generated. Attention: The project will already be changed in that moment. Please store a backup before the conversion.
–   If a program, function or function block is named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g. AUX, NUL, COM0, LPT1), the project cannot be saved correctly in the uncompressed format .pcwef.
–   If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another

path. The referenced library has to be deleted from the project and added to from the new path.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If multiple actions on data are defined in an HMI object that all affect one HMI page then changing of source values of one action also changes the values for the other actions. Therefore all actions on data of this object will have the same source values.

– With the function block TLS_SOCKET_2 used in server mode a connection can only be established to a single client.

– The function STRING_TO_BUF cannot be used with firmware versions 2020.0 and older. A compile error during code generation will be reported.

– The force list is deleted when project changes are written to the controller.

– If a task is named "Globals" or "ServiceTask" this will result in a runtime crash on the controller after writing the project. Please do not use these names.

31 PLCnext Engineer 2021.0.3 LTS

i | In the previous versions of PLCnext Engineer 2021.0 LTS, 2021.0.1 LTS, 2021.0.2 LTS and 2021.3 an error while saving projects could in rare cases result in incorrectly stored data. This could irreparably damage the projects. The error has been fixed with this version.

31.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2021.0.3 LTS and the previously released version PLCnext Engineer 2021.0.2 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

31.2 Fixed errors and limitations

– When a referenced library in a project was replaced by a newer version, incorrectly updated port lists could occur.

– Generating HMI page templates with the HMI Generator could result in a crash of PLCnext Engineer if the page template contained incompletely configured parameters.

– An erroneous check of preinstalled operating system components could cause PLCnext Engineer to fail to start.

– Erroneous device description files of Axioline Smart Elements were exchanged.

31.3 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– The processing of LREAL literals without the prefix „LREAL#" cannot be used.

– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++ programs and components is currently not supported by the controller firmware.

– Opening projects from a network drive can take a long time.

– The icons showing the connection status between PLCnext Engineer and a safety-related controller are missing.

– After renaming a safety-related variable with the refactoring function the verification of the variable needs to be confirmed. However the corresponding context menu item is inactive then. The project needs to be closed and reopened. After that the item is available.

– If an HMI page shows more than one variable in a Chart object, incorrect values may be displayed.

– When a visualization client is connected to the integrated HMI webserver, the memory consumption increases continuously.

– Vector graphics from the integrated HMI webservers are displayed incorrectly in Internet Explorer 11.

– When a controller is replaced in the project there are no online values displayed in the debug mode. The project has to be closed and reopened first.

– The online help for the HMI generator is not yet available in PLCnext Engineer 2021.0. It will be integrated in one of the next versions. However the HMI generator is fully functional and can be enabled by an AddIn license.

– If a relative path is set as default library path and an archive which contains a library is saved to the standard project path it will not be possible to save the archive a second time to a different location. The library will not be loaded in that case.

– When a project archive containing a library with program organization units is opened, errors can be reported that program organization units of the same name already exist. When PLCnext Engineer is closed and

the project is reopened afterwards the errors do not appear.

– Internet Explorer version 11 does not render SVG images in the HMI.

– Loading an autosaved project after an exception can result in an unhandled exception.

– User task in a ESM configuration with a SafetyProxy task must have a priority configured >=1.

32 PLCnext Engineer 2021.3

NOTE: Possible data loss

When saving projects, data could be stored incorrectly in rare cases. This can irreparably damage the projects. Make sure you keep backups of executable project versions.

32.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2021.3 and the previously released version PLCnext Engineer 2021.0.2 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

32.2 Application

– The LOGIC ANALYZER supports continuous recording synchronized with a user task.

32.3 Programming

– Copy/paste of a function block now automatically generates a new instance.
– TCP_* function blocks are substituted by TLS* and UDP_* function blocks. Additionally the new TLS_* function blocks support multicast.
– The data type WSTRING is supported in the IEC 61131-3 programming environment.
– The execution control for functions using EN/ENO parameters is deactivated in PLCnext Engineer. The implemented behaviour is not as expected by the users. The behaviour will be revised and reactivated in one of the upcoming releases. If you like to keep using EN/ENO you will have to stay on the PLCnext Engineer version 2021.0 LTS.

32.4 Network

– IO-Link integratrion by importing IO-Link device descriptions (IODD).
  The imported IO-Link devices can be operated on the local Axioline bus and in a PROFINET network using the Axioline IO-Link bus terminals.
– The Ethernet topology is now able to display VLAN information. Furthermore a device can be defined as root device.
– The GSDML converter supports the GDSML specifications 2.2 to 2.41.

32.5 HMI

– An editor for page templates is added to the components area.
– The chart object provides a downsampling mode and the left axis range can be defined by the value range of a recorded variable and limited by min/max values.
– The object explorer now has an option to exclude objects from the runtime application and the build process.
– A new "Bring to Top" dynamic for click actions is available.

32.6 Safety

– The safety engineering platform now gives the option to define a reset password which enables an admin user to reset a project password. The functionality is available when it is activated in the configuration file and PLCnext Engineer is started with admin rights.
– The safety related parameterization allows updating device descriptions. If the device description of an instantiated device is replaced by a newer version the parameter model will be tried to be adjusted to the new device description. The goal is to takeover as many user defined parameters as possible.
– For the creation of a signature for libraries containing loadable C functions a time stamp server is selected automatically.

32.7 Fixed errors and limitations

– The function TO_STRING with floating point variables and the FORMAT parameter 'D0' or 'F0' resulted in an output value with six decimals instead of no decimal.
– An unhandled exception occured when the autosave function was active and the autosave project was opened at the same time.
– The IEC 61131-3 function block CTUD incremented the output value CV when the inputs CU and CD both had a rising edge in the same cycle. This behaviour is incorrect according to the definition in the IEC 61131-3. Therefore now the output value of CV does not change if both inputs CV and CD are triggered at the same time.
– After the download of a project to the controller a reconnection to the controller failed.
– An unexpected exception occured when the "find and replace" function has been used with keywords like "FOR".
– Opening the help for functions and function blocks from the component area was not working.

– An unexpected exception occured when a port variable of a PLCnext high level language component was added by drag and drop.

32.8 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
    – Uninstall PLCnext Engineer.
    – Uninstall the Npcap software.
    – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++ programs and components is currently not supported by the controller firmware.

– The icons showing the connection status between PLCnext Engineer and a safety-related controller are missing.

– When a project archive containing a library with program organisation units is opened, errors can be reported that program organisation units of the same name already exist. When PLCnext Engineer is closed and the project is reopened afterwards the errors do not appear.

– Internet Explorer version 11 does not render SVG images in the HMI.

– Loading an autosaved project after an exception can result in an unhandled exception.

– User task in a ESM configuration with a SafetyProxy task must have a priority configured >=1.

– If an existing project is opened which has been built using EN/ENO parameters these parameters will be automatically deleted from the variables worksheet and a compiler error is generated. Attention: The project will already be changed in that moment. Please store a backup before the conversion.

– If a program, function or function block is named like a keyword from the IEC 61131-3 program languages (e.g. IF) or a keyword of the windows file system (e.g.

AUX, NUL, COM0, LPT1), the project cannot be safed correctly in the uncompressed format .pcwef.

– If a library which is referenced in a project cannot be found in the stored path, it will not be possible to replace the library with a library of the same name from another path. The referenced library has to be deleted from the project and added to from the new path.

– It is not possible to copy multiple lines from the parameter and tag list of HMI symbols or page templates and paste them in another symbol or page template at once.

– If multiple actions on data are defined in an HMI object that all affect one HMI page then changing of source values of one action also changes the values for the other actions. Therefore all actions on data of this object will have the same source values.

– A connection cannot be established with the function block TLS_CONNECT_2. Subsequently also receiving data with TLS_RECEIVE_2 and sending data with TLS_SEND_2 will not be successful.

– When the function block UDP_SOCKET_2 is used, an exception occurs on the controller. A correct execution of the project cannot be ensured in that case.

33 PLCnext Engineer 2021.0.2 LTS

> **NOTE: Possible data loss**
>
> When saving projects, data could be stored incorrectly in rare cases. This can irreparably damage the projects. Make sure you keep backups of executable project versions.

33.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2021.0.2 LTS and the previously released version PLCnext Engineer 2021.0.1 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

The installation on single core systems is possible with explicit administrator rights, but will be prohibited in future versions.

33.2 Fixed errors and limitations

– The AddIn "Ethernet Topology Viewer" requires now an activated license.
– The LOGIC ANALYZER in former versions showed interpolated values.
  This behavior has changed now.
– The statistic view in the controller cockpit had a calculation error for the amount of global variables and global safety variables.
  This error has been fixed.
– The calculation of the index of an ARRAY datatype could result in an internal error of the compiler.
  This error has been fixed.
– Different "Unexpected exceptions" caused by the function "Import from another project" and during "Save as" have been removed and fixed.
– Many stability problems in the "plant" and "component area" have been fixed.
– Opening huge MATLAB® Simulink® models inside the model viewer has been accelerated.
– Inserting PROFINET devices does now deactivate the functionality "MRP" by default and needs to be switched on explicitly by the user.
– The functionality "Download changes" with huge user projects could result in a watchdog error on the controller.
  This behavior has been fixed.

