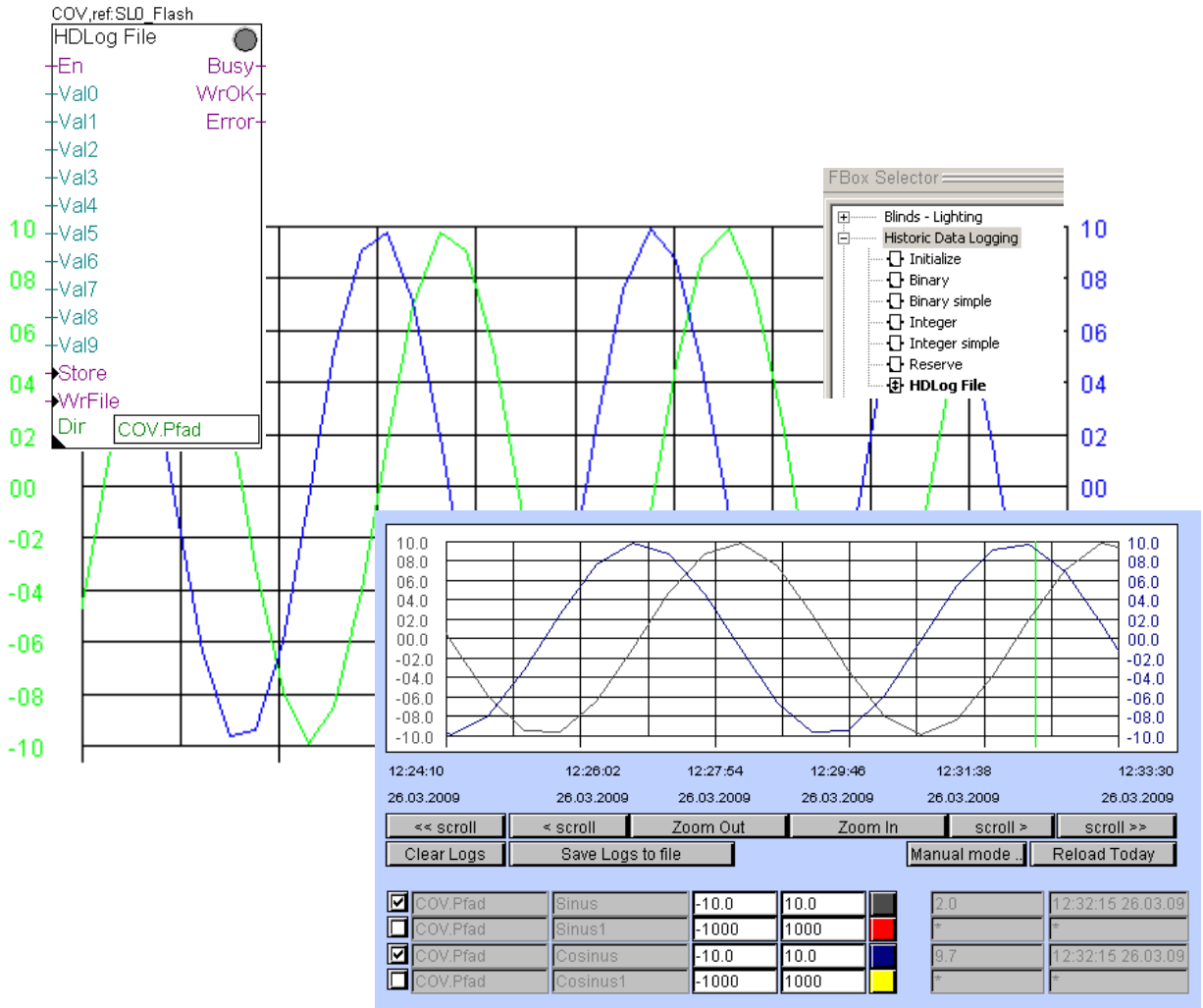
Quick Start Guide: HDLog

Data logging in Flash Memory



Contents

1 Introduction

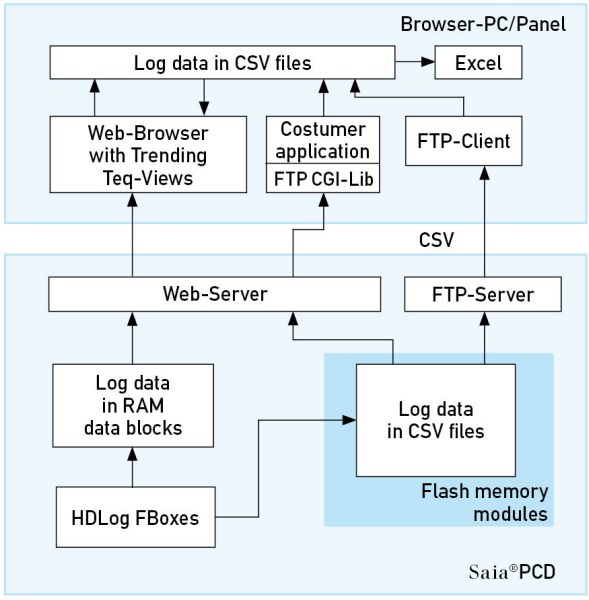
This document provides quick start instructions to configure and to use the HDLog.

