EN



CODESYS V3.5

Target Files

User manual

version 1.0

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CODESYS V3.5_Target Files_v1.0_EN

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1. Introduction

This guide describes target files for the akYtec PLCs programmable with CODESYS V3.5.

The **target file** (device description file) is an integral part of every CODESYS project. It contains information about the available hardware and software resources of the PLC, enables communication with the programming environment and use of additional functionality (e.g., backlight brightness, buzzer, etc.). Before creating a project for a specific PLC model, the target file must be installed in CODESYS as a package. Target packages can be downloaded here.

NOTE

- The version of the target file must be compatible with the firmware version of the PLC.
- You can use a CODESYS version higher than the version of the target file, but correct operation is only guaranteed if the versions of CODESYS and the target file match: the first three numbers must be the same: X.X.XX).

- The functionality described in the document is available only for target files of the version 3.5.11.x and higher, its extent depends on the specific version of the target file.
- It is not recommended to use AT addressing (via pointers to hardware addresses like %I, %Q, %M, %X) because the target file also uses addresses of this memory area and the concept of CODESYS V3 assumes that the user should work with variables and not with physical addresses. If AT addressing is used in the project, after updating the target file to the version 3.5.11.x or higher, the correctness of the project may be affected.

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2. Target files installation

Target files can be downloaded not only from our website but also from the PLC web configurator (section ***PLC > Downloads***). The target files are distributed as a file with the “package” extension. To add the package to CODESYS, select the ***CODESYS Installer*** option from the ***Tools*** menu.

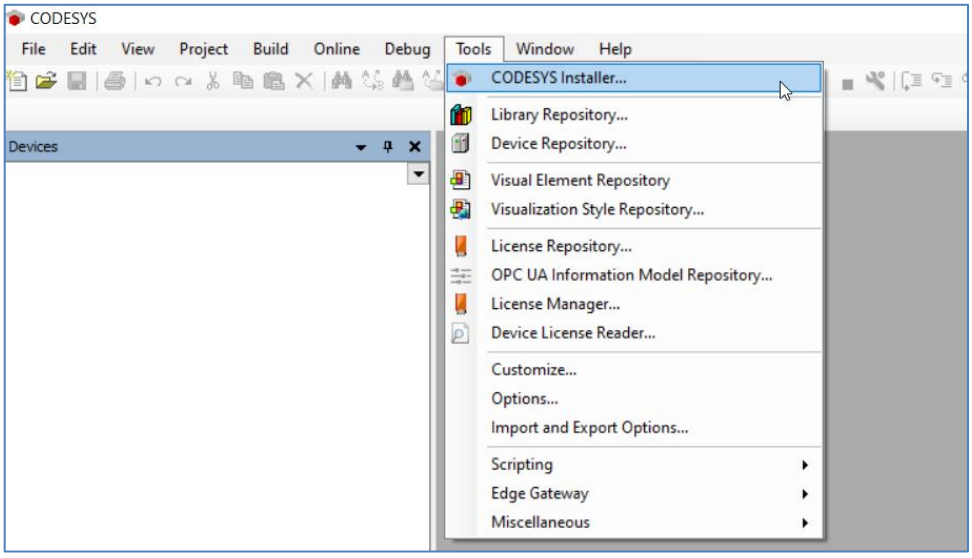


Fig. 2.1 Starting CODESYS Installer

> **NOTE**
> If the user rights are restricted on the PC with **CODESYS** installed, it may be necessary to run both **CODESYS** and **CODESYS Installer** as administrator.

In the opened window, click ***Install File*** and specify the path to the ***.package*** file.

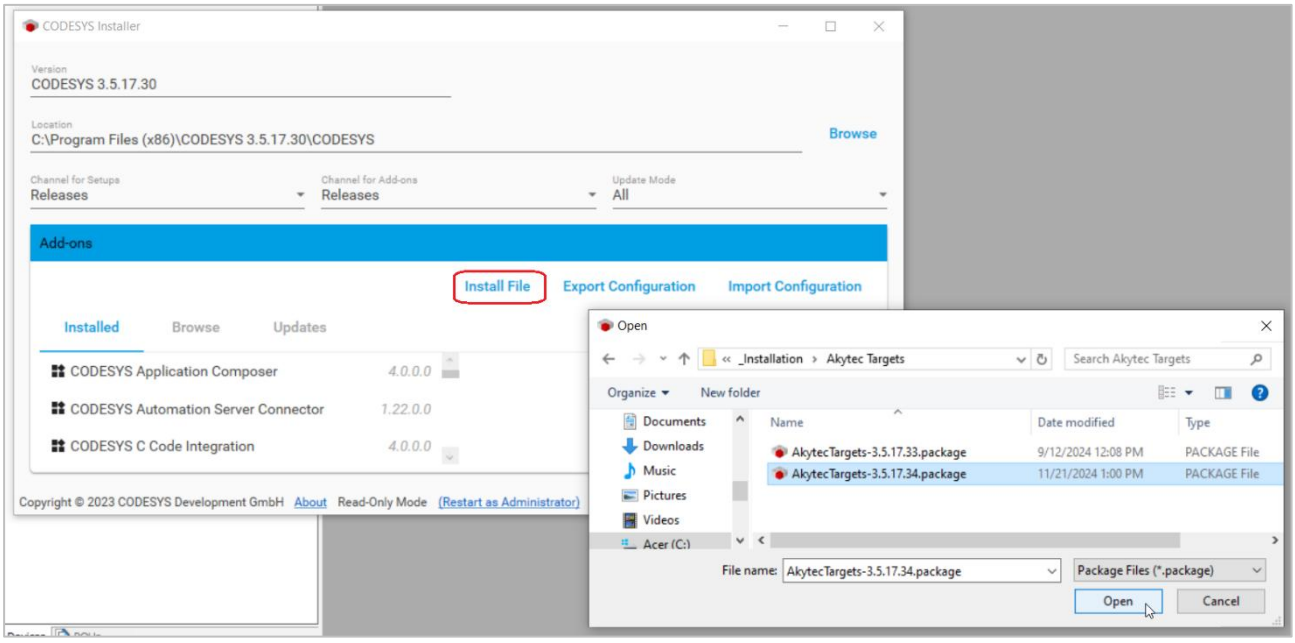


Fig. 2.2 Package selection

In the next window, click ***OK*** to confirm the installation.

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Fig. 2.3 Confirmation Required 1

In the new window, check the box ***I want to continue despite of missing signature (s)*** to confirm the installation of an unsigned package and click the ***Continue*** button.

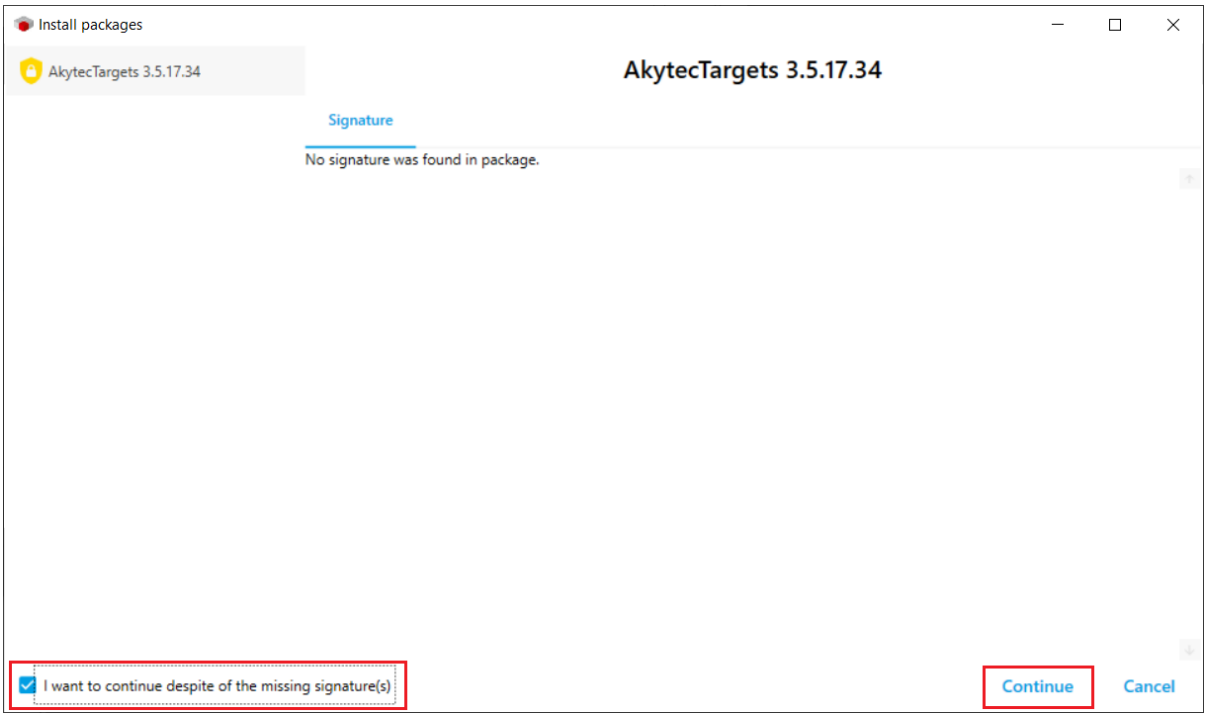


Fig. 2.4 Confirmation Required 2

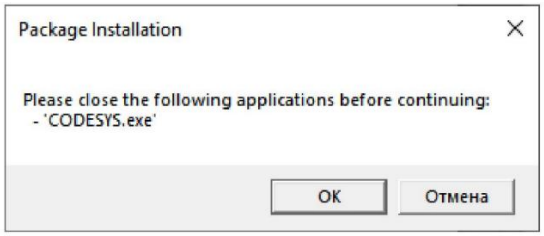


Fig. 2.5 Request to close CODESYS

Close CODESYS and click ***OK*** to start the target package installation.

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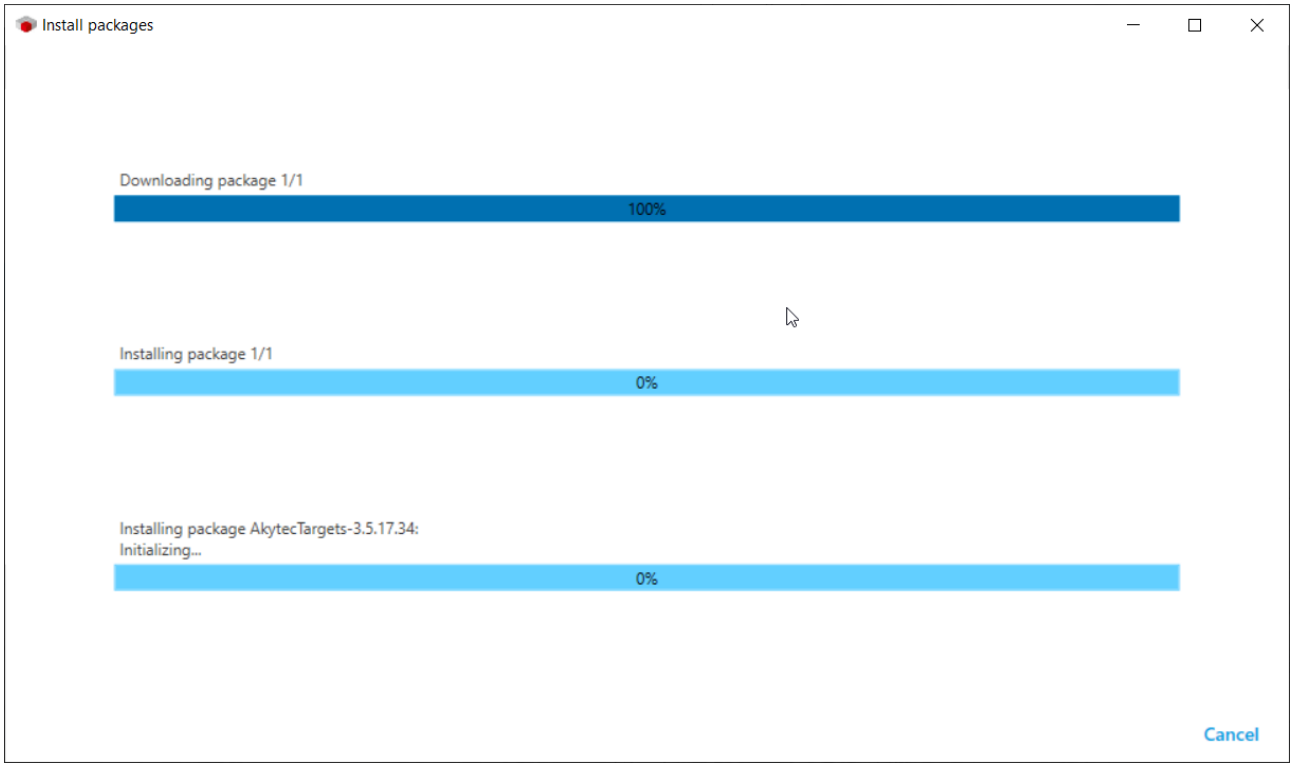


Fig. 2.6 Package installation progress

When the package installation is complete, an information window will appear. Click ***Ok*** to close it.