33.3 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.
– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.
– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.
– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.
– The processing of LREAL literals without the prefix "LREAL#" cannot be used.
– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++ programs and components is currently not supported by the controller firmware.
– Opening projects from a network drive can take a long time.
– The icons showing the conncection status between PLCnext Engineer and a safety-related controller are missing.
– After renaming a safety-related variable with the refactoring function the verification of the variable needs to be confirmed. However the corresponding context menu item is inactive then. The project needs to be closed and reopened. After that the item is available.
– If an HMI page shows more than one variable in a chart object the values can be displayed wrong.
– When a visualization client is connected to the integrated HMI webserver the memory consumption can increase continuously.
– Vector grahics from the integrated HMI webservers are displayed wrong in Internet Explorer 11.
– When a controller is replaced in the project there are no online values displayed in the debug mode. The project has to be closed and reopened first.
– The online help for the HMI generator is not yet available in PLCnext Engineer 2021.0. It will be integrated in one of the next versions. However the HMI generator is fully functional and can be enabled by an AddIn license.

– If a relative path is set as default library path and an archive which contains a library is saved to the standard project path it will not be possible to save the archive a second time to a different location. The library will not be loaded in that case.

– When you open a project archive containing a library with Program Organization Units (POUs), you may encounter error messages with the hint that POUs of the same name already exist.
If you close PLCnext Engineer and then reopen the project, the errors no longer occur.

– Loading an autosaved project after an exception can result in an unhandled exception.

– User task in a ESM configuration with a SafetyProxy-Task must have a priority configured ≥1.

34 PLCnext Engineer 2021.0.1 LTS

> **NOTE: Possible data loss**
>
> When saving projects, data could be stored incorrectly in rare cases. This can irreparably damage the projects. Make sure you keep backups of executable project versions.

34.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2021.0.1 LTS and the previously released version PLCnext Engineer 2021.0 LTS. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

34.2 Fixed errors and limitations

– Using the MOVE function with activated EN/ENO parameters and connected BOOL or STRING datatypes as input and output parameters could lead to a compile error.
This error has been fixed.

– In HMI applications the index variable of symbol lists were not initialized correctly if the index variable was a local tag or the symbol list was a local symbol in the project.
This error has been fixed.

– The configuration of the Global Data Space (GDS) was incomplete for safety related controllers.
This error has been fixed.

– If parameterization speedup was defined for a PROFINET device in the device description file the corresponding configuration file was automatically created with parameters for Fast Startup independent of the supported startup mode.
This error has been fixed.

– When the context menu in the NORG editor was opened while cross references were collected PLCnext Engineer could crash.
This error has been fixed.

34.3 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has

been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– The processing of LREAL literals without the prefix "LREAL#" cannot be used.

– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++ programs and components is currently not supported by the controller firmware.

– Opening projects from a network drive can take a long time.

– The icons showing the connection status between PLCnext Engineer and a safety-related controller are missing.

– After renaming a safety-related variable with the refactoring function the verification of the variable needs to be confirmed. However the corresponding context menu item is inactive then. The project needs to be closed and reopened. After that the item is available.

– If an HMI page shows more than one variable in a chart object the values can be displayed wrong.

– When a visualization client is connected to the integrated HMI webserver the memory consumption can increase continuously.

– Vector grahics from the integrated HMI webservers are displayed wrong in Internet Explorer 11.

– When a controller is replaced in the project there are no online values displayed in the debug mode. The project has to be closed and reopened first.

– The online help for the HMI generator is not yet available in PLCnext Engineer 2021.0. It will be integrated in one of the next versions. However the HMI generator is fully functional and can be enabled by an AddIn license.

– If a relative path is set as default library path and an archive which contains a library is saved to the standard project path it will not be possible to save the archive a second time to a different location. The library will not be loaded in that case.

– When you open a project archive containing a library with Program Organization Units (POUs), you may en-

counter error messages with the hint that POUs of the
same name already exist.
If you close PLCnext Engineer and then reopen the
project, the errors no longer occur.

35 PLCnext Engineer 2021.0 LTS

> **NOTE: Possible data loss**
>
> When saving projects, data could be stored incorrectly in rare cases. This can irreparably damage the projects. Make sure you keep backups of executable project versions.

35.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2021.0 LTS and the previously released version PLCnext Engineer 2020.6.2. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

35.2 Application

– Collecting the cross references has been moved to a thread which is independent of the user interface. A progress bar with the option to cancel the process has been implemented. The user interface is not blocked by collecting cross references anymore.

– A double click on a cross reference in debug mode can open a dialog which provides the selection of an instance.

– Rows in tables have alternating background colors to improve visibility.

– If the file User.config is corrupt the backup file *.Merged.config will be used. All user data will get lost using the backup. A corresponding message will be reported in the log file.

– When multiple instances of PLCnext Engineer are opened it is possible to copy program code, variables and variable groups from the restricted instance to the non-restricted one.

– You can now rename libraries in the file system. Dependencies of the file name in the projects were resolved.

– The LOGIC ANALYZER can record up to 16 data points now.

– Previously recorded and exported data can now be re-imported into the LOGIC ANALYZER for investigation.

– The error list can be filtered by the domain of the error source.

– Libraries consisting of different component types can be released. Component types can be non-safety and safety programs, HMI objects and devices. Following the menu "File, Release As Library..." you can select the component types to be included in the library. Addi-

tionally the dialog provides a deselection option for single HMI objects and devices.

– Under "Extras, Options..." you can set a timeout and the polling interval for the online communication between PLCnext Engineer and a controller. So the data exchange with a remote controller can be improved.

– Establishing a connection has been moved to a background thread in order to not blocking the user interface.

– Comments and HMI texts can be translated during runtime for project localization. HMI texts can be displayed in different languages using the LanguageCode tag in the HMI application. In the IEC program comments and user defined texts can be requested in different languages using the function block GET_LANG_STRING. To provide the translated texts the resource editor has been added for function blocks, programs and the HMI application. For setting the default language and the alternative languages, the menu item "Default Language Settings" has been added under "Extras, Options...".

– A refactoring function has been added via the context menu in data lists and variable worksheets. The refactoring function can be used to change the names of variables, instances and HMI tags. In the refactoring dialog, a checkbox can be used to select the individual locations to be changed or all locations can be selected and deselected via the context menu.

– The display name of variables in data lists and ports in port lists is not showing the resource path anymore.

– When all editors of an editor group are closed a hint is shown in the empty window.

– Under "Extras, Options..." a path for non-safety and safety parameters can be defined.

– If a new user is logged in on the controller during debugging and the new user is not authorized to view online values, the online values will be resetted.

– Two icons are added to the cockpit of the controller which enable store and restore of retain data. Up to ten backup files can be saved. Each further file deletes the oldest one. For restoring the most recent file is used.

– A new editor for reading and viewing the physical network topology has been implemented. The editor shows all devices connected to the controller and de-

tails like network addresses, ports and connection types. A license is required to activate the view.

– The viewer for Matlab Simulink models is now also capable of displaying Stateflow models and Truth Table functions.

– Variables from Matlab Simulink models can now be added to the LOGIC ANALYZER and the WATCHES window by drag and drop.

35.3   Programming

– For Function Block Diagram and Structured Text EN/ENO parameters are available. A global setting has been added under "Extras, Options..." to select whether new functions are added to a code worksheet with or without EN/ENO parameters. Additionally the parameters can be added to and removed from each function individually via the context menu in the corresponding editor.

– The overview map in the graphical code worksheets highlights coding errors in red color now. So you can easily navigate to the error locations.

35.4   Network

– A dialog has been added to the GSDML import process which allows the selection of device access points (DAP) to be imported.

– The structure of the devices in the components tree was changed to simplify the navigation.

35.5   HMI

– An action of a dynamic can be triggered by a data change of an assigned variable.

– An HMI page can be connected to a background page template. The template can provide predefined symbols and parameters.

– The HMI object type chart has been added. A data logger session can be assigned to this object to provide a trend view.

35.6   Safety

– When closing a previously saved project the compile output is not deleted from the binaries folder anymore to prevent the necessity of a rebuild after reopening the project.

– Function blocks that only process non-safety-related datatypes are displayed in the same way as standard function blocks to distinguish them from the function blocks which process safety-related data.

– You can delete the content of the safety log.

– Additional entries are made in the safety log when a password is entered wrongly, a password is changed or the safety log is deleted.

– In safety editors the intellisense window only shows functions, function blocks and datatypes that are allowed to be used for programming safety related code.