1.1 PCD Flash Trending

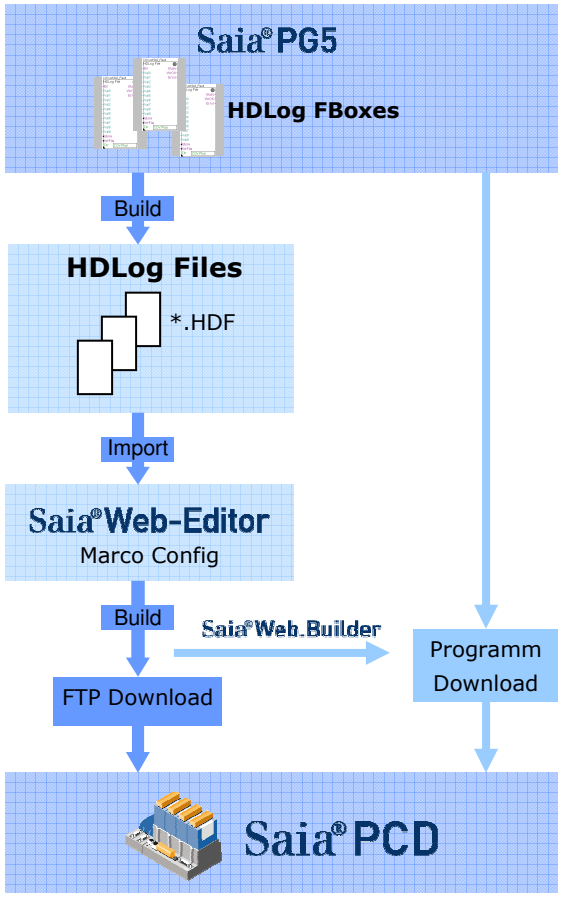
The new HDLog Trend macros are able to manage large amount of trending data.

This is possible, because the new approach is to store the trending data on the flash memory of the PCD and not in RAM before.

The schematic gives the system overview.



1.2 Workflow



In the new Filesystem the “build” generates the HDLog definition files (*.HDF).
In these HDF files is defined where the log data are stored in (path, file name, etc.) and how the trend curves in the browser (colors, unit, min/max.) will be represented.

The definition files are read in by the Web Editor and the settings transferred directly. Some parameters (colors, min/max.) can be changed after in the Web Editor.
The Trending macros are configured with the made settings accordingly.

2 Update the Systems

The new HDLog functionalities requires following system versions:

- **PG5 version 1.4.301.4** or higher

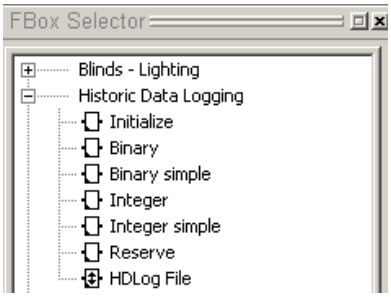
- **Web Editor 5.14.27**

- **HDLog FBox Library 2.1.030**

- **File System $2.5.307**

- The necessary **PCD Firmware** has **Version 1.10.16, we recommend to use Version 1.10.28**!

After installation you will find in PG5 under 'Application' the folder 'Historic Data Logging'. This folder should contain the following Fupla FBoxes:



3 HDLog with PG5

3.1 Hardware Configurations

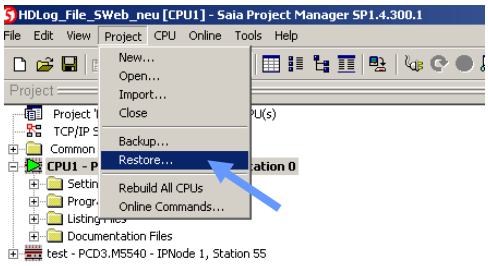
For the PG5 Example Project the following hardware has been used:

- **PCD3.M5540**
- **PCD3.R600 with SD Card PCD7.R-SD512 in Slot 0**
- **PCD7.R550M04 on M1**

3.2 Restoring the PG5 Example Project

Install PG5 Example Project over PG5 Restore function:

File: **PG5_1_4_GettingStarted_HDLogFile_V1.zip**

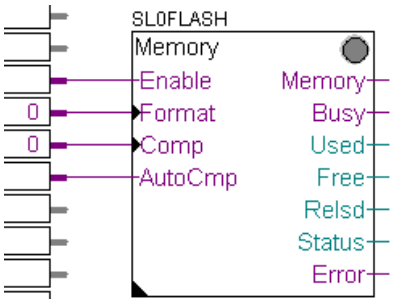


3.3 HDLog FBoxes

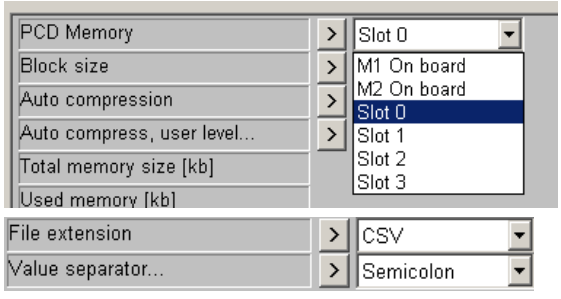
For HDLog application the File System needs the following FBoxes from the 'standard\file system family:

1. FBox „Memory Management"

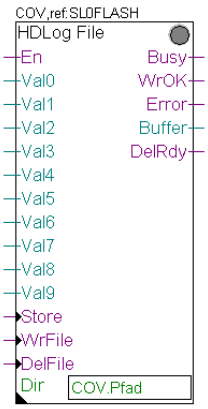
This FBox must be placed once in a Fupla file and have a unique name. It includes the general monitor and the handling of the memory and ensures a correct access to memory by the Read/Write FBoxes.



The concerned memory must be selected in the FBox. Buttons allow the user to Format and Compress the memory.



2. FBox „HDLog File“



This FBox records up to 10 values to analyse their history. The values logged first into a buffer (RAM DB) and are then stored - depending on definition - into a CSV-file.

The resulting files can be e.g. send by mail, accessed via FTP or read and displayed via SWeb application.

Signal Description:

Input

En	Recording is enabled or disabled. If input is Low all functions of the FBox are disabled.
Val	Value 0…9 to be logged (the values to be recorded must be connected)
Store	Trigger to log data
WrFile	Trigger to write the date from buffer into file
DelFile	Trigger to delete an old file

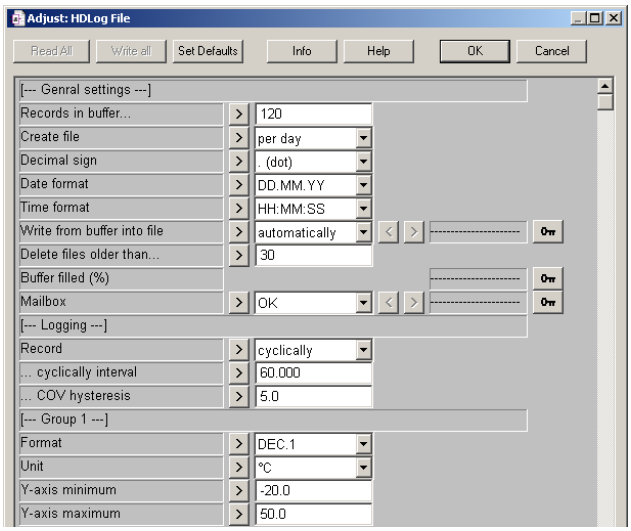
Output

Busy	High if data from buffer are written into file
WrOK	High for 1 program cycle to indicate that the data from buffer are written into file
Error	General error from File System, e.g. folder does not exist, disk full
Buffer	Buffer fill level
DelRdy	High for 1 program cycle to indicate that the delete file procedure has finished

Const

Dir	Directory to the CSV-files

Adjust the FBox „HDLog File“:



The following items are additionally in the new FBoxes:

- ASCII 0 in front of the values is now in space " ".
- The Time (String) can be attached with or without milliseconds.
- The Date can be applied as YYYY.MM.DD or DD.MM.YYYY.

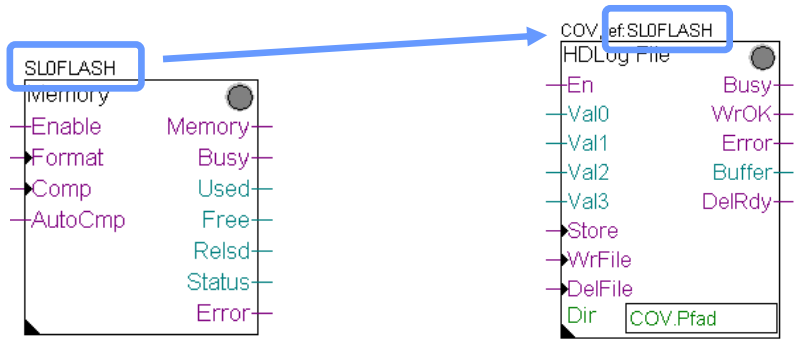
Adjust Description:

[--- General settings ---]	
Records in buffer…	Number of records in buffer
Create file	Pre selection of file content, 1 day, 1 week or 1 month
Decimal sign	Select weather the comma or dot is used as decimal sign
Date format	Select the date format
Time format	Select the time format
Write from buffer into file	When to write the buffer into file, automatically or on demand via WrFile
Delete files older than…	Delete files older than value (depending of type: days, weeks or month)
Buffer filled (%)	Buffer fill level
Mailbox	Mailbox to force e.g. from SCADA to write the data, with feedback information. 0=OK,1=WriteToFile
[--- Logging ---]	
Record	Logging type, cyclically, change of value or triggered
... cyclically interval	Interval for cyclically logging
... COV hysteresis	Change of value hysteresis for COV logging
[--- Group 1 to 4 ---]	
Format	Physically data format in group 1 to 4
Unit	Unit of values in group 1 to 4
Y-axis minimum	Y-axis minimum value in group 1 to 4
Y-axis maximum	Y-axis maximum value in group 1 to 4

For more detail please visit the FBox Online Info in PG5.