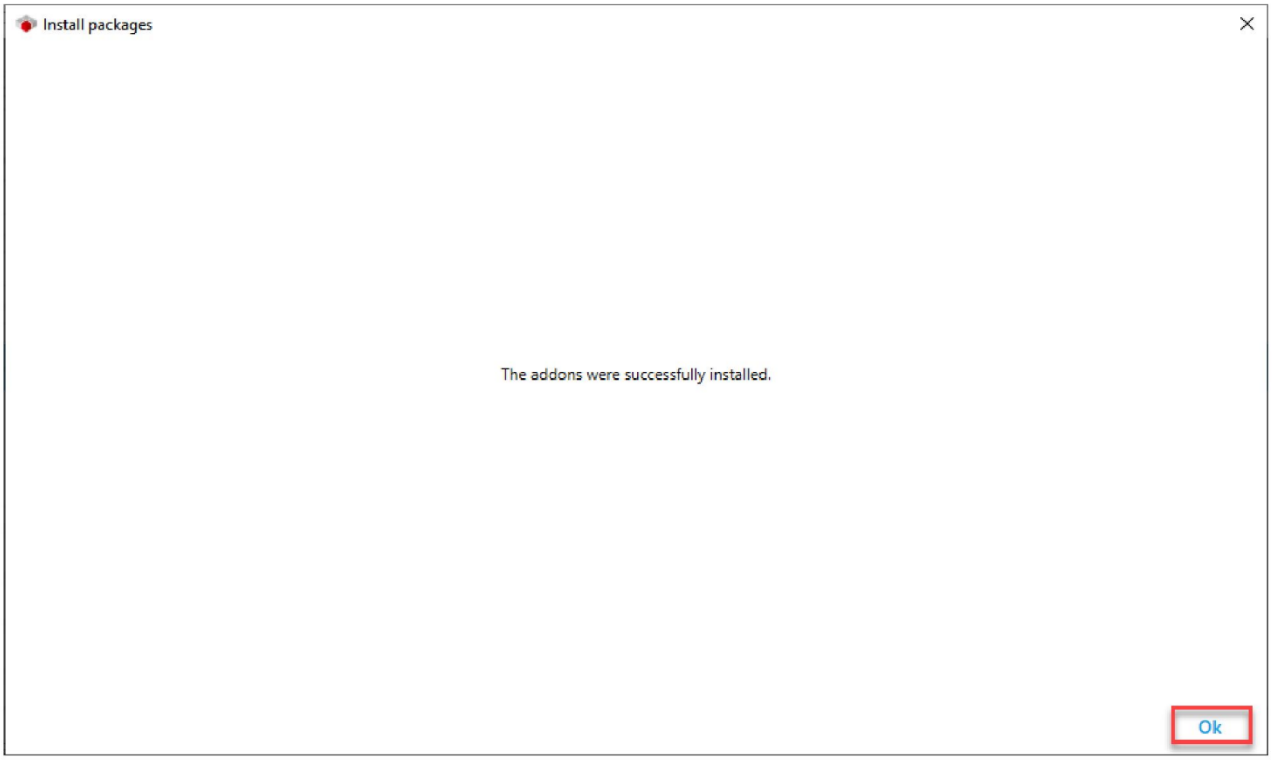


Fig. 2.7 Package installation completion

The installed package will be displayed on the ***AddOns / Installed*** tab. Now, you can launch CODESYS and create a new project using the installed target files.

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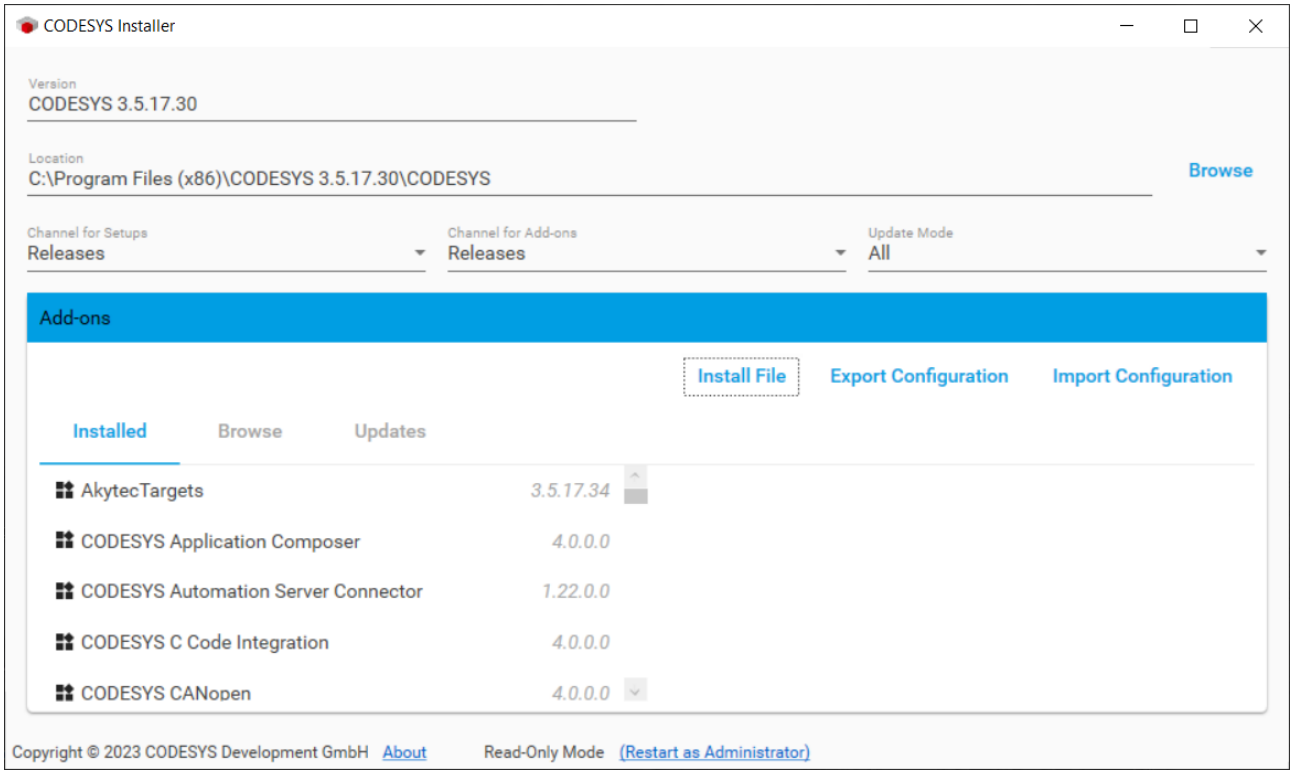


Fig. 2.8 View installed package

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3. Change target in project

To use the project for a newer device model, or if an inappropriate PLC type has been selected when creating a project, you can change the target device using the command ***Update Device*** in the context menu of the ***Device*** node and selecting the desired target from the opened list. By default, only the newest versions of the installed targets are displayed. To view all available versions, check the checkbox ***Display all versions***. Finally, click the ***Update Device*** button.

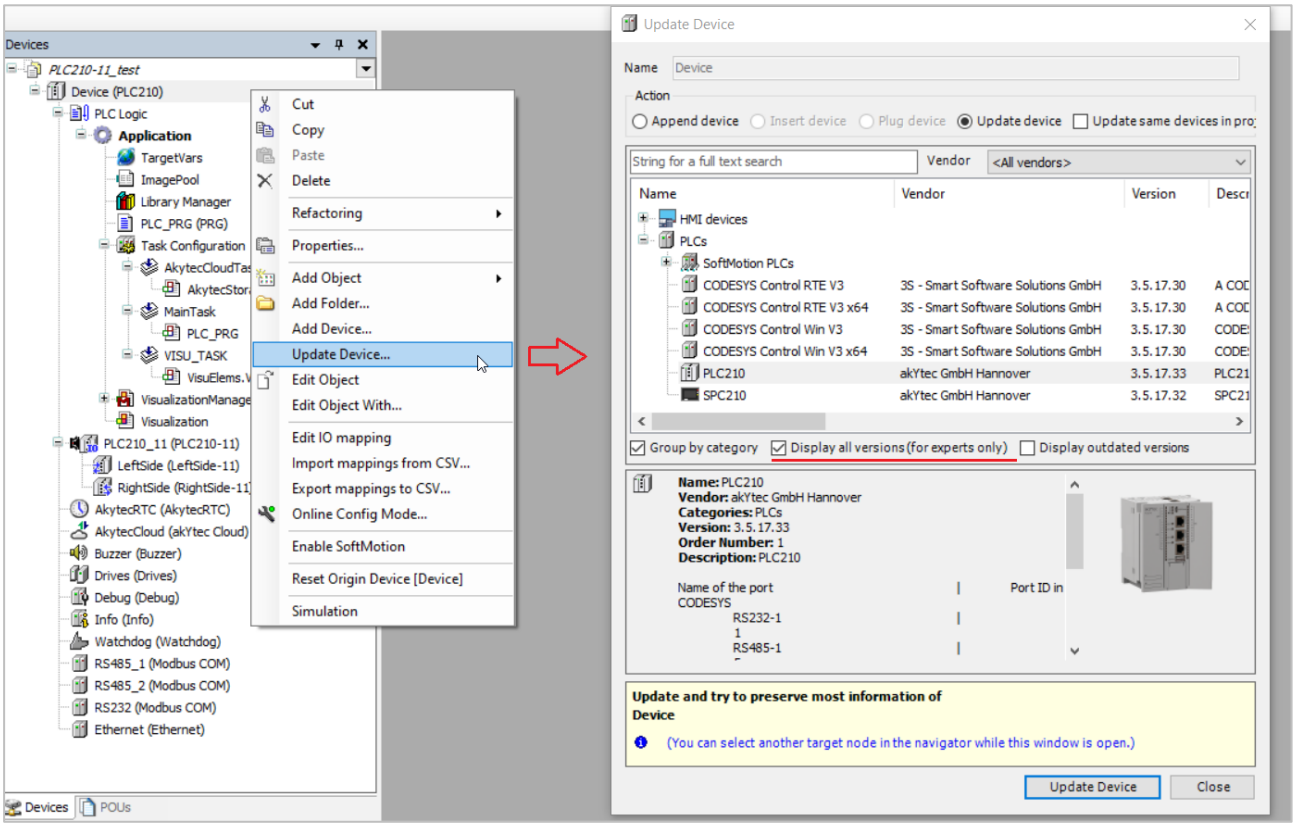


Fig. 3.1 Target change

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4. Target file variables

If the target files of the version 3.5.11.x and higher are used in a project, additional nodes with channels will be added to the project tree. The list of nodes may vary depending on the selected target.

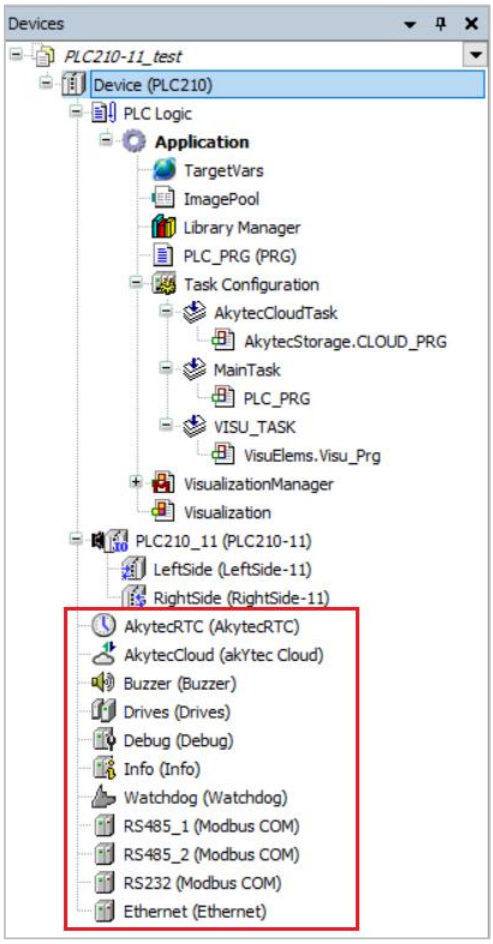


Fig. 4.1 Target file nodes in project tree

In the following sections, we will discuss all the nodes in the project tree available for the akYtek PLCs.

To assign a program variable to a specific channel, click twice in sequence in the respective row in the ***Variable*** column and select the desired variable using the ***Input Assistant***.