35.7   Security

– License management
From CodeMeter runtime version 6.90 the components which are integrated into PLCnext Engineer do not adjust any firewall settings automatically anymore. That means if network licenses shall be activated the network license server functionality has to be enbabled in the WebAdmin settings and the TCP port 22350 has to be unlocked in the firewall settings additionally. Administrator rights are required for adjusting the Windows firewall settings and the settings shall not be managed by an overlaid group policy.

– A template for the login dialog for the intergrated HMI webserver is provided. The template shows a message to inform the user that a login is permitted to authorized users only and the user agrees on data storage. This information is required according to IEC 62443-4-2. The message can be adapted by the application developer.

– When using the Application Control Interface (ACI) it is ensured that the client application and the PLCnext Engineer are executed by the identical user.

– The ACI is disabled when PLCnext Engineer is operated with graphical user interface.

– You can now enable and disable the ACI. To do this, you need administrator rights in PLCnext Engineer.

– The ACI can only be operated by one client at a time.

– Only one instance of PLCnext Engineer with enabled ACI can be executed at a time on one PC. Further instances will be executed with disabled ACI.

35.8   Fixed errors and limitations

– Up to 32 tasks could be added to an ESM. But according to the manual only up to 16 tasks are allowed. This error has been fixed.

– Reading project sources from a PLC did not work. This error has been fixed.

– In a project with a safety controller, the repeated creation of new variables and variable groups combined with moving of the variables into the newly created groups and a frequent change between the data list of the non-safe controller and the data list of the safe con-

troller could lead to a crash of PLCnext Engineer. This error has been fixed.

– When invalid ports were unlinked the incorrectly created ports had to be removed from the data list manually. This error has been fixed.

– The cross-reference window displayed internal variables created by the compiler. This error has been fixed.

– HMI pages which were deleted from a user project were not deleted from the PLCnext Control. These pages had to be removed manually from the controller. This error has been fixed.

– If a POU was copied from a library into a project and then changed, the controller executed the changed code after a download. If the changed POU was then deleted from the project again, the POU was not overwritten by the unchanged version from the library during the next download. The project had to be rebuild and then downloaded to ensure the controller executed the unchanged code from the library. This error has been fixed.

35.9 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– The processing of LREAL literals without the prefix "LREAL#" cannot be used.

– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++

programs and components is currently not supported by the controller firmware.

– Opening projects from a network drive can take a long time.

– The icons showing the connection status between PLCnext Engineer and a safety-related controller are missing.

– After renaming a safety-related variable with the refactoring function the verification of the variable needs to be confirmed. However the corresponding context menu item is inactive then. The project needs to be closed and reopened. After that the item is available.

– If an HMI page shows more than one variable in a chart object the values can be displayed wrong.

– When a visualization client is connected to the integrated HMI webserver the memory consumption can increase continuously.

– Vector graphics from the integrated HMI webservers are displayed wrong in Internet Explorer 11.

– When a controller is replaced in the project there are no online values displayed in the debug mode. The project has to be closed and reopened first.

– The online help for the HMI generator is not yet available in PLCnext Engineer 2021.0. It will be integrated in one of the next versions. However the HMI generator is fully functional and can be enabled by an AddIn license.

– If a relative path is set as default library path and an archive which contains a library is saved to the standard project path it will not be possible to save the archive a second time to a different location. The library will not be loaded in that case.

– Using the MOVE function with activated EN/ENO parameters and connected BOOL oder STRING datatypes as input and output parameters can lead to a compile error.

36 PLCnext Engineer 2020.6.2

36.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2020.6.2 and the previously released version PLCnext Engineer 2020.6. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

36.2 Fixed errors and limitations

– TO_REAL function
   Some specific input values of the function TO_REAL resulted in an unexpected return value.
   This error has been fixed.

– Changes to code during compile
   Changes to the user application code during compile to download the application to a connected
   PLCnext Control are prevented now. In former versions those changes could cause problems for the debug mode.

– Data list
   During move of data in data lists different problems could occur. For example, freezing of the user interface, loss of connections between data or an unhandled exception in the program. Additionally, the functionality copy/paste did not work anymore.
   These errors have been fixed.

– Change of signature
   If the user changes the signature of an existing function or method, this change was not overtaken into the project.
   This error has been fixed.

– Safety data list
   If the user deleted the "Default" variable group from the safety data list and created new variables, it could happen that these new variables are shown twice in the data list.
   This error has been fixed.

– VPN communication
   During connecting a PLCnext Control with
   PLCnext Engineer, an unhandled exception could happen.
   This unhandled exception has been fixed.
   Additionally, some performance enhancement is implemented for the user actions in the cockpit of the controller, in the functionality toggle execution values, forcing and overwriting of variables or polling the device state of connected controllers. The user interface felt freezed

during those actions.
   These problems have been fixed.

– Dynamics in nested symbols
   In case of nested symbols, it could happen that dynamics of the lowest level symbol were not executed correctly.
   This error has been fixed.

36.3 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
   – Uninstall PLCnext Engineer.
   – Uninstall the Npcap software.
   – Install PLCnext Engineer again.

– HMI pages which are deleted from a user project, are not deleted from the PLCnext Control. If necessary, these pages must be removed manually from the controller.

– C++ libraries built on a Linux operating system using the PLCnext Technology C++ Toolchain (PLCnCLI) 2019.0 can not be referenced in projects in PLCnext Engineer 2020.0 LTS or higher. The libraries have to be recompiled using the release > 2019.9 of the C++ toolchain before.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– The processing of LREAL literals without the prefix „LREAL#" cannot be used.

– The cross-reference window currently also displays internal variables created by the compiler.

– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++

programs and components is currently not supported by the controller firmware.

– If PLCnext Engineer detects invalid port links and the link is removed, you must manually remove the incorrectly created port from the data list.

– In a project with a safety controller, the repeated creation of new variables and variable groups combined with the moving of the variables into the newly created groups and a frequent change between the data list of the non-safe controller and the data list of the safe controller can lead to a crash of PLCnext Engineer.

– Up to 32 tasks can be added to an ESM. But according to the manual only up to 16 tasks are allowed. A project with more than 16 tasks per ESM cannot be started up on the controller.

– If a POU is copied from a library into a project and then changed, the controller will execute the changed code after a download. If the changed POU is deleted from the project again, the POU is not overwritten with the unchanged version from the library during the next download. The controller only executes the unchanged code from the library after the project has been recreated and then downloaded.

– Reading project sources from the controller does not work.

37 PLCnext Engineer 2020.6

37.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2020.6 and the previously released version PLCnext Engineer 2020.3.1. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

37.2 Application

– Colors of the icons
  The colors of the icons have been made a little darker to increase the contrast to the background

– Data Logger Service
  The Data Logger Service records data from the GDS. The data to be recorded and the trigger conditions are configured in the Data Logger Session Editor. The data is stored in the RAM of the controller or on the SD card. PLCnext Engineer does not have to be connected to the controller during data recording.

– LOGIC ANALYZER - Triggered recording
  The LOGIC ANALYZER now supports triggered recordings. For the configuration of the trigger conditions an additional icon has been added in the cross functional area of the logic analysis.

– csv export/import of data lists
  Data lists can be exported and imported using .csv files.

– Version information in RTF and HTML
  The version information can be stored in RTF and HTML format. The conversion is done via the options menu.

37.3 Programming

– Execution Indication in the graphical editor
  The design of the execution indication of executed code has been changed in the graphical editor.

– Set fixed width of NOrG worksheets
  The width of NOrG worksheets can be set. The width is measured as a multiple of the width of a contact and is adjustable between 8 and 16.

– Multiline instance names
  Instance names can now be displayed in multiple lines in the NOrG editor.

– Key combination for search and replace
  CTRL+F opens the local search and places the cursor in the „Search" field. CTRL+H opens the local search and places the cursor in the „Replace" field.

37.4 Network

PROFINET Fast Startup
PROFINET Fast Startup can be configured if this is supported by the controller and the devices.

37.5 HMI

– HMI generator
  For highly standardized applications it is possible to generate HMI contents automatically. For this purpose, an HMI generator configuration must be inserted in the component tree under „HMI". Then HMI pages can be generated in the context menu of the HMI web server via the „Generate HMI content" entry.
  A license is required for this function.

– Array indices as variables
  An array field can be indexed using variables.

– Nested symbols
  Symbols can now be nested over 4 levels.

– „Page Activated" action
  An action can be executed by activating an HMI page.

– HMI object explorer
  The HMI object explorer displays HMI objects in a tree structure and simplifies navigation through the object hierarchies and editing groups or individual elements.

– Import of HMI symbols
  If symbols are imported that already exist in the project, a query is displayed asking whether the existing symbol should be replaced.

– Separate symbol instances
  If a symbol instance has been disconnected from the symbol, the name of the missing symbol is displayed in the graphical editor.

37.6 Safety

– csv export/import of data lists
  Security related variables can also be imported as .csv files. A dialog prompts the user to verify the imported variables. In addition, an entry about the number of imported safety-related variables is written to the safety-related log.

– Export of checksums
  All security-relevant checksums are exported in a single file.

