



Data Sheet CODESYS Profiler

The CODESYS Profiler enables the detailed measurement of runtime behavior and code coverage at program block level.

The CODESYS Profiler is part of the tool bundle CODESYS Professional Developer Edition.

Product description

With the CODESYS Profiler, software engineers and application developers can perform an early measurement and evaluation of the processing times and code coverage of the different POU's in an IEC 61131-3 application. These measurements can be performed on the CODESYS SoftPLC or a physical device without changing the IEC 61131 application code in the project. Application development and measurement can be done in parallel in one and the same development environment.

Functionality

- Dynamic measurement of the runtime by different methods depending on the use case
- Measurement by Sampling (only available for multicore platforms) with adjustable sampling rate and with little affect on the runtime
- Measurement by Instrumentation for selected POU's with scalable influence on runtime and code size
- Measurement by execution points with code changes in the running application
- Starting measurement via variable or on command
- Clear presentation of measurement results on the development interface

Benefit

- Performance and code coverage measurement of the machine code already at the beginning of the development phase
- Timely notice of runtime issues
- Identification of time consuming program parts and the portion of unprocessed statements
- No modification of the application code by the user needed for measurement
- Collective or single measurement of application POU's possible
- Determination of code efficiency by comparing historical and current measurements
- Improved software quality

The CODESYS Profiler provides the following main functions:

- Runtime measurement by sampling:
 - Only available on multicore platforms
 - The measured task is stopped at arbitrary points in time and the current callstack is calculated
 - The share of a function in the total runtime of a task is determined statistically
 - Particularly suitable if the runtime of a task is close to the cycle time
 - Not suitable for identifying rare outliers in the task execution time
- Runtime measurement by code instrumentation:
 - Additional code is generated in the selected POU's to measure the runtime
 - The measurement is done on the PLC, the results are downloaded cyclically to the IDE
 - Always one single cycle is measured
 - A measurement can be started by hand or by a trigger event
 - Particularly suitable to detect rare outliers in the task execution time
- Runtime measurement in the profiler watchlist:
 - Execution points are set in the selected POU's and the execution time between those two execution points is measured
 - Can be carried out in the running application without rebuild or restart of the application
- Measurement of code coverage:

- Executed lines of code are identified with implicitly generated code
 - Executed lines of code are highlighted in colour during execution
 - Only available for structured text
- Display of results
 - Summarized overview
 - Call tree (by time or process)
 - Tables
 - Watch list
- Calculation of different information
 - Percentage of time spent in call
 - Total time spent in call
 - Average time of all POU calls of a single cycle
 - Minimum and maximum processing time over multiple cycles
 - Number of calls
 - Display of time spent for each call
 - Standard deviation of average measured time
 - Percentage of processed code
- Export of results in CSV format

Extended menu

Measurement details

Multiple result windows

Details of individual call times

The screenshot displays the CODESYS Profiler interface. The main window shows a call tree and a table of POU calls. The table has the following columns: POU Name, Time (µs), Average, Min., Max., Own Time, Own T., Calls, and Standard. The data rows include:

POU Name	Time (µs)	Average	Min.	Max.	Own Time	Own T.	Calls	Standard
HABTASK	246334	246334	246334	246334	246334	246334	1	-
PLC_PRG (PRG)	246334	246334	246334	246334	246334	246334	1	-
GetSumOfCoupler (FCN)	246334	246334	246334	246334	246334	246334	1	-
SetTimeString (PRG)	0.261	0.261	0.261	0.261	0.261	0.261	26.13	1
Play (PRG)	0.223	0.223	0.223	0.223	0.223	0.223	100.00	1
SendDataIn (FCN)	0.279	0.279	0.279	0.279	0.279	0.279	100.00	194
any2_fc_string(FCN)	0.164	0.164	0.164	0.164	0.164	0.164	36.82	3
MapConvert(FCN)	0.109	0.109	0.109	0.109	0.109	0.109	100.00	3

A smaller window titled 'Times for ST_ENTRY_FB_INIT' is also visible, showing a table with columns for Name, Duration, and Calls. The data rows include:

Name	Duration	Calls
ST_ENTRY_FB_INIT	0.214 µs	1
ST_ENTRY_FB_INIT	0.010 µs	2
ST_ENTRY_FB_INIT	0.000 µs	3
ST_ENTRY_FB_INIT	0.000 µs	4
ST_ENTRY_FB_INIT	0.000 µs	5
ST_ENTRY_FB_INIT	0.000 µs	6
ST_ENTRY_FB_INIT	0.000 µs	7
ST_ENTRY_FB_INIT	0.000 µs	8

Image: Display of the results from a runtime measurement using CODESYS Profiler

General information

Supplier:

CODESYS GmbH
 Memminger Strasse 151
 87439 Kempten
 Germany

Support:

<https://support.codesys.com>

Item:

CODESYS Profiler

Item number:

2101000004

Sales / Source of supply:

CODESYS Store

<https://store.codesys.com>

Included in delivery:

- Package for the CODESYS Development System including license agreement and online help
- License key

System requirements and restrictions

Programming System	CODESYS Development System V3.5.17.0 or higher
Runtime System	CODESYS Control V3.5.12.0 or higher
Supported Platforms/ Devices	The runtime measurement is independent of platform and device (for all CODESYS Control Runtime devices).
Additional Requirements	Subscription of the CODESYS Professional Developer Edition.
Restrictions	<ul style="list-style-type: none"> • Runtime measurement for IEC 61131 program parts only • Potential temporary code increase and prolongation of runtime by 10-50% dependent on PLC platform and program structure • Enabling or disabling the profiling feature or changing the profiling settings requires a download (online change is not possible). • Demo version: limited time and range of functions • Sampling: only available on multicore runtimes with version 3.5.15.0 or higher
Licensing	see CODESYS Professional Developer Edition
Required accessories	Optional: CODESYS Key

Detailed compatibility information

Version	Programming System
2.1.0.0	3.5.17.0 - newest
2.0.0.0	3.5.17.0 - newest
1.3.1.0	3.5.13.0 - 3.5.16.0
1.3.0.0	3.5.13.0 - 3.5.16.0
1.2.1.0	3.5.12.30 - 3.5.16.0
1.2.0.0	3.5.11.0 - 3.5.16.0

Note: Not all CODESYS features are available in all territories. For more information on geographic restrictions, please contact sales@codesys.com.

Note: Technical specifications are subject to change. Errors and omissions excepted. The content of the current online version of this document applies.