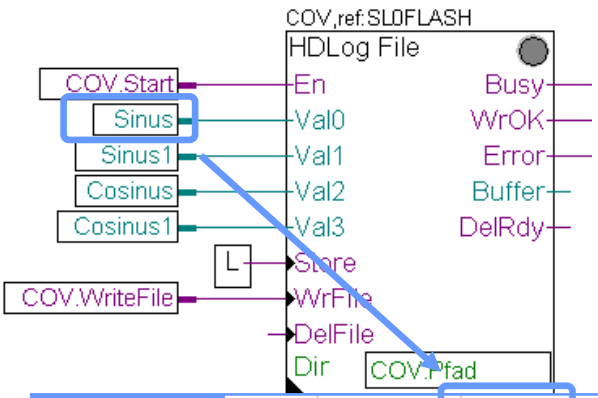
3.4 File System Management

The FBox “HDLog File” requires the File System FBox memory, but the File System management is not automatically defined. By mapping to a predefined Memory FBox, the FBox “HDLog File” knows into witch flash card the files are stored in.



Memory FBox **FBox „HDLog File“**

The Input Symbols are used in the CSV-file as header names. Therefore it is recommended to describe the FBox Inputs with intelligent names.
However the length of the symbols is limited, they may not be longer than 20 characters.

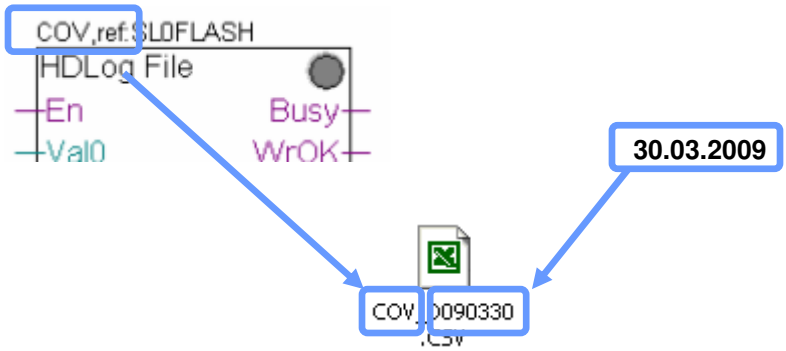


CSV file

		Time	Sinus	Sinus1	Cosinus	Cosinus1
	.03.2009	08:12:05	-2.2	-222.2	-9.7	-974.9
1238400755	30.03.2009	08:12:35	-7.2	-727.1	-6.8	-686.5
1238400785	30.03.2009	08:13:05	-9.8	-987.7	-1.5	-155.9
1238400815	30.03.2009	08:13:35	-9	-903.3	4.2	428.9
1238400845	30.03.2009	08:14:05	-5	-503.3	8.6	864
1238400875	30.03.2009	08:14:35	0.6	62.4	9.9	998
1238400906	30.03.2009	08:15:06	6.1	615	7.8	788.4

Further must be specified which data's are generated in the CSV-file. It can be either the data's of one day, one week or one month.

The CSV-file name consists of the FBox trend name and the date:



Example:

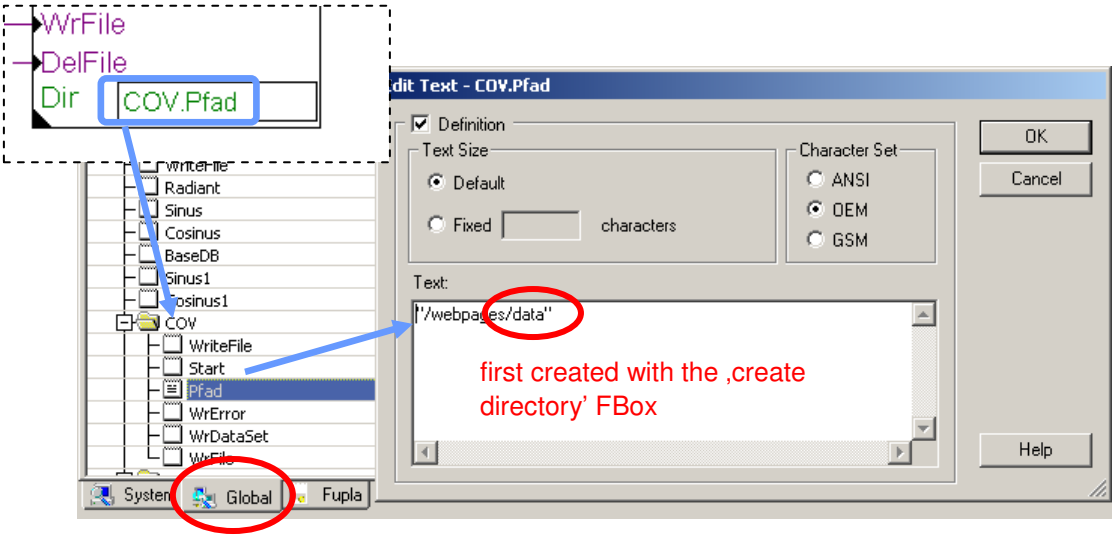
COV_D090330.csv	D=Day	30.03.2009
COV_W0911.csv	W=Week	Calendar Week 14, Year 2009
COV_M0903.csv	M=Month	March 2009