– Process data checksum
  If an error occurs during project generation, the process data checksum is assigned the value „n/a" to clearly indicate the faulty status.

– Connection abort in „Debug Run" status
  If the connection to the controller is disconnected while

the security-related controller is in „Debug Run" status, the user is notified that the controller automatically changes to „Debug Stop" status after 10 minutes. If the connection is disconnected from the Safety Cockpit, the user can choose whether the safety-related controller switches to „Safe Run" status, remains in „Debug Run" status or the connection should not be disconnected after all.

– Resources used
A statistics display can be opened via the node of the safety-related controller in the plant tree, which provides information about the resources used..

37.7 Fixed errors and limitations

– For the controllers AXC F 2152, AXC F 3152 and RFC 4072S it should be possible to configure 32 tasks, but only 16 tasks could be configured.

– The minimum cycle time for the AXC F 1152 controller was limited to 10 ms. The limit is now 5 ms.

– Safety variables could be used in the unsafe programming area without generating a compile error.

– The online status of actions was not uniformly displayed in the SFC-Editor.

– The automatic creation of VAR_EXTERNAL variables when selecting a VAR_GLOBAL variable via Intellisense did not work in the NOrG editor.

– After the password request in the HMI client was cancelled, the password request was displayed again. Canceling now returns you to the last opened page.

– Multiline network comments were partially displayed incompletely in the NOrG editor.

– Using the filter function in the dialog for adding complex data types to the „WATCH" window could lead to the error message „Unhandled Exception".

– If the port data type of a C++ component or a C++ program was subsequently changed, no further data type check was performed when the code was generated. Writing such a project to the controller resulted in an error if the linked data are not compatible.

– If the function „Debug in functions" was used together with methods on function modules, the formal parameters of the function modules were always initialized with zero or FALSE, even if other initial values were given.

37.8 Known errors and limitations

– In the IEC 61131-3 (3rd Edition) standard, Table 71 specifies the sequence for operators in structured text. Currently, the PLCnext Engineer Compiler treats lines 13, 14, 15 according to the sequence of the 2nd edition of IEC 61131-3. In the 3rd edition, the sequence has been changed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– HMI pages which are deleted from a user project, are not deleted from the PLCnext Control. If necessary, these pages must be removed manually from the controller.

– C++ libraries built on a Linux operating system using the PLCnext Technology C++ Toolchain (PLCnCLI) 2019.0 can not be referenced in projects in PLCnext Engineer 2020.0 LTS or higher. The libraries have to be recompiled using the release > 2019.9 of the C++ toolchain before.

– If you quit PLCnext Engineer unexpectedly during the import of a GSDML description, this will result in a corrupt user project.

– The IEC 61131-3 function MOD does not allow the value zero to be assigned to formal parameter IN2. The value zero causes a division by zero on the controller.

– The processing of LREAL literals without the prefix „LREAL#" cannot be used.

– The cross-reference window currently also displays internal variables created by the compiler.

– If you link the data type TIME of a PLCnext component in the data lists, the application cannot be executed on the controller. The linking of TIME data types in C++ programs and components is currently not supported by the controller firmware.

– If PLCnext Engineer detects invalid port links and the link is removed, you must manually remove the incorrectly created port from the data list.

– In a project with a safety controller, the repeated creation of new variables and variable groups combined with the moving of the variables into the newly created groups and a frequent change between the data list of the non-safe controller and the data list of the safe controller can lead to a crash of PLCnext Engineer.

– Up to 32 tasks can be added to an ESM. But according to the manual only up to 16 tasks are allowed. A project with more than 16 tasks per ESM cannot be started up on the controller.

– If a POU is copied from a library into a project and then changed, the controller will execute the changed code after a download. If the changed POU is deleted from the project again, the POU is not overwritten with the unchanged version from the library during the next download. The controller only executes the unchanged code from the library after the project has been recreated and then downloaded.

38   PLCnext Engineer 2020.3.1

38.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2020.3.1 and the previously released version PLCnext Engineer 2020.3. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

38.2   HMI

The HMI startup page of the visualization can now be opened without a login even when the enforcement of user levels is activated by "PLCnext user management". On every further page the user levels are enforced and a login is required when objects with access levels are configured.

38.3   Fixed errors and limitations

–   If projects referred to libraries based on an earlier version of PLCnext Engineer, this generated a compiler error.
     This error has been fixed for backward compatibility of the referenced libraries.

–   Opening instance worksheets to show online values takes a lot of time. This performance issue has been fixed.

–   PLCnext Engineer send MRP port configurations to permanent (non-configurable) ringport port submodules.
     PLCnext Engineer sends configuration now only to configurable port submodules.

38.4   Known errors and limitations

–   The standard IEC 61131-3 (3rd edition) describes in table 71 the operators of the ST language and their precedence. Since 2nd edition of the IEC 61131-3 standard, the precedence of the operators comparison (row 13), equality (row 14) and inequality (row 15) has changed. The PLCnext Engineer compiler crates today the sequencing described in the 2nd edition of the IEC 61131-3 standard.

–   If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
     –   Uninstall PLCnext Engineer.
     –   Uninstall the Npcap software.
     –   Install PLCnext Engineer again.

–   HMI pages which are deleted from a user project, are not deleted from the PLCnext Control. If necessary, these pages must be removed manually from the controller.

–   C++ libraries built on a Linux operating system using the PLCnext Technology C++ Toolchain (PLCnCLI) 2019.0 can not be referenced in projects in PLCnext Engineer 2020.0 LTS or higher. The libraries have to be recompiled using the release > 2019.9 of the C++ toolchain before.

–   Closing PLCnext Engineer during GSDML import by pressing ALT+F4 corrupts the project file. The message box in PLCnext Engineer asks for saving changes. If the user confirms the question with "yes", the project will be corrupted.

–   The IEC 61131-3 function MOD results in a division by zero if the formal parameter IN2 is zero.

–   Assignment of LREAL literals without the prefix "LREAL#" may lead to unexpected results.

–   When the functionality "Debug in functions" is active, initial values of formal parameters of Function Blocks with methods are ignored.

–   The cross references show internal created variables called "autogenerated".

–   If user libraries contain style sheets (CSS file), they are not used by the referencing project.

–   If C++ programs with datatype TIME ports are assigned to other ports, a download to the controller is not possible due to a not supported port datatype by the firmware. PLCnext Engineer does not check this connection or prohibit the download of the project.

–   Missing data type check in case of changed port from a C++ program. If a project with a changed port and connected port data type is written to the controller, a PLC error is shown in the logging window in the cockpit.

–   Disconnecting invalid ports, due to a change of the data type, does not remove invalid port. The user has to remove the port then manually.

–   When adding complex data types to the watch window, filtering in the dialog can result in an unhandled exception.

39 PLCnext Engineer 2020.3

39.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2020.3 and the previously released version PLCnext Engineer 2020.0.1. All parts of the previously released version are included in the current version. The software supports operation on Windows 10 (as of build 1709) 64-bit.

39.2 Application

– The title of PLCnext Engineer shows now the complete path of the actual user project.
– The "Version Information" editor shows now HTML files. The HTML code can be imported and exported. For an unified look, cascading style sheets (CSS) can be imported into the project. In case of converting a project from a former version, all existent version information data is deleted automatically.
– The controller AXC F 3152 (Order No. 1069208) is now supported by PLCnext Engineer.
– The user can configure now up to three different time server (NTP server) for controller with firmware 2020.3 or higher.
– The instance tree in the plant view offers now a context menu to jump to the corresponding type of the POU instance.
– Controller with multiple ESMs can now run one idle task on each core.
– The topology planner in PLCnext Engineer is deactivated.
– The dialog for releasing IEC libraries offers now the project structure including user folders instead of a flat list.
– Adding complex data type variables to the watch window offers now a dialog in which single or multiple fields of the data type can be chosen by the user.
– The cross reference window offers now new predefined filters.

39.3 Programming

– Choosing a global variable in an IEC 61131-3 POU editor results now in the automatic declaration of the external variable.
– The user can now choose the variable attribute Constant in the variables tables. Variables with this attribute cannot be overwritten by the user application during runtime.
– The limit of characters in comments of graphical IEC 61131-3 editors is raised to 2048.
– The network oriented graphical editor (NOLD) offers now toolbar buttons for collapsing or expanding all networks.
– The tooltip in graphical IEC 61131-3 editors show now the variable comment next to the datatype.
– The limit of 10 worksheets per POU is increased to 20 worksheets.

39.4 Network

– The GSDML import supports specification version 2.2 to 2.4.
– PROFINET devices can now be configured as shared device if supported.

39.5 HMI

– It is not necessary anymore to re-authenticate via login dialog after a browser refresh.
– Local HMI symbol types have precedence over library symbol types. A symbol on a lower hierarchy level (library) is overloaded by a symbol with the same name on a higher hierarchy level (project).
– If a new version of an existing symbol is imported, they shall have the means to connect existing symbol instances to the newly imported symbol. If the GUID is not retained, the tool offers a context menu in the symbol name property view to update the references
– The tool offers now client specific page and application tags.
– Expressions offer now new string operations: concat(); indexOf(); lastIndexOf(); left(); right(); substr(); substring().