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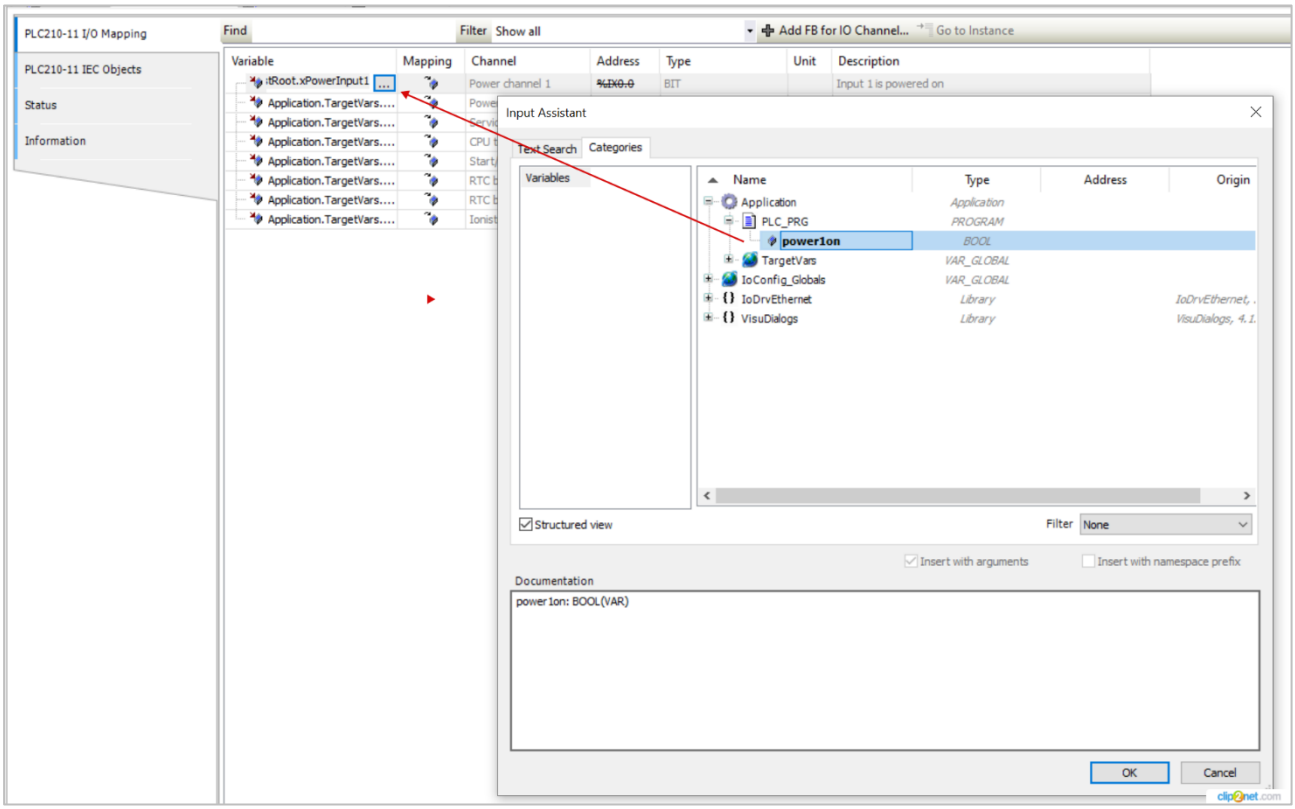
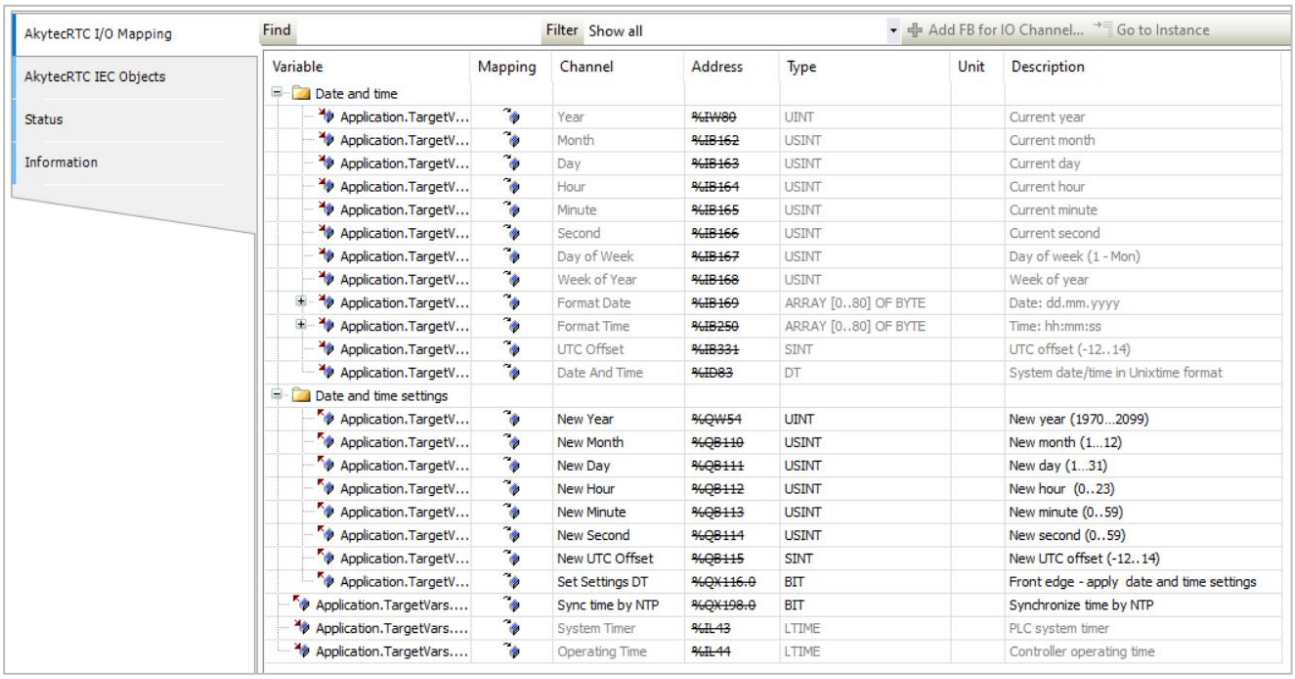


Fig. 4.2 Linking a variable to a target channel

4.1 AkytecRTC

The ***AkytecRTC*** node is used to control the system time.

Device: SPC210, PLC210



Variable	Mapping	Channel	Address	Type	Unit	Description
Date and time						
Application.TargetV...		Year	%IW80	UINT		Current year
Application.TargetV...		Month	%IB162	USINT		Current month
Application.TargetV...		Day	%IB163	USINT		Current day
Application.TargetV...		Hour	%IB164	USINT		Current hour
Application.TargetV...		Minute	%IB165	USINT		Current minute
Application.TargetV...		Second	%IB166	USINT		Current second
Application.TargetV...		Day of Week	%IB167	USINT		Day of week (1 - Mon)
Application.TargetV...		Week of Year	%IB168	USINT		Week of year
Application.TargetV...		Format Date	%IB169	ARRAY [0..80] OF BYTE		Date: dd.mm.yyyy
Application.TargetV...		Format Time	%IB250	ARRAY [0..80] OF BYTE		Time: hh:mm:ss
Application.TargetV...		UTC Offset	%IB331	SINT		UTC offset (-12..14)
Application.TargetV...		Date And Time	%ID83	DT		System date/time in Unixtime format
Date and time settings						
Application.TargetV...		New Year	%QW54	UINT		New year (1970...2099)
Application.TargetV...		New Month	%QB110	USINT		New month (1...12)
Application.TargetV...		New Day	%QB111	USINT		New day (1...31)
Application.TargetV...		New Hour	%QB112	USINT		New hour (0..23)
Application.TargetV...		New Minute	%QB113	USINT		New minute (0..59)
Application.TargetV...		New Second	%QB114	USINT		New second (0..59)
Application.TargetV...		New UTC Offset	%QB115	SINT		New UTC offset (-12..14)
Application.TargetV...		Set Settings DT	%QX116.0	BIT		Front edge - apply date and time settings
Application.TargetVars....		Sync time by NTP	%QX198.0	BIT		Synchronize time by NTP
Application.TargetVars....		System Timer	%IL43	LTIME		PLC system timer
Application.TargetVars....		Operating Time	%IL44	LTIME		Controller operating time

Fig. 4.1.1 AkytecRTC channels

Table 4.1.1 AkytecRTC channels

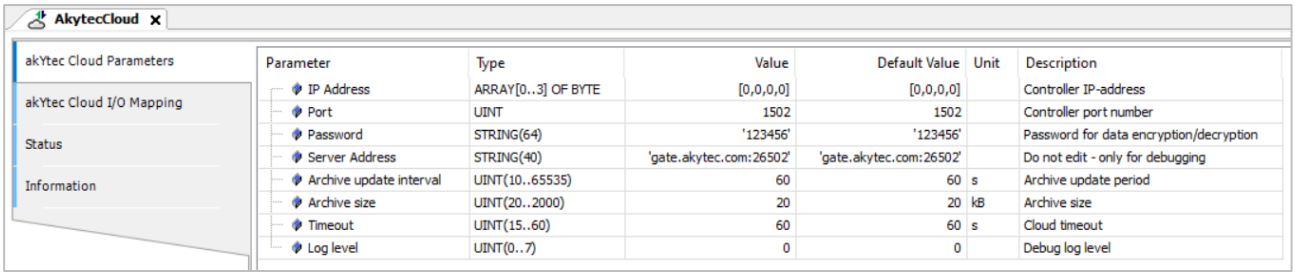
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Channel	Type	Access	Description
			Current DateTime
Year	UINT	R	Current year
Month	USINT	R	Current month
Day	USINT	R	Current day
Hour	USINT	R	Current hour
Minute	USINT	R	Current minute
Second	USINT	R	Current second
Day of week	USINT	R	Day of the week (***1*** = Monday)
Week of year	USINT	R	Week of the year
Format date	STRING(80)	R	Date as a formatted string (dd.MM.yyyy)
Format time	STRING(80)	R	Time as a formatted string (hh:mm:ss)
UTC offset	SINT	R	Time zone as UTC offset in hours (-12...14)
Date and Time	DT	R	System date and time in Unix time format
			New DateTime
New year	UINT	RW	New year (1970...2099)
New month	USINT	RW	New month (1...12)
New day	USINT	RW	New day (1...31)
New hour	USINT	RW	New hours (0...23)
New minute	USINT	RW	New minute (0...59)
New second	USINT	RW	New second (0...59)
New UTC offset	SINT	RW	New time zone as UTC offset in hours (-12...14)
Apply new DateTime	BOOL	RW	Command: write new date and time parameters on rising edge. If the parameter value exceeds the specified range, the previous value is retained.
			Single channels
Synchronize via NTP	BOOL	RW	Command: one-off system time synchronizing via NTP on rising edge. Make sure that in the web interface the ***Enable NTP Client*** checkbox on the ***System / Time*** tab is checked and the required NTP servers are specified.
System time	LTIME	R	Device system time (time elapsed since the first PLC start)
Operating time	LTIME	R	Device operating time (non-volatile, updated once a minute). The counter retains its value after firmware update. It can be reset in a service center only.

4.2 AkytecCloud

The ***AkytecCloud*** node is used to connect to the ***AkytecCloud*** service.