Due to the restrictions of the File System (max. 1000 files) and email (transmission restriction 1MB), an intelligent file format should be chosen.

3.5 File System Structure

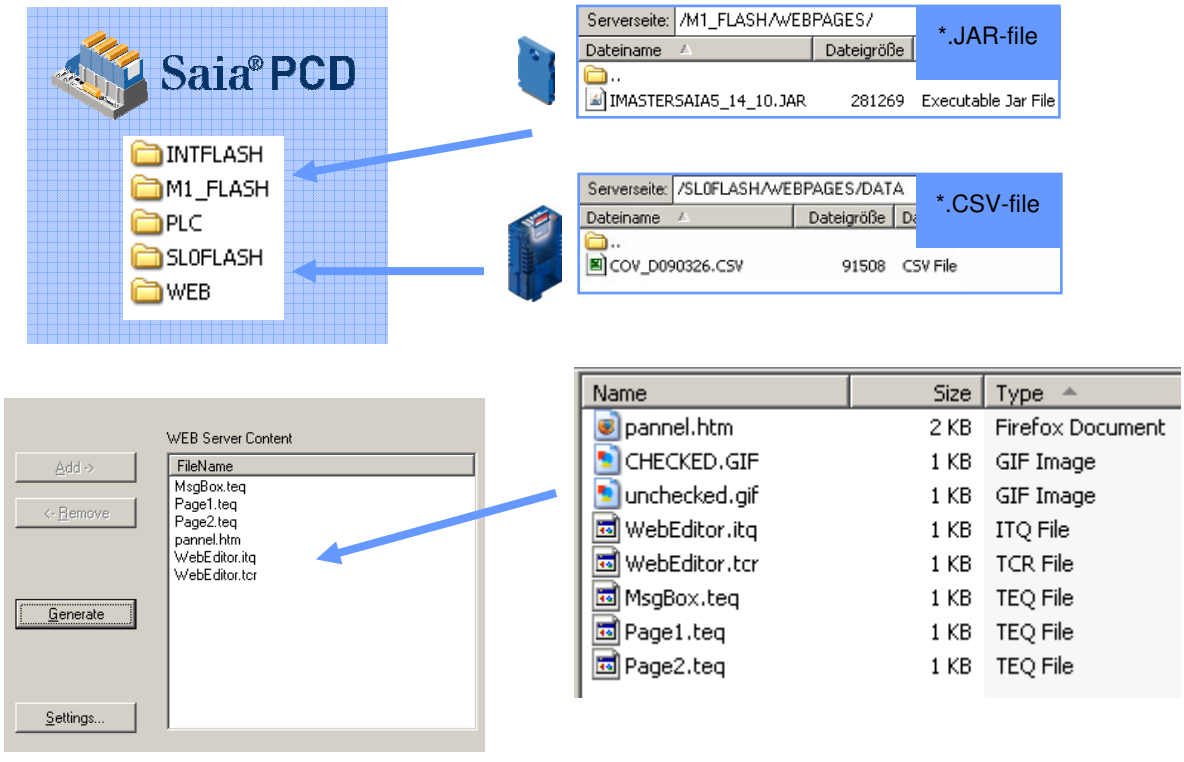
The emerging CSV-files are built in a folder. This folder must be defined with the FBox parameter “Dir”. Therefore you must also respect the following limitations:

- Maximum length of files or directory names (dot and extension included) = 23 characters
- Maximum total length (including 10 char for memory name) = 64 characters
- Memory, directory, and file names are converted in upper case by the PCD



With sub-registers like this example “/webpages/data”, a regulatory structure can be achieved. To be clearified at this point: these structured subdirectories have to be placed mandatory into the directory „Webpages“. The subdirectory “Data”, in the before listed example, has to be created before use with FUPLA FBoxes.