39.6 Safety

– The handling of connecting PROFIsafe process data to standard variables is now easier. The tool creates the necessary safety related variables in background automatically.

39.7 Security

– The online help of PLCnext Engineer describes how to handle projects securely regarding the security features which are provided regarding project handling today.

39.8 Fixed errors and limitations

– Various errors in the import interface for GSDML files have been fixed.

– Some errors in regards of PROFIsafe F addresses are fixed.

– The LOGIC ANALYZER window offers now the possibility to scroll and zoom the captured data.

– An online connection between PLCnext Engineer and a controller over VPN connection resulted in a 100 % CPU load of the host system.
This error has been fixed.

– Search and replace for network comments has been fixed.

– The internal error with the error message "This is often caused by an incorrect address or SOAP action" has been fixed.

39.9 Known errors and limitations

– The standard IEC 61131-3 (3rd edition) describes in table 71 the operators of the ST language and their precedence. Since 2nd edition of the IEC 61131-3 standard, the precedence of the operators comparison (row 13), equality (row 14) and inequality (row 15) has changed. The PLCnext Engineer compiler crates today the sequencing described in the 2nd edition of the IEC 61131-3 standard.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– HMI pages which are deleted from a user project, are not deleted from the PLCnext Control. If necessary, these pages must be removed manually from the controller.

– C++ libraries built on a Linux operating system using the PLCnext Technology C++ Toolchain (PLCnCLI) 2019.0 can not be referenced in projects in PLCnext Engineer 2020.0 LTS or higher. The libraries have to be recompiled using the release > 2019.9 of the C++ toolchain before.

– Closing PLCnext Engineer during GSDML import by pressing ALT+F4 corrupts the project file. The message box in PLCnext Engineer asks for saving changes. If the user confirms the question with "yes", the project will be corrupted.

– The IEC 61131-3 function MOD results in a division by zero if the formal parameter IN2 is zero.

– Assignment of LREAL literals without the prefix "LREAL#" may lead to unexpected results.

– When the functionality "Debug in functions" is active, initial values of formal parameters of Function Blocks with methods are ignored.

– The cross references show internal created variables called "autogenerated".

– If user libraries contain style sheets (CSS file), they are not used by the referencing project.

– If C++ programs with datatype TIME ports are assigned to other ports, a download to the controller is not possible due to a not supported port datatype by the firmware. PLCnext Engineer does not check this connection or prohibit the download of the project.

– Missing data type check in case of changed port from a C++ program. If a project with a changed port and connected port data type is written to the controller, a PLC error is shown in the logging window in the cockpit.

– Disconnecting invalid ports, due to a change of the data type, does not remove invalid port. The user has to remove the port then manually.

– When adding complex data types to the watch window, filtering in the dialog can result in an unhandled exception.

40   PLCnext Engineer 2020.0.1

40.1   General notes

This section describes changes made between the current version of PLCnext Engineer 2020.0.1 and the previously released version PLCnext Engineer 2020.0 LTS. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1 64-bit and Windows 10 (as of build 1709) 64-bit.

40.2   Resolved errors and problems

– If you have sorted the variable list in the global variable table by comment, then the error message "Unexpected Exception" occured.
  This error has been fixed.

– In rare cases a user application with safety relevance on a RFC 4072S caused the error message "Error! Unknown version of the file "pniodev.bin"".
  This error has been fixed.

– If you connect ports in the data list with a user defined datatype with a huge amount of members, then the CPU of the PC shows a usage of 100 % load. In some cases it results in the error message "Unexpected Exception".
  This error has been fixed.

– If you delete single ports in the data list table, in some cases the error message "Unexpected Exception" was shown.
  This error has been fixed.

40.3   Known errors and limitations

– The standard IEC 61131-3 (3rd edition) describes in table 71 the operators of the ST language and their precedence. Since 2nd edition of the IEC 61131-3 standard, the precedence of the operators comparison (row 13), equality (row 14) and inequality (row 15) has changed. The PLCnext Engineer compiler crates today the sequencing described in the 2nd edition of the IEC 61131-3 standard.

– When you print projects, SFC code worksheets are not printed.

– If the online-device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt npcap installation. In this case, proceed as follows:
  – Uninstall PLCnext Engineer.
  – Uninstall the Npcap software.
  – Install PLCnext Engineer again.

– Saving a project in the Shadow folder (C:\Users\User\AppData\Roaming\PHOENIX CONTACT\PLCnext Engineer\2019.9\SHADOW) of the PLCnext Engineer

installation can lead to the error message "Unexpected Exception".

– Any MRP configuration of an ET200 device from Siemens does not work in this version.
  Do not configure any MRP data to use the device.

– If you delete HMI pages from a user project, they are not deleted from the controller.
  If necessary, you have to remove these HMI pages from the controller manually.

– C++ libraries built on a Linux operating system using the PLCnext Technology C++ Toolchain (PLCnCLI) 2019.0 can not be referenced in projects in PLCnext Engineer 2020.0 LTS. The libraries have to be recompiled using the release 2020.0 of the C++ toolchain before.

– If you create variables with the prefix "VAR_", the compiler runs into an error.
  For variable identifiers please do not start with keywords from the IEC 61131-3 standard.

41 PLCnext Engineer 2020.0 LTS

41.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2020.0 LTS and the previously released version PLCnext Engineer 2019.9. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1 64-bit and Windows 10 (as of build 1709) 64-bit.

41.2 Programming

– The functionality „Import From Another Project" offers now the possibility to overwrite existent program organization units.

– The functionality „Search and replace" supports now strings up to 500 characters.

– The user can configure library paths relative to the project path.

– A selected variable in a code or variable worksheet can synchronize the CROSS REFERENCES window via the context menu.

– The initial start page when creating a new program organization unit is now the code worksheet instead of the variable table.

– The Cross Function Area of PLCnext Engineer contains now an online state control. This window offers the state of standard and safety PLCs and a context menu for the common functionalities known from the plant tree.

41.3 IEC 61131-3 functions and function blocks

Name	Status	Note
MEMORY_COMPARE	new	
TO_TIME TO_LTIME	new	Overloaded functions, replace all specific functions.
BUF_TO_STRING	changed	Bug fix: String was created errornous if buffer was filled with \0 Sample: Buffer ABC\0\0\0 resulted in 'ABC□□□' Length 6 Now in 'ABC' Length 3
AR_STATISTIC_SINGLE AR_STATISTIC_ITERATE	new	
PACK UNPACK	new	
SET_BIT GET_BIT RESET_BIT INVERT_BIT MEMORY_COPY MEMORY_SET GET_CHAR FILE_READ FILE_SEEK FILE_WRITE STRING_COPY BUF_TO_* *_TO_BUF	changed	The typed input formal parameters now support ANY_INT
TO_BYTE TO_WORD TO_DWORD TO_LWORD with STRING	changed	Only pure values/literals allowed inside string and whitespaces at beginning/end.

41.4 Network

– The new Axioline Smart Elements can now be used in PLCnext Engineer.

– PLCnext Engineer supports now the new controller AXC F 1152.

41.5 HMI

– The search/replace operation now supports comments in the parameter editor.

– PLCnext Engineer allows symbol parameters of complex User Defined Type (UDT).

– Expressions in symbol parameters are supported.

– Pages can have parameters of the same types as symbols. The page parameters are specified as part of the page-related actions (Load Page, Show Dialog).

– Nested symbols with a nesting level of one are supported.

– The „Symbol List" is available in the „Objects" area. This creates an HMI object to which an ARRAY can be connected. Each field of the ARRAY is assigned to its own graphic in the symbol list, which visualizes the value of the field.

– A new „ReadOnly" dynamic is available, unlike the disable dynamic which turns off all animations and changes the rendering of a button. The „ReadOnly" dynamic prevents the object from participating in keyboard or mouse input but all rendering is unchanged and all dynamics remain enabled.

41.6 Viewer for Simulink® models

– The Simulink® block scope is supported by the viewer. The scope block needs a testpoint connected, if the attached line does not provide a port. In offline mode, just the block is presented.

– In online/debug mode, the value can be added to the LOGIC ANALYZER or WATCHES window through drag and drop.

– A selection of blocks with parameters will open a parameter view as a subeditor control. This editor shows all Simulink® parameters (setable values without connection point) of the Simulink® block. Here all online available parameters can be overwritten/forced within a value range using the „OverwriteForceControl".

41.7 Safety

– The safety ressource cockpit has now the functionality to read the log files of the safety ressource during runtime.

– The firmware version of the safety ressource is now shown correctly in the safety cockpit.

– A PROFIsafe device configuration with F-Address = 0 is not allowed due to the actual PROFIsafe specification. This will result in an error after compile.

41.8 Security

– The fill in functionality for user credentials allows now to store more than one credential.