Device: SPC210, PLC210



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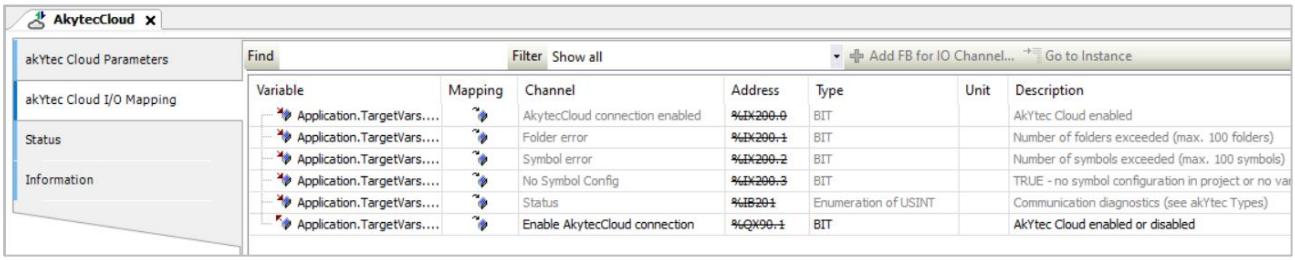


Fig. 4.2.1 AkytecCloud channels

Table 4.2.1 AkytecCloud channels

Channel	Type	Access	Description
Parameters (1)			
IP Address	ARRAY[0..3] OF BYTE	RW	IP address of the device interface used for communication with AkytecCloud. The value ***0.0.0.0*** means that all interfaces are used for communication.
Port	UINT	RW	Device interface used for communication with AkytecCloud
Password	STRING(64)	RW	Data encryption password, which must also be specified when adding a device to AkytecCloud
Server Address	STRING(40)	RW	URL of the AkytecCloud server. The parameter is only used during debugging, so its value can only be changed upon instructions of akYtec technical support.
Logging interval	UINT (10…65535)	RW	Log data recording period in seconds. The archive is read by the cloud service after the broken connection with the device is restored. The archive includes parameters of the symbol configuration with “read-only” access.
Archive size	UINT (20…2000)	RW	Archive size in kilobytes. 20 to 34 bytes are used to record one variable (including time stamp) (depending on the type of variable).
Timeout	UINT(15…60)	RW	AkytecCloud request timeout, used to detect a connection breakage
Log level	UINT(0..6)	RW	Debugging information log level. ***0*** - only main messages are recorded ***6*** - each transaction with details The log can be viewed in the web configurator: (***Status / Logs / AkutecCloud***)
I/O Mapping			
AkytecCloud enabled	BOOL	R	Flag: AkytecCloud communication service enabled
Folder Error (2)	BOOL	R	Error: the maximum number of folders in the project has been exceeded The maximum allowed number of folders is 100.
Symbol Error	BOOL	R	Error: the maximum number of variables assigned in the symbol configuration has been exceeded. The maximum allowed number of variables is 1000
No Symbol Config	BOOL	R	***TRUE*** - there is no symbol configuration component in the project, which is required for exchange with AkytecCloud, or no variables are selected in the symbol configuration
Status	ENUM of UINT	R	Status of communication with cloud service See ***CLOUD_STATUS*** enumeration in AkytecTypes library Possible values: ***CONNECT*** - connection to AkytecCloud is in progress ***COMM_OK*** - data exchange with AkytecCloud is in progress. ***COMM_ERROR*** - no data exchange with AkytecCloud within timeout ***NO_COMM*** - communication with AkytecCloud is disabled (***Enable AkytecCloud*** channel is set to ***FALSE***)
Enable	BOOL	RW	***TRUE*** - enable AkytecCloud communication service

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AkytecCloud			***FALSE*** - disable AkytecCloud communication service Default value: ***TRUE***

NOTE

1) Project variables cannot be assigned to the parameters of the tab **Parameters**.

2) In this context, a “folder” is a namespace element in the symbol configuration - i.e., if the symbol configuration contains variables of the same program, it corresponds to one folder, and if it contains variables of five different programs, it corresponds to five folders.

4.3 Buzzer

The ***Buzzer*** node is used to control the buzzer.

Device: SPC210, PLC210

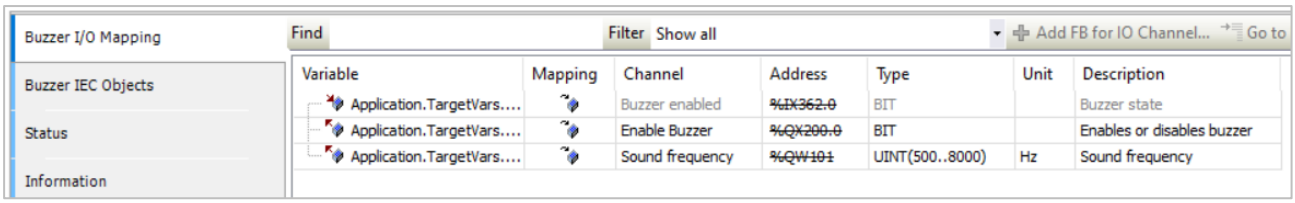


Fig. 4.3.1 Buzzer channels

Table 4.3.1 Buzzer channels

Channel	Type	Access	Description
Buzzer enabled	BOOL	R	Flag: ***TRUE*** when buzzer is active
Enable buzzer	BOOL	RW	Command: buzzer is on when ***TRUE*** and remains until ***FALSE***
Sound frequency	UINT	RW	Sound frequency in Hz (500...8000)

4.4 Drives

The ***Drives*** node is used to control the built-in flash memory and the connected flash drives, updated every 5 seconds.

Device: SPC210, PLC210

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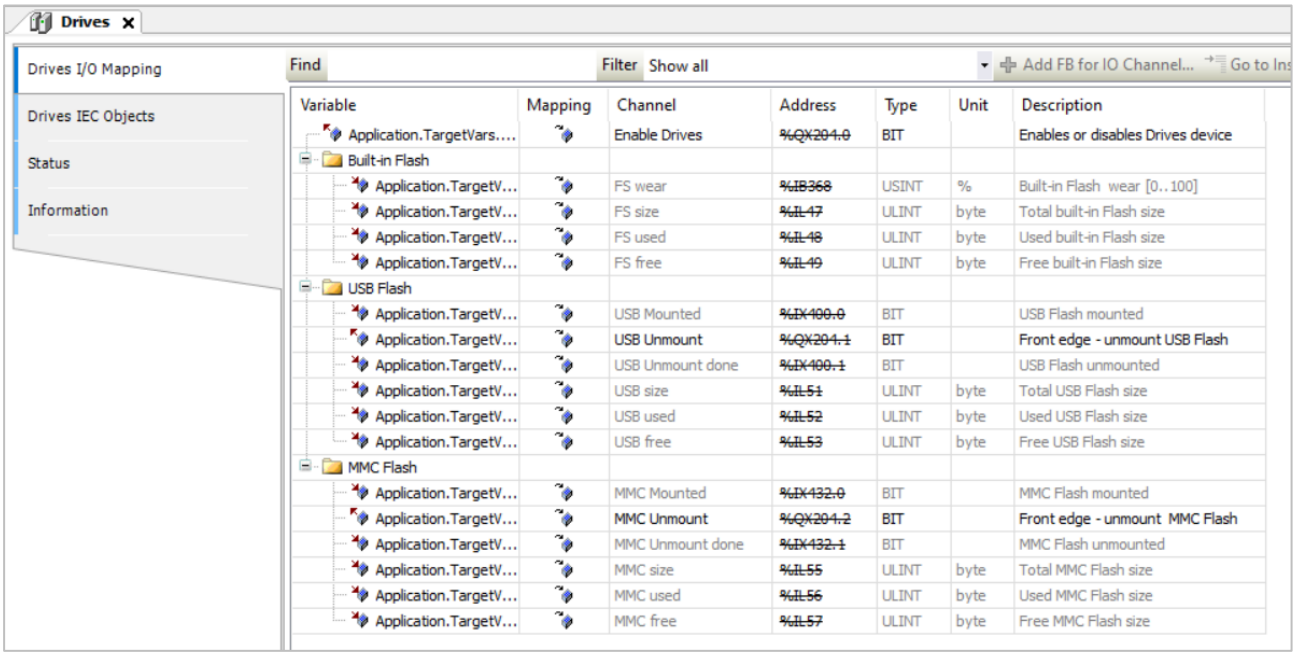


Fig. 4.4.1 Drives channels

Table 4.4.1 Drives channels

Channel	Type	Access	Description
Single parameters			
Enable Drives	BOOL	RW	Command: starts updating information about available flash memory. ***TRUE*** - read-only node channels are updated every 5 seconds, ***FALSE*** - read-only node channels contain no information.
Built-in Flash			
FS wear	USINT	R	Used rewrite cycles of embedded flash memory (0...100%)
FS size (1)	ULINT	R	Size of embedded flash memory in bytes
FS used (1)	ULINT	R	Used embedded flash memory in bytes
FS free (1)	ULINT	R	Free embedded flash memory in bytes
USB Flash			
USB mounted	BOOL	R	Flag: ***TRUE*** - USB flash drive is mounted, FALSE - unmounted
USB unmount	BOOL	RW	Command: set to ***TRUE*** to unmount the USB drive. It should remain ***TRUE*** until ***USB Unmount done*** = ***TRUE*** (i.e. unmount process is completed).
USB unmounted	BOOL	R	Flag: ***TRUE*** – USB drive is unmounted. Becomes ***FALSE*** on the falling edge in the ***USB Unmount*** channel.
USB size	ULINT	R	Size of USB drive memory in bytes
USB used	ULINT	R	Used USB drive memory in bytes
USB free	ULINT	R	Free USB drive memory in bytes
MMC Flash			
MMC mounted	BOOL	R	Flag: ***TRUE*** - MMC drive is mounted, ***FALSE*** – unmounted
MMC unmount	BOOL	RW	Command: set to ***TRUE*** to unmount the MMC drive. It should remain ***TRUE*** until ***MMC Unmount done*** = ***TRUE*** (i.e. unmount process is completed).
MMC unmounted	BOOL	R	Flag: ***TRUE*** - MMC drive is unmounted. Becomes ***FALSE*** on the falling edge in the ***MMC Unmount*** channel.
MMC size	ULINT	R	Size of MMC drive memory in bytes
MMC used	ULINT	R	Used MMC drive memory in bytes
MMC free	ULINT	R	Free MMC drive memory in bytes

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NOTE

1) The size of the area allocated for the CODESYS runtime system is indicated, not the size of physical memory.

4.5 Network

The ***Network*** node is used to view and modify the Ethernet parameters of PLC.

Device: SPC210

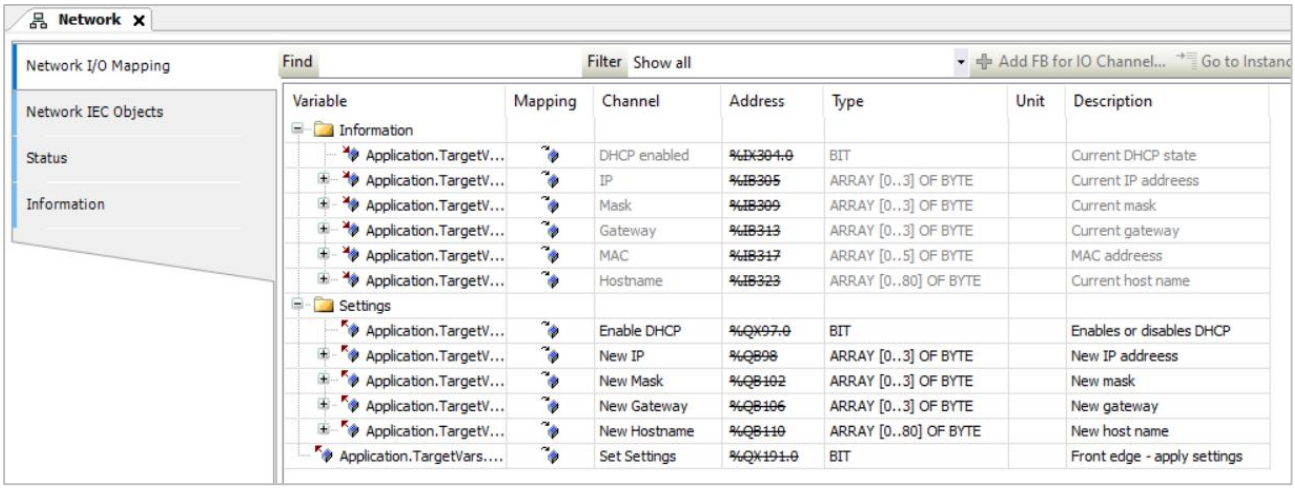


Fig. 4.5.1 Network channels

Table 4.5.1 Network channels

Channel	Type	Access	Description
Information			
DHCP enabled	BOOL	R	Flag: ***TRUE*** – DHCP mode enabled
IP	ARRAY[0..3] OF BYTE	R	IP address of PLC. Each byte of the array contains an octet of the address in decimal form.
Mask	ARRAY[0..3] OF BYTE	R	Subnet mask of PLC. Each byte of the array contains an octet of the address in decimal form.
Gateway	ARRAY[0..3] OF BYTE	R	Gateway of PLC. Each byte of the array contains an octet of the address in decimal form.
MAC	ARRAY[0..5] OF BYTE	R	MAC address of PLC. Each byte of the array contains an octet of the address in decimal form.
Hostname	STRING(80)	R	Network name of PLC
Settings			
Enable DHCP	BOOL	RW	***TRUE*** – enable DHCP mode, ***FALSE*** - disable DHCP mode
New IP	ARRAY[0..3] OF BYTE	RW	New IP address of PLC. Each byte of the array contains an octet of the address in decimal form.
New mask	ARRAY[0..3] OF BYTE	RW	New subnet mask of PLC. Each byte of the array contains an octet of the address in decimal form.
New gateway	ARRAY[0..3] OF BYTE	RW	New gateway of PLC. Each byte of the array contains an octet of the address in decimal form.
New hostname	STRING(80)	RW	New network name of PLC
Single channels			
Apply new parameters	BOOL	RW	Command: apply all network parameters on rising edge. If the parameter value is incorrect (e.g. ***0.0.0.0***), the previous value is retained.

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4.6 Screen

The ***Screen*** node enables to control the brightness of the display backlight. The control is available only if the project contains visualization screens and ***VISU_TASK*** task (the default name of this task should not be changed).