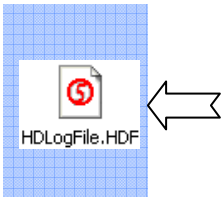
Using HDLog to File System, it is suggested storing the files with FTP connection in following structure:



Via Web it is possible to access the WEBPAGES directory in the Flash Modules M1_Flash and SL0Flash.

3.6 HDF-Files

The HDF (Historic Data Filesystem) file is the HDLog configuration file for the Web Editor. It ensures that the Web project can use the configured variables. It is recommended to store the HDF File in the project folder of the system.



HDLogFile.HDF - Notepad

File Edit Format View Help

```
[HDLogFile]
Version=2
FBoxName=Zyklisch
Memory=SL0FLASH
Folder=Zyklisch.Pfad
FolderContent=Day
Records=10
Mailbox=HDLog.HDLogFile_2.Mailbox

[Record 1]
Name=Sinuskurve
Format=DEC.3
Unit=°C
Colour=255,255,255
Y-Axis min=-20.0
Y-Axis max=50.0

[Record 2]
Name=Sinuskurve1
Format=DEC.3
Unit=°C
Colour=0,0,0
Y-Axis min=-20.0
Y-Axis max=50.0

[Record 3]
Name=Cosinuskurve
Format=DEC.3
Unit=°C
Colour=175,175,175
Y-Axis min=-20.0
Y-Axis max=50.0

[Record 4]
Name=Cosinuskurve1
Format=DEC.2
Unit=%rF
Colour=175,175,175
Y-Axis min=0.0
Y-Axis max=100.0
```

[HDLogFile]	
Version=1	Version HDLog Filesystems
Memory=SL0FLASH	Storage location CSV-files
Folder=COV.Pfad	Path CSV-files = /webpages/HDLog
FolderContent=Day	Defined how often the File is generated
Records=10	Defined how many trend curves are selected
[Record 1]	Definition of each trend curve (1 - 10)
Name=Sinuskurve	Header and trend name
Format=DEC.1	Format of the displayed value
Unit=°C	Additionally unit e.g. °C
Color=255,0,0	Color of the trend curves
Y-Axis min=-20.0	Minimum Scaling
Y-Axis max=50.0	Maximum Scaling

3.7 CSV-Files

The trend files are generated in CSV format; so ASCII with „;“ (Semicolon) as space between data’s. The CSV-files are stored in the SD flash card memory module PCD3.R600. If you followed the instructions in this document you might have now a CSV similar like this:

Recording Item

Recording Date

Recording Time

Trend name Input Value 0…3

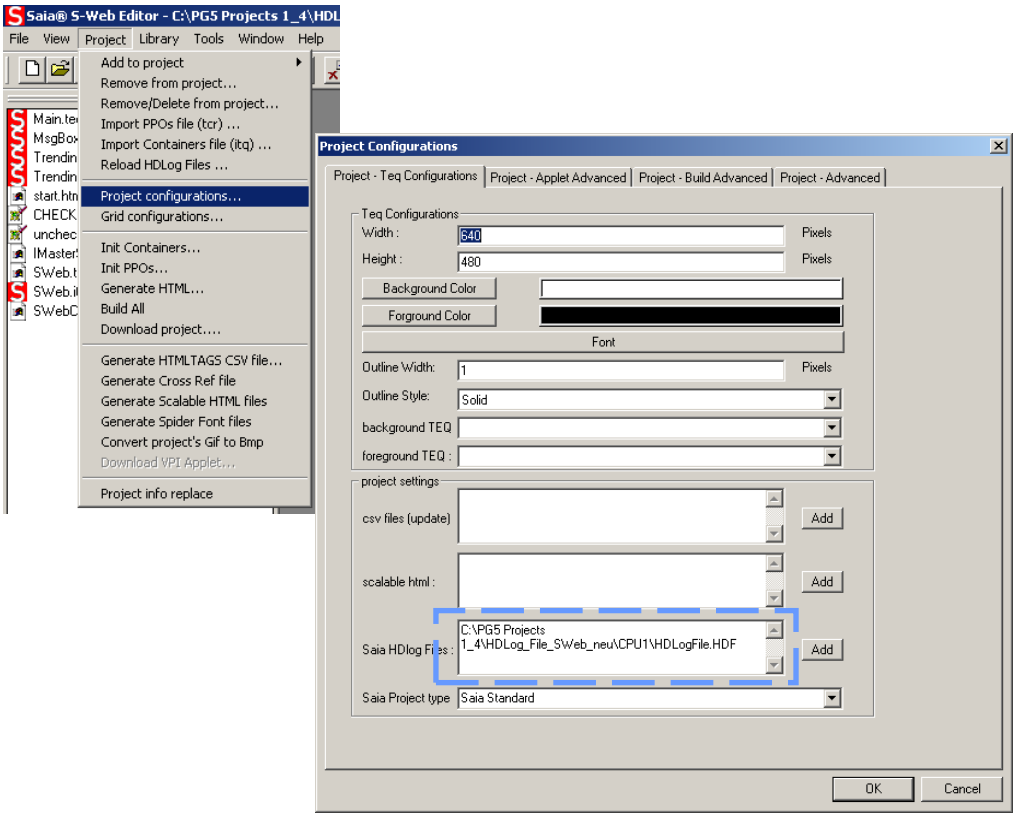
(s)	Date	Time	Sinus	Sinus1	Cosinus	Cosinus1
1238064831	26.03.2009	10:53:51	0	9.9	9.9	999.9
1238064831	26.03.2009	10:53:51	0	9.9	9.9	999.9
1238064861	26.03.2009	10:54:21	5.5	556.3	8.3	830.9
1238064891	26.03.2009	10:54:51	9.2	928.3	3.7	371.6
1238064921	26.03.2009	10:55:21	9.7	976	-2.1	-217.4
1238064951	26.03.2009	10:55:51	6.9	690	-7.2	-723.7
1238064981	26.03.2009	10:56:21	1.6	160.8	-9.8	-986.9
1238065011	26.03.2009	10:56:51	-4.2	-424.4	-9	-905.4
1238064831	26.03.2009	10:53:51	0	9.9	9.9	999.9
1238065041	26.03.2009	10:57:21	-8.6	-861.5	-5	-507.5
1238065071	26.03.2009	10:57:51	-9.9	-997.7	0.6	67.5
1238065101	26.03.2009	10:58:21	-7.8	-785.3	6.1	619.1
1238065131	26.03.2009	10:58:51	-2.9	-298.5	9.5	954.3
1238065161	26.03.2009	10:59:21	2.9	292.4	9.5	956.2
1238065191	26.03.2009	10:59:51	7.8	781.3	6.2	624.1
1238065221	26.03.2009	11:00:21	9.9	997.2	0.7	73.9
1238065251	26.03.2009	11:00:51	8.6	864.8	-5	-502