41.9 Known errors and limitations

– The standard IEC 61131-3 3rd edition describes in table 71 the operators of the ST language and their precedence. Since 2nd edition of the IEC 61131-3 standard, the precedence of the operators comparison (row 13), equality (row 14) and inequality (row 15) has changed.
Currently the PLCnext Engineer compiler handles the sequencing as described in the 2nd edition of the IEC 61131-3 standard.

– Currently the functionality „Print Project" does not include SFC code worksheets.

– If the online device editor is not able to find any controller or PROFINET device, it might be caused by a corrupt „npcap" installation. In such cases please deinstall the PLCnext Engineer and afterwards explicitly the „npcap" software.
Reinstall PLCnext Engineer.

– Storing a project in the SHADOW folder (C:\Users\User\AppData\Roaming\PHOENIX CONTACT\PLCnext Engineer\2019.9\SHADOW) of the PLCnext Engineer installation can result in an „unhandled exception".

– Any MRP configuration of a Siemens ET200 device does not work in this version. If you are using this device, please do not configure any MRP data.

– HMI pages which are deleted from a user project, are not deleted from the PLCnext controller. If necessary, these pages must be removed manually from the controller.

– C++ libraries built on a Linux operating system using the PLCnext Technology C++ Toolchain (PLCnCLI) 2019.0 cannot be referenced in projects in PLCnext Engineer 2020.0 LTS. The libraries have to be recompiled using the release 2020.0 LTS of the C++ toolchain before.

42 PLCnext Engineer 2019.9

42.1 General notes

This section describes changes made between the current version of PLCnext Engineer 2019.9 and the previously released version PLCnext Engineer 2019.6. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1 64-bit and Windows 10 (as of build 1709) 64-bit.

42.2 Programming

– A quick edit mode for faster online POU type changes is now available. This functionality is presented via icons in the toolbar of PLCnext Engineer and reduces the amount of mouse action for a simple change of IEC 61131-3 code.
– The cross-reference windows shows now an indication about the status of the presented cross references. A red dot signalizes that the cross references are invalid, a green dot shows valid references.
– Local POU types have priority over library POU types. The program organization units (POUs) in a project and their referenced libraries have a hierarchy. A POU on a lower hierarchy level is replaced by a POU with the same name on a higher hierarchy level.
– With PLCnext controller firmware 2019.9 it is possible to force variable and port values. Forced variables are presented by a special color indication and in the force list view. Please take care of the limitation which is described in „Known errors and limitations" chapter.

42.3 Network

– In the PROFINET device settings, there is a new category „Redundancy" if it is supported by the device description. The category provides the configuration items Redundancy Data Hold Timer (RDHT).
– At PROFINET controller settings, there is a new category „Redundancy" if the controller supports the PROFINET system redundancy. For this property there is a combo box to select the supported redundancy type.
– The PLCnext Engineer supports now the Phoenix Contact Applicative System Redundancy (ASR).
– PROFINET device functionality MRP can now be switched off in the device settings.

42.4 PLCnext Engineer HMI

The user can now use folders in the HMI plant tree for a better structuring of the HMI application.

42.5 Known errors and limitations

– Archiving projects on network storages can result in an „unhandled exception".
– The force list view contains all forced variables. In case of safety related variables, the list does not show the data type and value of the forced variable.
– Storing a project in the SHADOW folder (C:\Users\User\AppData\Roaming\PHOENIX CONTACT\PLCnext Engineer\2019.9\SHADOW) of the PLCnext Engineer installation can result in an „unhandled exception".
– A reboot of the controller can result in an exception on connected HMI clients. A reload of the page removes this exception.
– Storing a project with special characters in the project name can result in an „unhandled exception". Please avoid special characters, e.g. dots in the project name.
– HMI pages which are deleted from a user project, are not deleted from the PLCnext controller. If necessary, these pages must be removed manually from the controller.
– A double click (drilldown function) on a transition, action or interlock in debug mode, does not open the online instance of the object.
– If a user replaces a library by a library with the same ID, all instantiated ports are disconnected.
– If the „Write and Start Project Changes" command is requested by the user when the controller is stopped, the project change could be denied by the controller and a warm restart could be performed executing the unchanged project. Use the command „Write and Start Project" for project changes when the controller is in stop state.
– If only safety parameters have changed in a safety application, it is necessary to download and start the standard application additionally after sending the safety related user application.

43   PLCnext Engineer 2019.6

43.1   General notes

This section describes all changes made between the current version of PLCnext Engineer 2019.6 and the previously released version PLCnext Engineer 2019.3. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1 64-bit and Windows 10 (as of build 1709) 64-bit.

43.2   Programming

– A double click on a function, a function block instance or a SFC transition in a graphical worksheet opens the corresponding implementation if available and not hidden.

– Graphical PC WORX 6 program code, which is imported via the PLCopen XML interface, can now be imported directly in network oriented program organization units.

– The PLCopen XML import interface for PC WORX 6 projects has been improved.

43.3   Network

– When importing of GSDML files MRP parameter settings are now also supported.

– The GSDML import supports specification version 2.2 to 2.35.

43.4   HMI

– The HMI simulator does not start automatically when switching to debug mode. To start the HMI Simulator, please use the context menu of the HMI Application node.

43.5   Safety

– The programming editor for safety related user applications does now support Undo/Redo.

– The controller password for the safety related resource can be changed in the safety cockpit.

– If the user wants to change variables which are used in a locked safety network, he will be informed and can unlock the network in a dialog.

– The safety related library „IEC 61131-3 Safety" and „PLCopen_SF" show now tooltips in English and German language.

– Controller with Safety resource can now be replaced by the „Replace" function.

43.6   General application

– The user can now start multiple instances of

PLCnext Engineer. The first instance is started without any restriction, all further instances start in a „restricted mode".

In the restricted mode, projects can be opened, but not edited. An online mode in a restricted instance is not possible.

The possibility to start multiple instances is for copying objects from one project to another.

The following objects currently support copy/paste:

Object	Copy/Paste
Program organisation units	✓
Program organisation units from referenced library	
Datatype	✓
Datatype from referenced library	✓
User-folders from project	
Variables, variable groups, local and from referenced libraries	
Structured text	✓
Network orientated code	✓
FBD, LD, SFC code or code objects	✓
Profinet devices	
HMI pages	
HMI symbols	
HMI dynamics	
HMI symbol from local folder	
HMI symbol from referenced library	
HMI page template	
HMI page template from referenced library	

– The LOGIC ANALYZER has now access to port variables of a PLCnext controller.

– The programming editor groups offer a drop-down menu for opening editors. This is convenient in case if the user has multiple programming worksheets.

– The PLCopen XML interface for PC WORX 6 projects can now overwrite existing objects during import.

– The download of project sources to the controller can now include system and user libraries.

– When the project is closed the expansion states of the type hierarchy views and the instance hierarchy views

is saved. This information is restored when the project is reopened.

43.7 Viewer for Simulink

– The Viewer for Simulink in PLCnext Engineer supports now Simulink Multirate models.

43.8 Security

– Authentication data for login to a PLCnext Controller can now be saved to the host PC for an easier access. The saved password can be removed under "Extras, Options, Administration, Password Manager".

43.9 Known errors and limitations

– All ports from a MATLAB Simulink multirate model are now attached to the fastest user task of the model. This can cause inconsistent variable data when connecting multirate models to other programs via port connections.

– HMI pages which are deleted from a user project, are not deleted from the PLCnext controller. If necessary, these pages must be removed manually from the controller.

– A double click (drilldown function) on a transition, action or interlock in debug mode, does not open the online instance of the object.

– Replacing of a controller in a user application when types are not available can result in a crash of the software PLCnext Engineer.

– If there are unreachable projects in the recent project list, PLCnext Engineer stays in initialization state and shows the splash screen only. In such cases, the user has to delete the recent projects list by deleting the file User.config in the following path: C:\Users\User\AppData\Roaming\PHOENIX CONTACT\PLCnext Engineer\2019.6

– The online function "execution values" can show wrong online values in some cases. The executed values on the controller are correct in those cases.

– An archive with a referenced tampered library cannot be unpacked by PLCnext Engineer. The tampered library is shown in the error message in that cases. A solution is to unpack the archive with standard ZIP tools.

– If a user replaces a library by a library with the same ID, all instantiated ports are disconnected.

– If the "Write and Start Project Changes" command is requested by the user when the controller is stopped, the project change could be denied by the controller and a warm restart could be performed executing the unchanged project. Use the command "Write and Start

Project" for project changes when the controller is in stop state.

– After a reboot of the controller an HMI client does not reconnect to the HMI webserver automatically. Reloading the website will reestablish the connection.

44   PLCnext Engineer 2019.3

44.1   General notes

This section describes all changes made between the current version of PLCnext Engineer 2019.3 and the previously released version PLCnext Engineer 2019.0 LTS Hotfix 1. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1 64-bit and Windows 10 (as of build 1709) 64-bit.