Device: SPC210

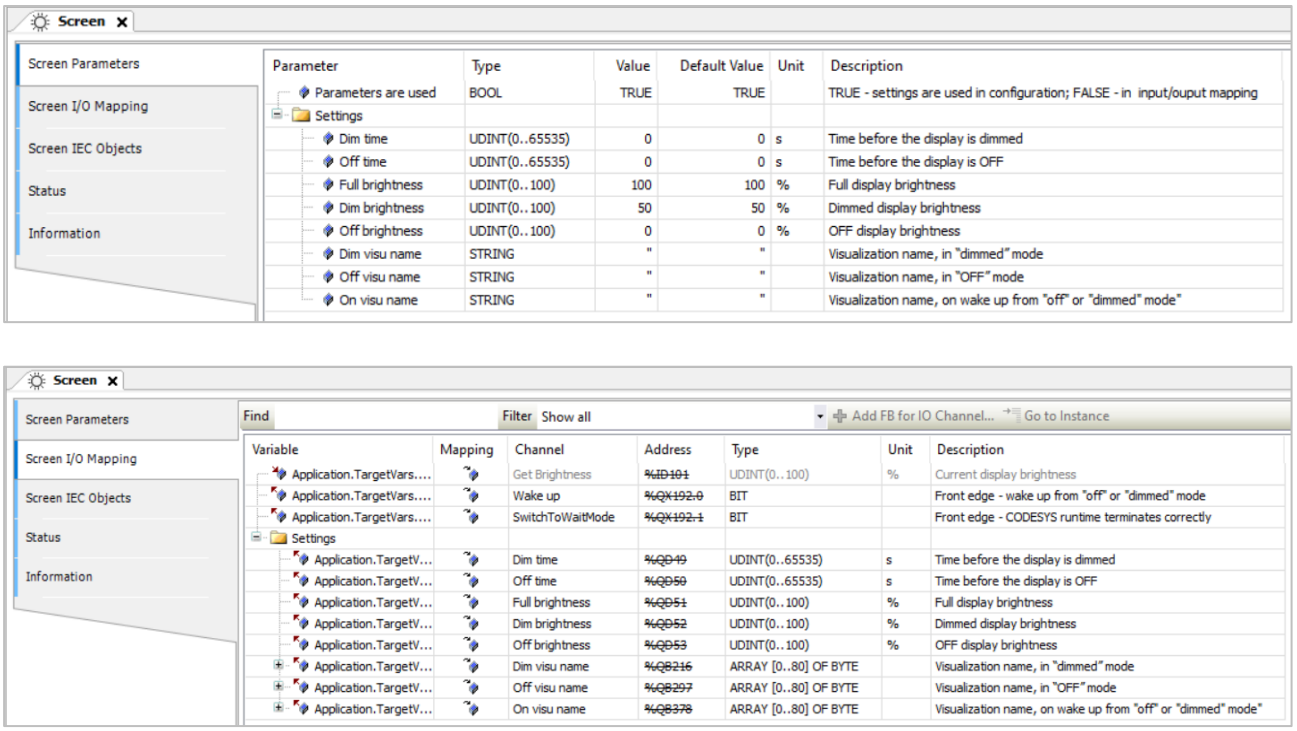


Fig. 4.6.1 Screen channels

Table 4.6.1 Screen channels

Channel	Type	Access	Description
Parameters (1)			
Single channels			
Parameters active	BOOL	RW	The setting determines which parameters are active. ***TRUE*** - the parameters of ***Parameters*** tab are used, ***FALSE*** - the parameters of ***I/O Mapping*** tab are used.
Settings			
Dim time (2)	UDINT	RW	Delay of switching to Dim mode in seconds. If ***0***, Dim mode is not used.
Off time (2)	UDINT	RW	Delay of switching to Off mode in seconds. If ***0***, Off mode is not used.
Full brightness	UDINT(0..100)	RW	Display brightness in Standard mode in %
Dim brightness	UDINT(0..100)	RW	Display brightness in Dim mode in %
Off brightness	UDINT(0..100)	RW	Display brightness in Off mode in %
Dim visu name	STRING(80)	RW	Visualization name in Dim mode. If no name is specified, screen will not be changed.
Off visu name	STRING(80)	RW	Visualization name in Off mode. If no name is specified, screen will not be changed.
On visu name	STRING(80)	RW	Visualization name in Standard mode. If no name is specified, screen will not be changed.
I/O Mapping			
Single channels			

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Get brightness	UDINT(0..100)	R	Current display brightness in %
Wake up	BOOL	RW	Command: switch to Standard mode on rising edge
SwitchToWaitMode	BOOL	RW	Command: on rising edge, the CODESYS runtime system process is correctly terminated and enters Standby mode. In this mode, the display shows the image defined in the web configurator on the ***PLC / Psplash*** tab. To restart the runtime system, tap the screen 2 times within the interval of 300 ms to 2 s.
Settings			
Dim time (2)	UDINT	RW	Delay of switching to Dim mode in seconds. If ***0***, Dim mode is not used.
Off time (2)	UDINT	RW	Delay of switching to Off mode in seconds. If ***0***, Off mode is not used.
Full brightness	UDINT(0..100)	RW	Display brightness in Standard mode in %
Dim brightness	UDINT(0..100)	RW	Display brightness in Dim mode in %
Off brightness	UDINT(0..100)	RW	Display brightness in Off mode in %
Dim visu name	STRING(80)	RW	Visualization name in Dim mode. If no name is specified, screen will not be changed.
Off visu name	STRING(80)	RW	Visualization name in Off mode. If no name is specified, screen will not be changed.
On visu name	STRING(80)	RW	Visualization name in Standard mode. If no name is specified, screen will not be changed.

NOTE

1) Project variables cannot be assigned to the parameters of the tab **Parameters**.

2) Both **Dim time** and **Off time** are counted from the last screen touch. For correctly stepped back-light control, the **Dim time** must be less than the **Off time**.

- In the **Dim** and **Off** modes, the first screen touch is not processed, i.e. if anybody touches the screen in the Dim or Off mode accidentally, no screen control will be activated.
- If the system variable **CurrentVisu** is used, switching of visualization screens when changing backlight mode is performed for all users, including web visualization clients.

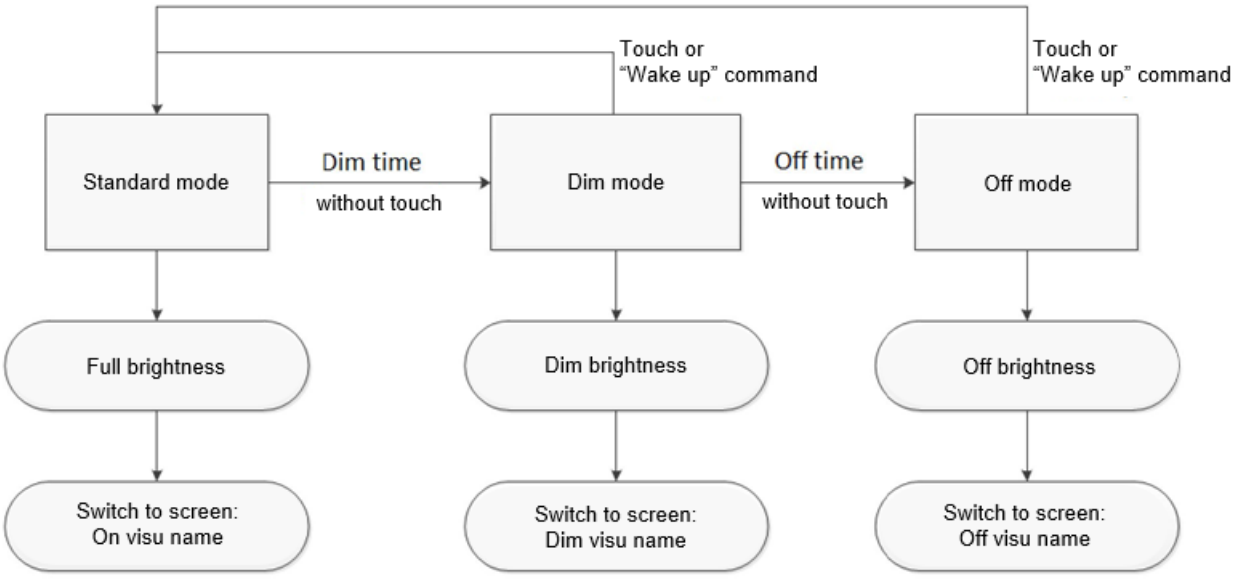


Fig. 4.6.2 Mode diagram

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4.7 Debug

The **Debug** node contains debugging information, updated with a specified interval.

Device: SPC210, PLC210

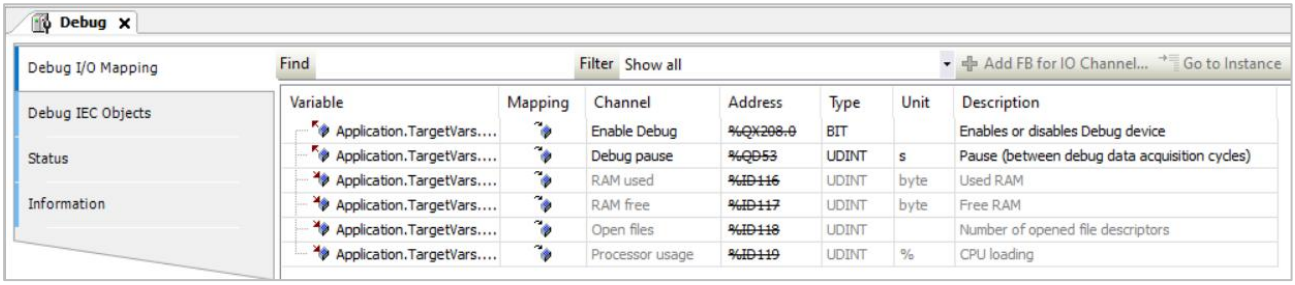


Fig. 4.7.1 Debug channels

Table 4.7.1 Debug channels

Channel	Type	Access	Description
Enable debug	BOOL	RW	Command: start bit to update debug information. ***TRUE***: read-only node channels are updated with the interval ***Update interval***. ***FALSE:*** read-only node channels contain no information.
Update interval	UDINT	RW	Debug information update interval in seconds
RAM used	UDINT	R	Used RAM in bytes
RAM free	UDINT	R	Free RAM in bytes
Open files	UDINT	R	Number of handles opened by runtime system process
CPU usage	UDINT	R	CPU usage in %

4.8 Info

The ***Info*** node contains information about the PLC and the user project.

Device: SPC210, PLC210

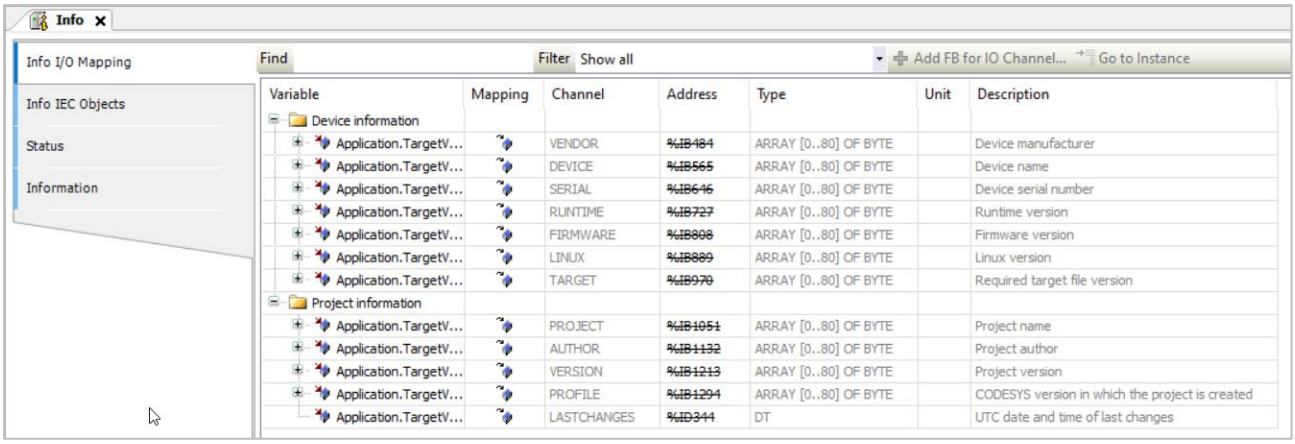


Fig. 4.8.1 Info channels

Table 4.8.1 Info channels

Channel	Type	Access	Description
Device information			
VENDOR	STRING(80)	R	PLC manufacturer

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DEVICE	STRING(80)	R	PLC model
SERIAL	STRING(80)	R	PLC serial number
RUNTIME	STRING(80)	R	Runtime system version
FIRMWARE	STRING(80)	R	Firmware version
LINUX	STRING(80)	R	Linux version
TARGET	STRING(80)	R	Target file version required for current firmware
Project information			
PROJECT	STRING(80)	R	Project name
AUTHOR (1), (2)	STRING(80)	R	Project author
VERSION (1), (2)	STRING(80)	R	Project version
PROFILE	STRING(80)	R	CODESYS version in which the project was created
LASTCHANGES	DT	R	Date and time of last modification (UTC+0)

NOTE

1) The data is entered by the user in the CODESYS menu **Project** > **Project Information.** It is recommended to check the option **Automatically generate 'Project Information' POUs**.