The CSV-file can be viewed in any spreadsheet program.

4 HDLog with Web Editor

4.1 HDF-File Integration into Web Editor

First of all you have to define the HDLog HDF files in the project's configuration window.
Use the menu 'Project' → 'Project configurations...' and add your HDLog files by clicking 'Add' like shown in the screenshots below.



Please consider:
The Fupla data's are not updated automatically into the macro. To be sure that the current data's are in the macro, follow one of these options:

- Reload the macro (insert the macro again)

- Restart the Web-Editor

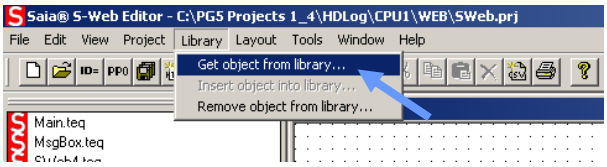
- Add the HDF File again as shown above
  The HDF File can as well be reloaded with the option in the menu „Project" → „Reload HDLog Files"

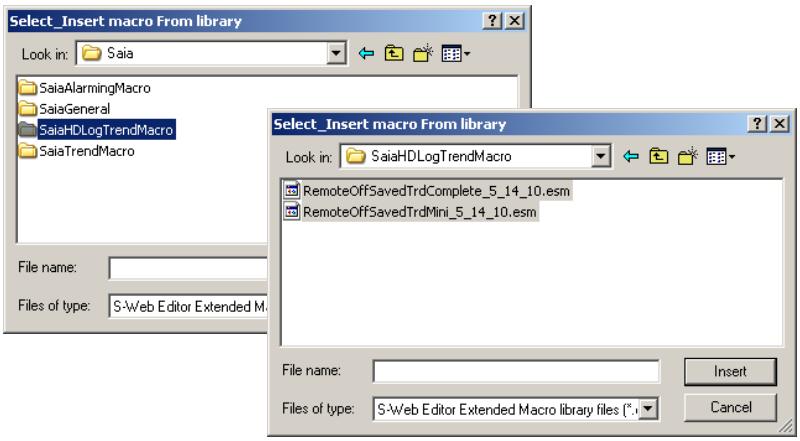
4.2 HDLog Macro Integration into Web Editor

In comparison to Offline Trend macros there is also a difference in how the browser client communicates with the PCD. In case of HDLog Trend macros the trending data is stored and organized in files. This means the browser client will get files with trending data from the PCD.

In past, the macros became more complex, therefore it was necessary to integrate the macros with a **Macro Configurator**. By this configurator the handling of the complex macros become very simple.