44.2   Programming

Grafical IEC 61131-3 editor

If the user connects a variable to the left of a VAR_IN_OUT formal parameter, the editor attaches the same variable automatically to the right formal parameter.

44.3   Network

PROFINET Address assignment

The user can choose one of the supported address assignment methods as described in the device description. This option modifies the behavior of the PROFINET controller in address assignment.

Ethernet IP Adapter

Special system variables for data exchange and diagnostics are available for the Ethernet IP adapter functionality of the AXC F 2152 / FW 2019.3.

44.4   PLCnext Engineer HMI

„Write Value" dynamic

You can now choose between a variable or a constant for the dynamic „write value".

User defined symbols

It is now possible to use symbols inside symbols. This function is limited for one level of nesting.

44.5   General Application

Support of RFC 4072S

The new controller RFC 4072S is available in PLCnext Engineer. A template cannot be provided due to safety restrictions. For programming, the controller must be inserted from the component area into an empty project by using drag-and-drop.

Rename types with capital letters only

Up from now it is also allowed to rename types in the component area by changing to capital letters.

Cross reference window

Usability improvements like sorting or a better filter icon are implemented.

Copy POU type from library

The user is now able to copy not secured POUs from referenced libraries into the user project. The copied POU must be renamed.

Recycle bin

The recycle bin is automatically emptied by the system for project archives.

AutomationML - Automation Project Configuration

PLCnext Engineer can now import and export AutomationML APC files.

Performance

Further steps for the PLCnext Engineer performance improvement are implemented.

PLCopen XML Import from PC WORX 6

The PLCopen XML import of PC WORX 6 code now also includes the POU assignment to tasks.

44.6   Viewer for Simulink

Online values

The user can now define test points in Simulink models. These test points can be used to show online values in the tooltip during debug mode.

Jump to instance

The user can directly jump from the Simulink model type to the instance via context menu.

44.7   Known errors and limitations

IEC 61131-3 programming

Input values at the functions STRING_TO_TIME/LTIME are interpreted incorrectly, if the last significant units are separated by a dot.

Example:

Incorrectly interpreted value:
STRING#'T#24d20h13m23.123s'

Correctly interpreted value:
STRING#'T#24d20h13m23123ms'

HMI

Animation Smoothing:

If animation smoothing is enabled on a dynamic of an object contained in a symbol list, that dynamic does not get executed.

44.8 IEC 61131-3: functions and function blocks

Tabelle 1   Removed and replaced functions and function blocks

Name	Replaced by	Note
S_BIT_IN_BYTE S_BIT_IN_WORD S_BIT_IN_DWORD S_BIT_IN_LWORD	SET_BIT	Due to Safety incompatibility use new version.
R_BIT_IN_BYTE R_BIT_IN_WORD R_BIT_IN_DWORD R_BIT_IN_LWORD	RESET_BIT	Due to Safety incompatibility use new version
I_BIT_IN_BYTE I_BIT_IN_WORD I_BIT_IN_DWORD I_BIT_IN_LWORD	INVERT_BIT	Due to Safety incompatibility use new version
BIT_TEST	GET_BIT	Due to Safety incompatibility use new version
SHL_BYTE SHL_WORD SHL_DWORD SHL_LWORD SHR_BYTE SHR_WORD SHR_DWORD SHR_LWORD	SHL SHR	Due to Safety incompatibility use new version
GET_SYM	GET_SYMBOL	

45 PLCnext Engineer 2019.0 LTS Hotfix 1

45.1 General notes

This section describes all changes made between the current version of PLCnext Engineer 2019.0 LTS Hotfix 1 and the previously released version PLCnext Engineer 2019.0 LTS. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1 64-bit and Windows 10 (as of build 1709) 64-bit.

45.2 Programming

Code generation

If IEC structures or IEC arrays are connected as formal parameters, the code generation of function and method calls of function blocks was faulty.
This error has been rectified.

45.3 Known errors and limitations

Internal Error

During code generation, an „Internal Error: E2003" may occur as a result of troubleshooting.
This error can be removed by replacing the controller with the same controller type in the user application.

Deleted variables used in WATCHES window

If a variable is deleted from the user project that is still in the WATCHES window, this variable will be doubled in the WATCHES window with each compilation process.
Delete those variables manually in the WATCHES window.

46 PLCnext Engineer 2019.0 LTS

46.1 General notes

This section describes all changes made between the current version of PLCnext Engineer 2019.0 LTS and the previously released version PC Worx Engineer 7.2.3. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1 64-bit, Windows 8.1, and Windows 10 (as of build 1709) 64-bit.

46.2 PC Worx Engineer becomes PLCnext Engineer

The PC Worx Engineer software has been renamed to PLCnext Engineer. Existing licenses remain valid.

46.3 PLCnext Engineer licenses

Registration for free license no longer required

Registering at phoenixcontact.net/products to order a free license for PLCnext Engineer is no longer required.

46.4 Programming

Code generation

The buttons for compilation have been removed from the user interface. The compiling process has been separated from the Syntax Check and moved to a background process. The process is executed on a separate core of the multi-core architecture of the host system.

Memory use and performance

Due to changes to the architectural concept for data storage in user projects, PLCnext Engineer requires substantially less RAM and processor performance during the creation of applications.

Application development in accordance with IEC 61131-3

According to IEC 61131-3, it is not allowable to write functions to variables of the VAR_INPUT application type. However, for reasons of compatibility with PC Worx 6 applications, this function can be activated in the PLCnext Engineer compiler options.
The TIME data type is now based on the "signed Integer" 32-bit basic data type instead of the "unsigned Integer".

Extended Variable Identifier

Via the "Extended Variable Identifier" option, additional special identifiers can be used besides those permitted by IEC 61131-3. For the specific rules for extended identifiers, please refer to the online help in PLCnext Engineer.

The SFC programming language

You can now program interlocks in the SFC programming language.
You can create sequencer blocks in a compact form. The compact form includes all formal parameters of the sequencer blocks in one structure.
In sequencer blocks, you can set up two worksheets as "always execute". These are executed either prior to or after the sequencer block in every cycle of the calling program.

Initializing complex data types

Besides initializing complex data types in accordance with IEC 61131-3, you can also conveniently initialize variable instances in the variables editor. A special editor can be used to do so. For variables with a complex data type, you can access the editor from the toolbar.

46.5   PLCnext Engineer HMI

Symbol groups

You can combine objects and symbols in groups.

Importing HMI pages

You can now import visualization pages and visualization symbols from existing projects.

Accessing local variables of POU instances

In the visualization, you can now access local variables of POU instances.

System variables for client control

In the controller, two new system variables that enable client identification and also client control are available to you.

User management

The web server of the controller has been connected to the PLCnext Technology user management. HMI clients must login to the web server. A corresponding login template can be found in PLCnext Engineer in the "HMI" area.

46.6   Application

Library creation

PLCnext Engineer now supports the creation of device, visualization and application libraries.

Replacing devices and controllers

You can now replace devices and controllers in the project with other revisions. To replace devices and controllers, select "Copy/Paste" from the context menu or use Drag-and-drop with the Shift button.

Online debugging of IEC 61131-3 user applications

For debugging IEC-61131-3 user applications, you can generate special debug code. You can use the debug code to monitor online values of variables without breakpoints, for example.

You can set the specific debug code settings in the cockpit of the controller.

"Properties" editor

In the "Properties" editor, you can add metadata to the project. You can save a version history, for instance. The editor supports HTML import/export and can integrate image files and tables.

Windows (64-bit) installation

The PLCnext Engineer software has been changed to 64-bit. Installing it on 32-bit operating systems is no longer possible.

Viewer for Simulink$^®$ models

A viewer for the representation of MATLAB® Simulink® models that are processed on a PLCnext controller is available as an add-in.

Functional safety programming

Programming safety-related user applications and applications for configuring and starting up PROFIsafe devices on safety-oriented controllers with PLCnext Technology is possible with an add-in license.

Security

You can change your password in PLCnext Engineer in the cockpit of the controller.

For an integrity check of the PLCnext Engineer installation, a tool is available for you from Phoenix Contact on request. By means of this tool, you can detect modifications of an existing installation.

46.7   Known errors and limitations

Enumerations in loops

When you use enumerations in loops, creating the application can result in an "Internal Error".

Renaming libraries

You must not rename library files generated for PLCnext Engineer in the file system after their creation. The initial name is also used within the library and verified during referencing.

SFC transitions

Within transitions, you must not use the data types for the graph that are generated by the SFC function block. Using these data types can result in the "Error during generating native code".

Reading AXL-F devices

Currently, you cannot automatically read connected AXL-F devices in the project tree via the menu item in the context menu.