2) If the boot application is created using the command **Create boot application** (both online and offline), the channels **AUTHOR** and **VERSION** are cleared after PLC reboot in current CODESYS versions. This does not occur if the boot application is created implicitly, e.g. when loading the project using the **Login** command with the **Update boot application** option checked. Information about this bug is described in the CODESYS bug tracker (CDS-47464).

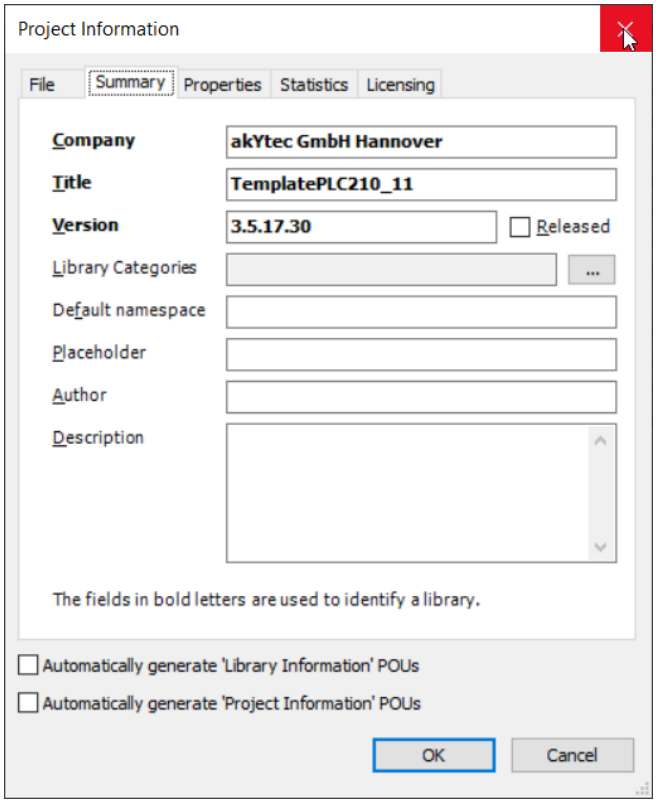


Fig. 4.8.2 Project information

4.9 Watchdog

The **Watchdog** node contains information about watchdog timer operation.

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Device: SPC210, PLC210

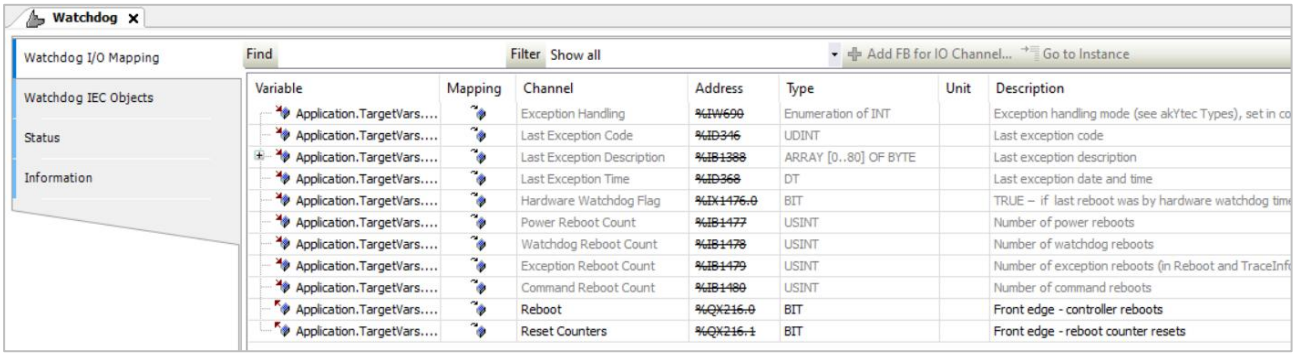


Fig. 4.9.1 Watchdog channels

Table 4.9.1 Watchdog channels

Channel	Type	Access	Description
Exception Handling	Watchdog. ExceptionHandling	R	Exception handling mode selected in Configurator. Possible values: ***CatchInCodesys*** - CODESYS standard exception handling (switch to STOP, "freeze" the visualization) ***Reboot*** - device reboot by exception ***TraceInfo*** - display exception information (touchscreen PLC only) ***TraceInfoAndReboot*** - display exception information and reboot in 10 seconds (touchscreen PLC only)
Last Exception Code (1)	UDINT	R	Last exception code
Last Exception Description (1)	ARRAY [0..80] OF BYTE	R	Description of the last exception Each byte can be read as a string
Last Exception Time (1)	DT	R	Date and time of the last exception
Hardware Watchdog Flag	BOOL	R	Flag: last reboot has occurred due to hardware watchdog timer triggering
Power Reboot Count	USINT	R	Non-volatile counter of device reboots on power failure
Watchdog Reboot Count	USINT	R	Non-volatile counter of device reboots on hardware watchdog triggering
Exception Reboot Count	USINT	R	Non-volatile counter of device reboots on exception (in ***Reboot*** or ***TraceInfoAndReboot*** modes)
Command Reboot Count	USINT	R	Non-volatile counter of device reboots on command via ***Reboot*** channel
Reboot	BOOL	RW	Command: device is rebooted on rising edge with correct termination of all running processes
Reset Counters	BOOL	RW	Command: counters are reset on rising edge

NOTE

1) If the PLC is switched off without exception (e.g. on a command via **Reboot** channel or on power failure), the counter will be reset after reboot.

4.10 PLC210_XX

The ***PLC210_XX*** node contains information about the status of power supply and control elements of the device.

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Device: PLC210

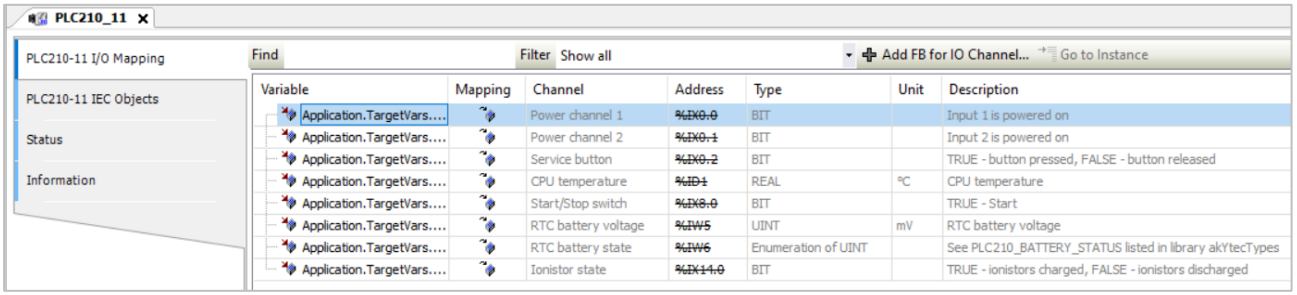


Fig. 4.10.1 PLC210_XX channels

Table 4.10.1 PLC210_XX channels

Channel	Type	Access	Description
Power channel 1	BOOL	R	***TRUE*** – power on power input 1 ***FALSE*** – no power on power input 1 (PLC210 only)
Power channel 2	BOOL	R	***TRUE*** – power on power input 2 ***FALSE*** – no power on power input 2 (PLC210 only)
Service button	BOOL	R	Service button state: ***TRUE*** – pressed, ***FALSE*** – released
CPU temperature	REAL	R	CPU temperature
Start/Stop switch	BOOL	R	Start/Stop switch state. TRUE – start
RTC battery voltage	UINT	R	Battery voltage in V
RTC battery status	ENUM of UINT	R	See ***PLC210_BATTERY_STATUS*** in ***AkytecTypes*** library
UPS state	BOOL	R	TRUE – supercapacitors charged, FALSE – discharged

NOTE

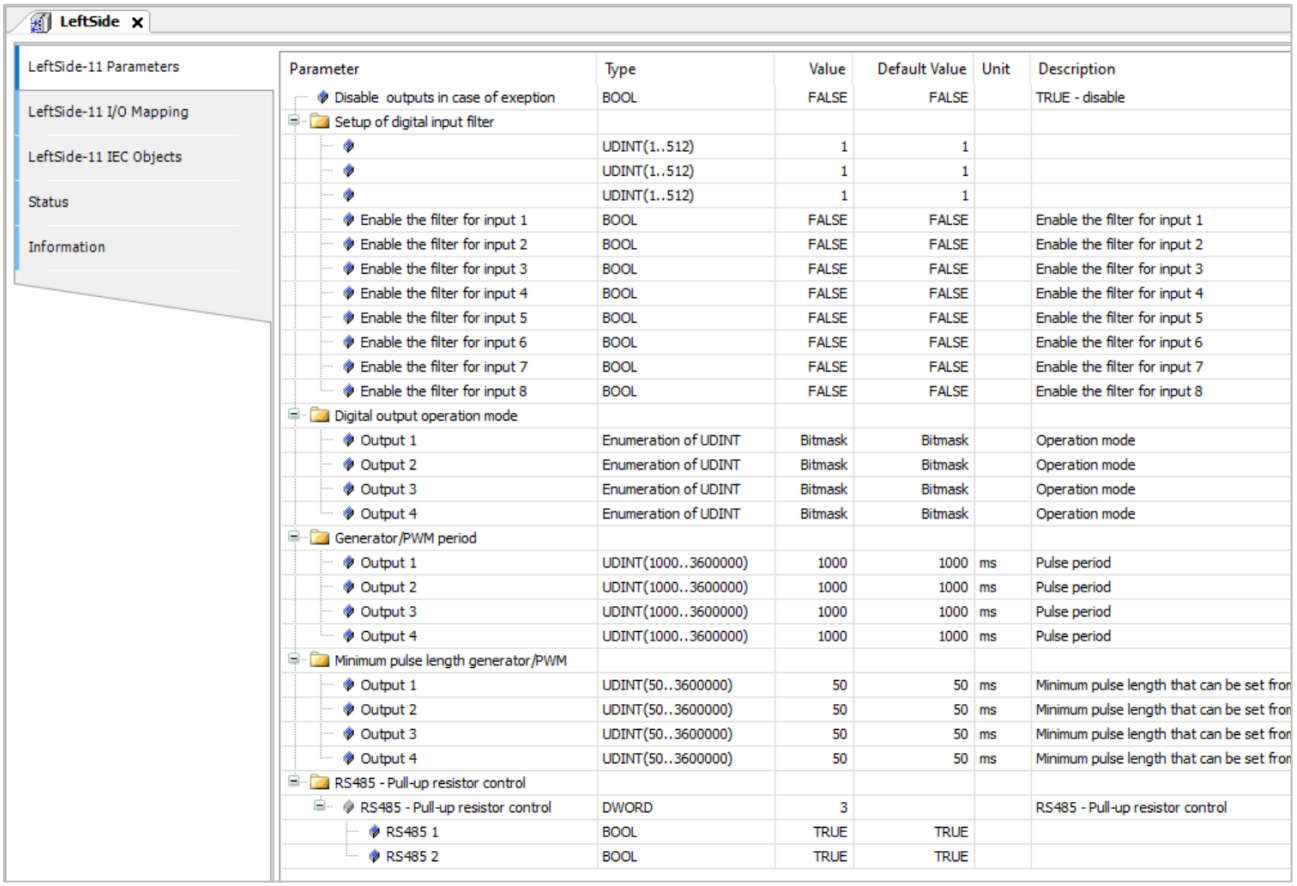
- The node **PLC210_XX** defines the contents of the nodes **LeftSide** and **RightSide** and must match the device model. Make sure the target device selected in the project matches the model of the device to program. If not, see Sect. 3.
- The channels **RTC battery voltage**, **RTC battery status**, and **UPS state** are available in target files of version 3.5.17.32 and higher.

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4.11 LeftSide

The ***LeftSide-XX*** node is used to control the inputs and outputs of the left PLC board.