46.8 IEC 61131-3: functions and function blocks

New functions and function blocks

Name	Description
ADDRESS_TO_ID ID_TO_ADDRESS AR_MGT RECV_ALARM	The new PROFINET function blocks replace the following function blocks: ADDR_TO_ID ID_TO_ADDR AR_MGT RALRM
DINT_TO_TIME TO_DINT	DINT_TO_TIME replaces UDINT_TO_TIME TO_DINT with connected TIME data type replaces TO_UDINT
PARITY	The overloaded function replaces typed blocks.
STRING_TO_LTIME	Only numbers and literals are allowed in the STRING.
TO_STRING	New FormatString {0:C} for the display of a character
INVERT_BIT RESET_BIT SET_BIT GET_BIT	Overloaded functions replace typed blocks.
TRUNC_DINT TRUNC_INT TRUNC_LINT TRUNC_SINT	Typed TRUNC functions for use with a TO_REAL conversion
LOWER_BOUND UPPER_BOUND	Lower and upper limit of an ARRAY data type
TO_BIG_ENDIAN TO_LITTLE_ENDIAN FROM_BIG_ENDIAN FROM_LITTLE_ENDIAN	Conversion functions

Removed functions and function blocks

Name	Replaced by	Description
TO_UDINT (with TIME) UDINT_TO_TIME	TO_DINT DINT_TO_TIME	The TIME data type corresponds to a 32-bit value with prefix, which means that these function blocks are no longer needed for a conversion without prefixes.
TO_DINT (with BYTE/WORD) TO_INT (with BYTE) TO_LINT (with BYTE/WORD/DWORD)	–	The function duplicates the right-hand byte of a bit-based input parameter and also discards a prefix bit.
BOOL_TO_DINT	TO_DINT	Typed functions are replaced by overloaded.
BOOL_TO_IN	TO_INT	
BOOL_TO_LINT	TO_LINT	
BOOL_TO_SINT	TO_SINT	
BOOL_TO_UDINT	TO_UDINT	
BOOL_TO_UINT	TO_UINT	
BOOL_TO_ULINT	TO_ULINT	
BOOL_TO_USINT	TO_USINT	
BYTE_TO_SINT		
BYTE_TO_UDINT		
BYTE_TO_UINT		
BYTE_TO_ULINT		
BYTE_TO_USINT		
DWORD_TO_DINT		
DWORD_TO_INT		
DWORD_TO_SINT		
DWORD_TO_UDINT		
DWORD_TO_UINT		
DWORD_TO_ULINT		
DWORD_TO_USINT		
WORD_TO_INT		
WORD_TO_SINT		
WORD_TO_UDINT		
WORD_TO_UINT		
WORD_TO_ULINT		
WORD_TO_USINT		

Name	Replaced by	Description
BYTE_TO_BOOL WORD_TO_BOOL DWORD_TO_BOOL LWORD_TO_BOOL	TO_BOOL	Only the right-aligned bit of the connected formal parameter is evaluated.
PARITY_BYTE PARITY_WORD PARITY_DWORD PARITY_LWORD	PARITY	Typed functions are replaced by overloaded.
S_BIT_IN_BYTE S_BIT_IN_WORD S_BIT_IN_DWORD	SET_BIT	Typed functions are replaced by overloaded.
I_BIT_IN_DWORD I_BIT_IN_WORD I_BIT_IN_BYTE	INVERT_BIT	Typed functions are replaced by overloaded.
BIT_TEST	GET_BIT	–
R_BIT_IN_BYTE R_BIT_IN_WORD R_BIT_IN_DWORD	RESET_BIT	Typed functions are replaced by overloaded.
SHR_WORD SHL_WORD	SHR SHL	Typed functions are replaced by overloaded.
INT_TO_WORD WORD_TO_INT	TO_WORD TO_INT	Typed functions are replaced by overloaded.

Functions and function blocks with modified behavior

Name	Description
TO_DINT TO_INT TO_LINT TO_SINT TO_UDINT TO_UINT TO_ULINT TO_USINT	Prior to converting, source and target data type are converted into the highest base.
Datatype TIME All FUs/FBs using TIME	The TIME data type of IEC 61131-3 has been changed from int32 to signed int32.
STRING_TO_TIME	Converts a STRING data type into a TIME data type. Only valid values or literals are permitted in the STRING.
TO_NUM with STRING	Converts a STRING data type into a NUM data type. Only valid values or literals are permitted in the STRING.
BUF_TO_TIME TIME_TO_BUF	The LTIME data type is supported.

47 PC Worx Engineer version 7.2.3

47.1 General notes

This section describes all changes made between the current version of PC Worx Engineer 7.2.3 and the previously released version 7.2.2. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1, Windows 8.1, and Windows 10 (as of build 1511, 32-bit/64-bit).

47.2 Programming

High host system CPU utilization

During communication between an AXC F 2152 controller and the software PC Worx Engineer 7.2, it could be that all cores of the CPU of the system on which the PC Worx Engineer was executed were running at a utilization rate of up to 90%.
This error has been rectified.

Interface response behavior

On host systems that do not have a connection to the Internet, and therefore do not have a connection to the Phoenix Contact license server, the validity of the license was queried each time an action was performed in PC Worx Engineer. As a result, the operability of the interface was reduced.
Queries are no longer issued each time an action is performed in PC Worx Engineer, rather at defined time intervals.

Crashing when renaming instances

Renaming an instance during the background compilation led to an "InvalidOperationException".
This error has been rectified.

48   PC Worx Engineer version 7.2.2

48.1   General notes

This section describes all changes made between the current PC Worx Engineer version 7.2.2 and the previously released version 7.2.1 build 104. All parts of the previously released version are included in the current version. The software supports operation under Windows 7 Service Pack 1, Windows 8.1, and Windows 10 (as of build 1511, 32-bit/64-bit).

48.2   PC Worx Engineer licenses

Phoenix Contact Activation Wizard

Once installed, a demo version of PC Worx Engineer is available to you for 30 days. In order to use PC Worx Engineer after this period, you must register for a free license. To receive your free license, register with phoenixcontact.net/products and configure your license requirements using the PC WORX ENGINEER 7 product (Order No. 1046008).

For information and changes on the Phoenix Contact Activation Wizard, please refer to the change documentation for the relevant software.

48.3   Programming

"Debug Functions" and "Execution Value"

The "Debug Functions" and "Execution Value" functions can now be enabled and disabled via the controller cockpit. When using these functions, please note that a certain amount of additional code must be generated by the PC Worx Engineer compiler and sent to the controller.

GSDML import

Device import now supports GSDML files according to the current 2.34 specification.

Known errors and limitations

Renaming of instances during background compilation leads to an "InvalidOperationException". In this case, PC Worx Engineer is terminated automatically. Do not change any instance names during the background compilation process.

49 PC Worx Engineer version 7.2 build 104

49.1 General notes

This section describes all changes made between the current PC Worx Engineer version 7.2 build 104 and the previously released version 7.2 build 91.

All parts of the previously released version are included in the current version.

The software supports operation under Windows 7 Service Pack 1, Windows 8.1, and Windows 10 (as of build 1511, 32-bit/64-bit).

49.2 PC Worx Engineer licenses

Phoenix Contact Activation Wizard

Once installed, a demo version of PC Worx Engineer is available to you for 30 days. In order to use PC Worx Engineer after this period, you must register for a free license. To receive your free license, register with phoenixcontact.net/products and configure your license requirements using the PC WORX ENGINEER 7 product (Order No. 1046008).

Version 1.0 build 80 of the Phoenix Contact Activation Wizard is now part of the PC Worx Engineer installation file. You do not have to download it separately.

In addition, you can use the Phoenix Contact Activation Wizard to activate an emergency license.

Contact the Phoenix Contact hotline if you want to activate an emergency license.

Network licenses

The licensing mechanism in PC Worx Engineer now also supports the use of network licenses.

49.3 Programming

IEC 61131-3 programming

INPUT formal parameters can now be written within a function or function block.

50 PC Worx Engineer version 7.2 build 91

50.1 General notes

The software supports operation under Windows 7 Service Pack 1, Windows 8.1, and Windows 10 (as of build 1511, 32-bit/64-bit).

50.2 PC Worx Engineer licenses

Phoenix Contact Activation Wizard

Once installed, a demo version of PC Worx Engineer is available to you for 30 days. In order to use PC Worx Engineer after this period, you must register for a free license. To receive your free license, register with phoenixcontact.net/products and configure your license requirements using the PC WORX ENGINEER 7 product (Order No. 1046008).

You will also need the Phoenix Contact Activation Wizard to activate the license. This wizard is available as a download with the PC WORX ENGINEER 7 product (Order No. 1046008).

Network licenses

The "network license" license type for the PC Worx Engineer 7.2 build 91 software is not yet available. A new version of the PC Worx Engineer software will be available for download soon.

50.3 Debugging in functions and methods

The "debugging in functions and methods" function is deactivated in PC Worx Engineer version 7.2 build 91 software. A new version of the PC Worx Engineer software including the "debugging in functions and methods" function will be available for download soon.

50.4 System requirements

A multi-core processor is required to operate the PC Worx Engineer software. This also applies when used in a virtual environment.

A system with Intel$^®$ Core™ i5 or comparable is recommended for operating the software.