Device: PLC210



Parameter	Type	Value	Default Value	Unit	Description
Disable outputs in case of exeption	BOOL	FALSE	FALSE		TRUE - disable
Setup of digital input filter					
	UDINT(1..512)	1	1		
	UDINT(1..512)	1	1		
	UDINT(1..512)	1	1		
Enable the filter for input 1	BOOL	FALSE	FALSE		Enable the filter for input 1
Enable the filter for input 2	BOOL	FALSE	FALSE		Enable the filter for input 2
Enable the filter for input 3	BOOL	FALSE	FALSE		Enable the filter for input 3
Enable the filter for input 4	BOOL	FALSE	FALSE		Enable the filter for input 4
Enable the filter for input 5	BOOL	FALSE	FALSE		Enable the filter for input 5
Enable the filter for input 6	BOOL	FALSE	FALSE		Enable the filter for input 6
Enable the filter for input 7	BOOL	FALSE	FALSE		Enable the filter for input 7
Enable the filter for input 8	BOOL	FALSE	FALSE		Enable the filter for input 8
Digital output operation mode					
Output 1	Enumeration of UDINT	Bitmask	Bitmask		Operation mode
Output 2	Enumeration of UDINT	Bitmask	Bitmask		Operation mode
Output 3	Enumeration of UDINT	Bitmask	Bitmask		Operation mode
Output 4	Enumeration of UDINT	Bitmask	Bitmask		Operation mode
Generator/PWM period					
Output 1	UDINT(1000..3600000)	1000	1000	ms	Pulse period
Output 2	UDINT(1000..3600000)	1000	1000	ms	Pulse period
Output 3	UDINT(1000..3600000)	1000	1000	ms	Pulse period
Output 4	UDINT(1000..3600000)	1000	1000	ms	Pulse period
Minimum pulse length generator/PWM					
Output 1	UDINT(50..3600000)	50	50	ms	Minimum pulse length that can be set fror
Output 2	UDINT(50..3600000)	50	50	ms	Minimum pulse length that can be set fror
Output 3	UDINT(50..3600000)	50	50	ms	Minimum pulse length that can be set fror
Output 4	UDINT(50..3600000)	50	50	ms	Minimum pulse length that can be set fror
RS485 - Pull-up resistor control					
RS485 - Pull-up resistor control	DWORD	3			RS485 - Pull-up resistor control
RS485 1	BOOL	TRUE	TRUE		
RS485 2	BOOL	TRUE	TRUE		

Fig. 4.11.1 LeftSide-XX Parameters channels

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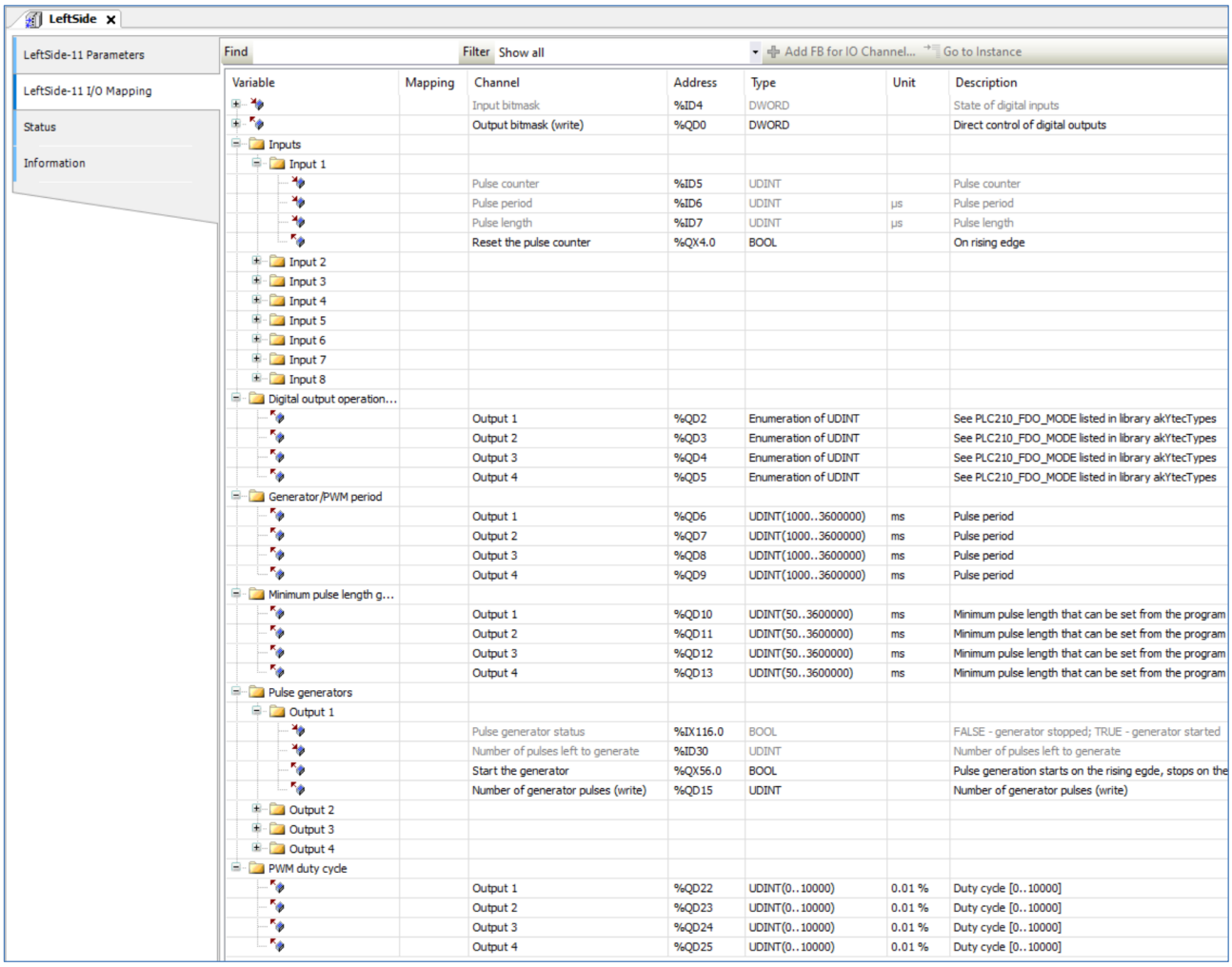


Fig. 4.11.2 LeftSide-XX I/O Mapping channels

Table 4.11.1 LeftSide-XX channels

Channel	Type	Access	Description
Parameters (1)			
Single channels			
Disable outputs on exception	BOOL	RW	***TRUE*** – in case of exception, all outputs are switched to ***Off*** state (disabled), ***FALSE*** – outputs retain their states in case of exception
FDI filters			
Number of measurements used for FDI1, 2, 3, 7	UDINT(1…512)	RW	Number of consecutive measurements used by the filter of the corresponding input
Number of measurements used for FDI4, 5, 6	UDINT(1…512)	RW	
Number of measurements used for FDI8	UDINT(1…512)	RW	
FDIn	BOOL	RW	***TRUE*** – enable filter, ***FALSE*** – disable filter
DO operation mode			
DOn	ENUM of UDINT	RW	DO operation mode. Possible values: - ***BITMASK*** - ***GEN_PULSE*** (Pulse Generator) - ***PWM***

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			See ***PLC210_FDO_MODE*** in AkytecTypes library
Pulse period			
DOn (2)	UDINT(i..j)	RW	Output pulse period. Used in Generator and PWM modes only. PLC210-11/12/14: [1000…360000000] ms PLC210-13 - Generator: [10…4294967] µs - PWM: [200…4294967] µs
Minimum pulse duration			
DOn (2)	UDINT(k..l)	RW	Output pulse duration. Used in Generator and PWM modes only. PLC210-11/12/14: [50…360000000] ms PLC210-13 - Generator: [10…4294967] µs - PWM: [200…4294967] µs
RS485 failsafe resistors bitmask			
RS485 failsafe resistors bitmask	DWORD	RW	RS485 failsafe resistors bitmask ***TRUE*** – resistor connected, ***FALSE*** – disconnected
I/O Mapping			
Single channels			
Input bitmask	DWORD	R	Bitmask of discrete inputs. BOOL variables can be bound to individual inputs.
Output bitmask	DWORD	RW	Bitmask of discrete outputs. BOOL variables can be bound to individual outputs, but only if no DWORD variable is already bound to the channel
Inputs / DIn			
Pulse counter	UDINT	R	Pulse counter of input n. The counter is incremented on falling edge, reset to 0 on overflow.
Pulse period	UDINT	R	Pulse period in ms
Pulse duration	UDINT	R	Pulse duration in ms
Counter reset	BOOL	RW	Command: TRUE – counter reset on rising edge
DO operation mode			
DOn	ENUM of UDINT		DO operation mode. Possible values: - ***BITMASK*** - ***GEN_PULSE*** (Pulse generator) - ***PWM*** See ***PLC210_FDO_MODE*** in AkytecTypes library
Pulse period			
DOn (2)	UDINT(i..j)	RW	Output pulse period. Used in Generator and PWM modes only. PLC210-11/12/14: [1000…360000000] ms PLC210-13 - Generator: [10…4294967] µs - PWM: [200…4294967] µs
Minimum pulse duration			
DOn (2)	UDINT(k..l)	RW	Output pulse duration. Used in Generator and PWM modes only. PLC210-11/12/14: [50…360000000] ms PLC210-13 - Generator: [10…4294967] µs - PWM: [200…4294967] µs
Pulse generators / DOn			
Pulse generator status	BOOL	R	***TRUE*** – generator is running, ***FALSE*** – generator is stopped
Pulses left (3)	UDINT	R	Countdown of the number of pulses left to generate
Start generator	BOOL	RW	Command: pulse generation started on rising edge, stopped on falling edge
Number of pulses (2) (3)	UDINT	RW	Number of pulses to be generated. Generation starts immediately after writing the new value. Write ***0*** to stop generation.
PWM duty cycle			

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DOn [2]	UDINT(0..1000)	RW	PWM duty cycle specified in hundredths of a percent (***5000*** = 50%)

NOTE

1) Project variables cannot be assigned to the parameters of the tab **Parameters**.

2) The operation of the output is determined by the following parameters:

   - **DO operation mode**
   - **Pulse period**
   - **Minimum pulse duration**
   - **PWM duty cycle**

   These parameters are available both on the **Parameters** tab and on the **I/O Mapping** tab. The **Parameters** tab is used to set the initial values of the parameters. On the **I/O Mapping** tab, you can bind variables to these parameters. Changing the value of a variable causes the parameter to change immediately.

   The **Minimum pulse duration** parameter allows you to limit the pulse duration for the case the equipment should not be controlled by pulses of very short duration.

   Let's consider the effect of this parameter on the output signal. Assume:

   - **Pulse period** = 1000 ms
   - **PWM duty cycle** = 50%

   So, the calculated pulse duration = 500 ms

   - **Minimum pulse duration** = 300 ms

   So far, the parameter **Minimum pulse duration** has no effect on the process.

   Assume the value of the variable bound to the **Period** channel changes, and the period is now 500 ms. Thus, the calculated pulse duration becomes 250 ms. But since **Minimum pulse duration** = 300 ms, the actual pulse duration will also be 300 ms.

   If the set **Period** is less than **Minimum pulse duration**, the minimum possible value of **Period** is used as the current minimum pulse duration:

   - 50 ms for PLC210-11/-12/-14
   - 10 µs for PLC210-13

3) The pulse generation is started by the rising edge in the **Start generator** channel. The channel value is processed only in the **Pulse generator** mode and only if the value of the channel **Number of pulses** is greater than **0**.

   In the **Pulse generator** mode, **PWM duty cycle** = 50% is used (cannot be changed). In this mode:

   - **Pulse generator status** = **TRUE**
   - **Pulses left to generate** – gradually decreases with each generated pulse.

   After generation of the last pulse:

   - **Pulse generator status** = **FALSE**
   - **Pulses left to generate** = **0**

   To restart the generator requires a rising edge to be generated in the **Start generator** channel.

   If the settings (period, duration, number of pulses) are changed during the generation process, this has no effect on the generation of the current pulse sequence. The new values will be saved and used at the next generator start.

   If the **Start generator** channel becomes **FALSE** during the generation process, the generation of the current pulse sequence is stopped. In this case:

   - **Pulse generator status** = **FALSE**
   - **Pulses left to generate** = **0**

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4.12 RightSide

The ***RightSide-xx*** node is used to control the inputs and outputs of the right PLC board.

Device: PLC210

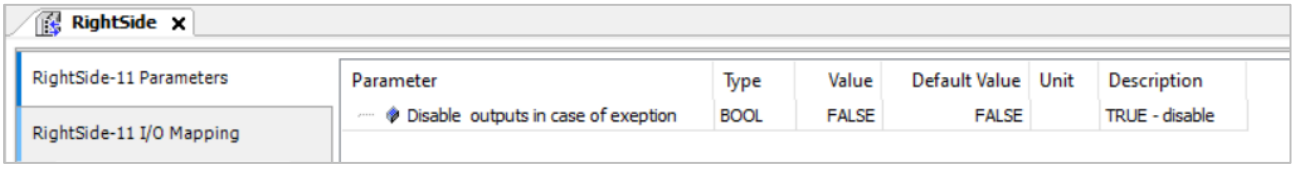
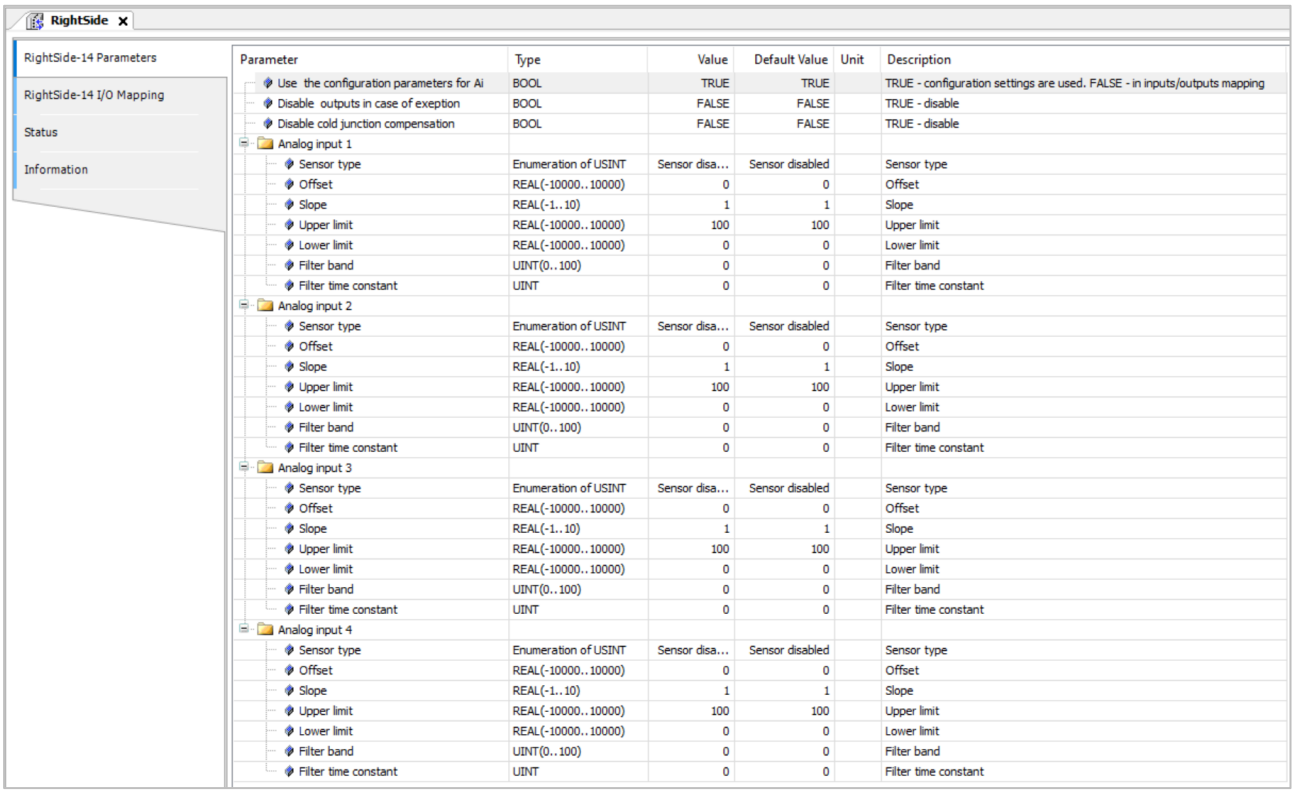


Fig. 4.12.1 RightSide-11 Parameters channels



Parameter	Type	Value	Default Value	Unit	Description
Use the configuration parameters for Ai	BOOL	TRUE	TRUE		TRUE - configuration settings are used. FALSE - in inputs/outputs mapping
Disable outputs in case of exeption	BOOL	FALSE	FALSE		TRUE - disable
Disable cold junction compensation	BOOL	FALSE	FALSE		TRUE - disable
Analog input 1					
Sensor type	Enumeration of USINT	Sensor disa...	Sensor disabled		Sensor type
Offset	REAL(-10000..10000)	0	0		Offset
Slope	REAL(-1..10)	1	1		Slope
Upper limit	REAL(-10000..10000)	100	100		Upper limit
Lower limit	REAL(-10000..10000)	0	0		Lower limit
Filter band	UINT(0..100)	0	0		Filter band
Filter time constant	UINT	0	0		Filter time constant
Analog input 2					
Sensor type	Enumeration of USINT	Sensor disa...	Sensor disabled		Sensor type
Offset	REAL(-10000..10000)	0	0		Offset
Slope	REAL(-1..10)	1	1		Slope
Upper limit	REAL(-10000..10000)	100	100		Upper limit
Lower limit	REAL(-10000..10000)	0	0		Lower limit
Filter band	UINT(0..100)	0	0		Filter band
Filter time constant	UINT	0	0		Filter time constant
Analog input 3					
Sensor type	Enumeration of USINT	Sensor disa...	Sensor disabled		Sensor type
Offset	REAL(-10000..10000)	0	0		Offset
Slope	REAL(-1..10)	1	1		Slope
Upper limit	REAL(-10000..10000)	100	100		Upper limit
Lower limit	REAL(-10000..10000)	0	0		Lower limit
Filter band	UINT(0..100)	0	0		Filter band
Filter time constant	UINT	0	0		Filter time constant
Analog input 4					
Sensor type	Enumeration of USINT	Sensor disa...	Sensor disabled		Sensor type
Offset	REAL(-10000..10000)	0	0		Offset
Slope	REAL(-1..10)	1	1		Slope
Upper limit	REAL(-10000..10000)	100	100		Upper limit
Lower limit	REAL(-10000..10000)	0	0		Lower limit
Filter band	UINT(0..100)	0	0		Filter band
Filter time constant	UINT	0	0		Filter time constant

Fig. 4.12.2 RightSide-14 Parameters channels

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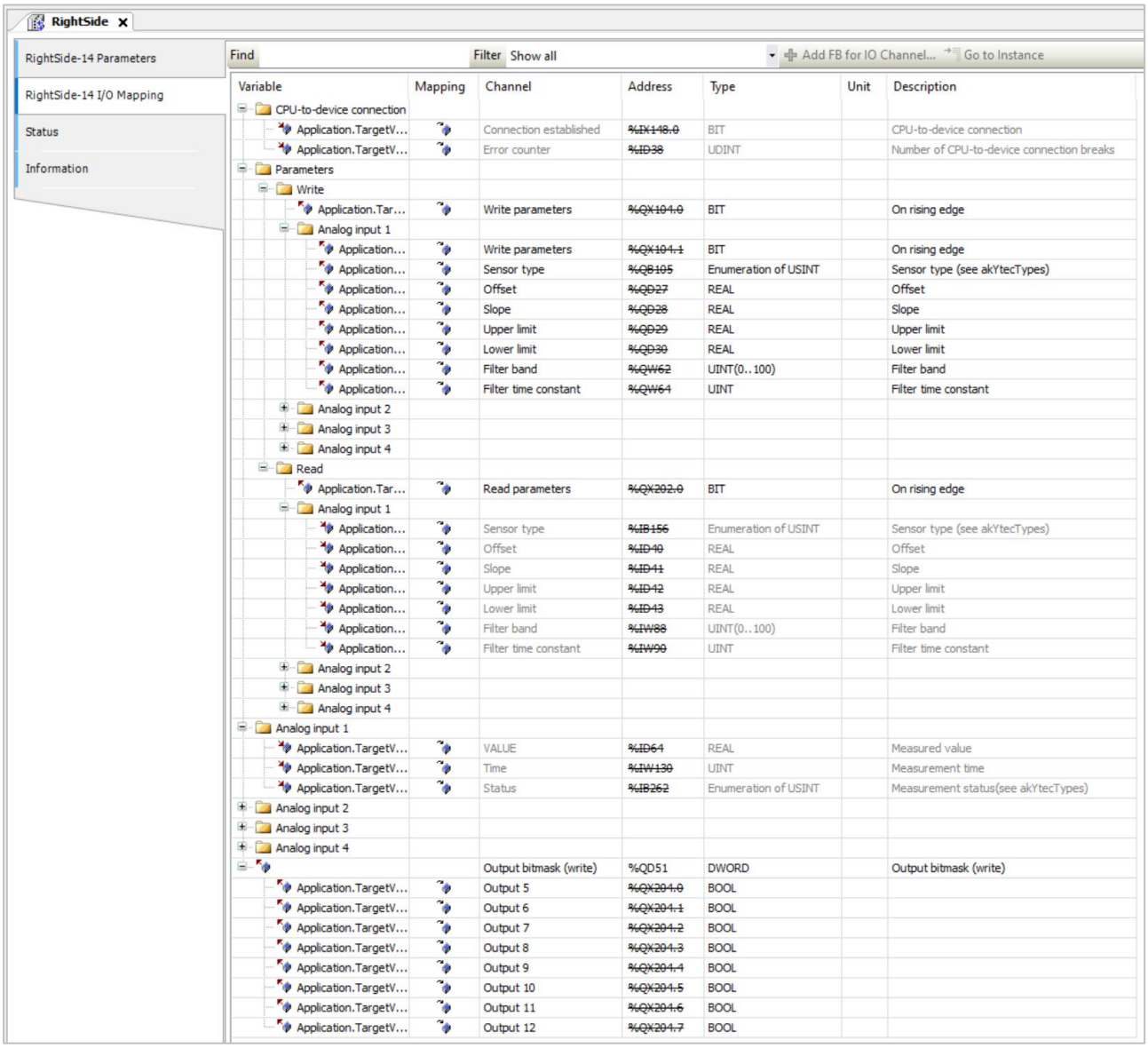


Fig. 4.12.3 RightSide-14 I/O Mapping channels

Table 4.12.1 RightSide-xx channels

Channel	Type	Access	Description
Parameters (1)			
Single channels			
Switch off outputs on exception	BOOL	RW	***TRUE*** – in case of exception all outputs are set to ***FALSE*** (switched off), ***FALSE*** – outputs retain their states. Parameter is used only in PLC210-11/-12/-13
Use Parameters for AI configuration	BOOL	RW	***TRUE*** – analog inputs are configured on the Parameters tab and are not available for reading/writing using the channels of the I/O Mapping tab, ***FALSE*** – analog inputs are configured on the I/O Mapping tab. Parameter is used only in PLC210-14
Disable cold junction compensation	BOOL	RW	***TRUE*** – cold junction compensation for AIs is disabled, ***FALSE*** – enabled. Parameter is used only in PLC210-14
AIn			

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Sensor type	ENUM of USINT	RW	Type of sensor/signal connected to input. See enumeration ***ANALOG_SENSORS*** in AkytecTypes library
Offset	REAL (-10000.0..10000.0)	RW	See "Characteristic curve correction" in the device User Guide
Slope	REAL(-1.0..10.0)	RW	
Upper limit	REAL (-10000.0..10000.0)	RW	See “Linear signal scaling” in the device User Guide
Lower limit	REAL (-10000.0..10000.0)	RW	
Filter band	UINT(0..100)	RW	See “Digital filtering” in the device User Guide
Filter time constant	UINT	RW	
I/O Mapping			
Connection to CPU			
Connection established	BOOL	R	***TRUE*** – communication between CPU and right board established, ***FALSE*** – no communication.
Error counter	UDINT	R	Communication error counter between CPU and right board
Single channels			
Input bitmask	DWORD	R	Bitmask of discrete inputs. BOOL variables can be bound to individual inputs. Parameter is used only in PLC210-12/-13
Output bitmask	DWORD	RW	Bitmask of discrete outputs. BOOL variables can be bound to individual outputs, but only if no DWORD variable is already bound to the channel.
AI parameters / Write (folder and all subfolders are used in PLC210-14 only)			
Write parameters	BOOL	RW	Parameters of all analog inputs are recorded on rising edge in volatile memory, i.e. not saved after PLC restart. Their recording at device start should be foreseen in the program.
AI parameters / Write / AIn			
Write parameters	BOOL	RW	Parameters of this AI are recorded on rising edge
Sensor type	ENUM of USINT	RW	Type of sensor/signal connected to input. See enumeration ***ANALOG_SENSORS*** in AkytecTypes library
Offset	REAL (-10000.0..10000.0)	RW	See "Characteristic curve correction" in the device User Guide
Slope	REAL(-1.0..10.0)	RW	
Upper limit	REAL (-10000.0..10000.0)	RW	See “Linear signal scaling” in the device User Guide
Lower limit	REAL (-10000.0..10000.0)	RW	
Filter band	UINT(0..100)	RW	See “Digital filtering” in the device User Guide
Filter time constant	UINT	RW	
AI parameters / Read (folder and all subfolders are used in PLC210-14 only)			
Read parameters	BOOL	RW	Parameters of all analog inputs are read on rising edge
AI parameters / Read / AIn			
Sensor type	ENUM of USINT	RW	Type of sensor/signal connected to input. See enumeration ***ANALOG_SENSORS*** in AkytecTypes library
Offset	REAL (-10000.0..10000.0)	RW	See "Characteristic curve correction" in the device User Guide
Slope	REAL(-1.0..10.0)	RW	
Upper limit	REAL (-10000.0..10000.0)	RW	See “Linear signal scaling” in the device User Guide
Lower limit	REAL (-10000.0..10000.0)	RW	
Filter band	UINT(0..100)	RW	See “Digital filtering” in the device User Guide

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Filter time constant	UINT	RW	
AIn			
Value	REAL	R	Measured value
Time	UINT	R	Relative measurement time (1 unit = 0.01 s)
Status	ENUM of USINT	R	Measurement status See enumeration ***ANALOG_SENSOR_ERROR*** in akYtecTypes library

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