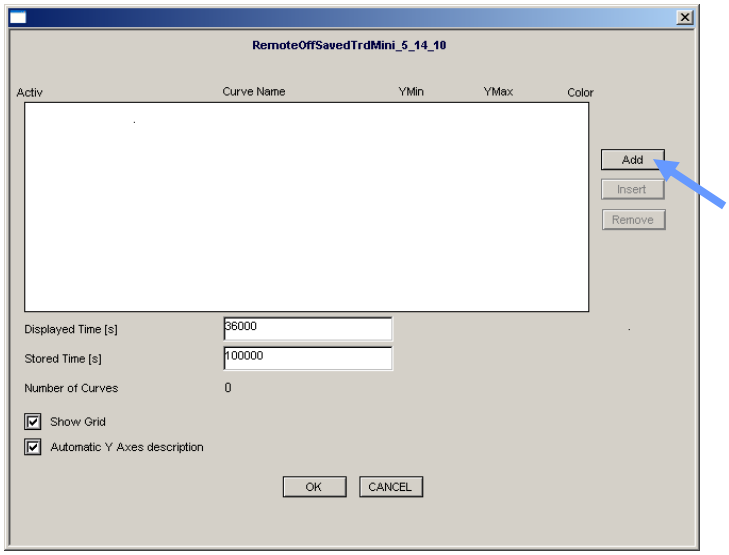
To get macros into a teq file, choose in menu 'Library' the option 'Get object from library…'



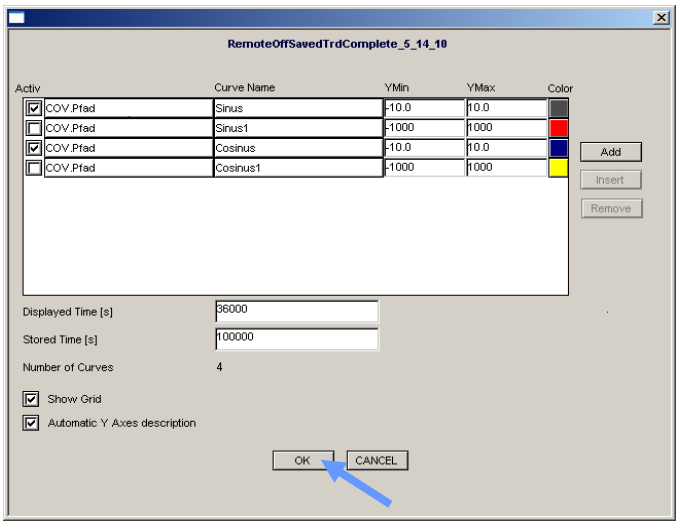


Choose the macro you want to insert.

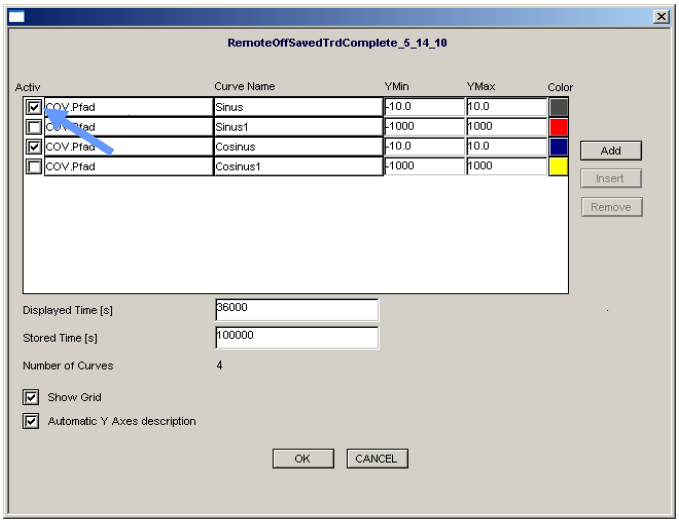
Once a macro is chosen, the **Macro Configurator** opens automatically.



With 'Add' you can insert some trend curves.



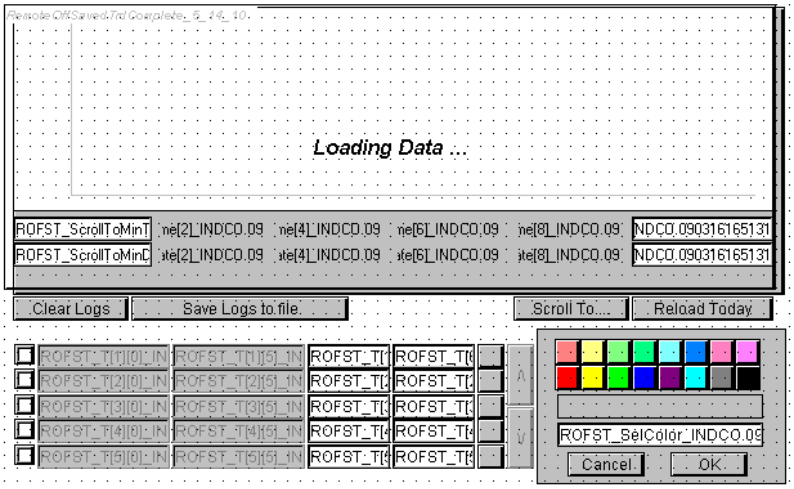
It is possible to insert maximally 10 trend curves.



By select / deselect the check box you can decide which curves will be always indicated.

It is always possible to enable / disable the trend curves during Online Trending.

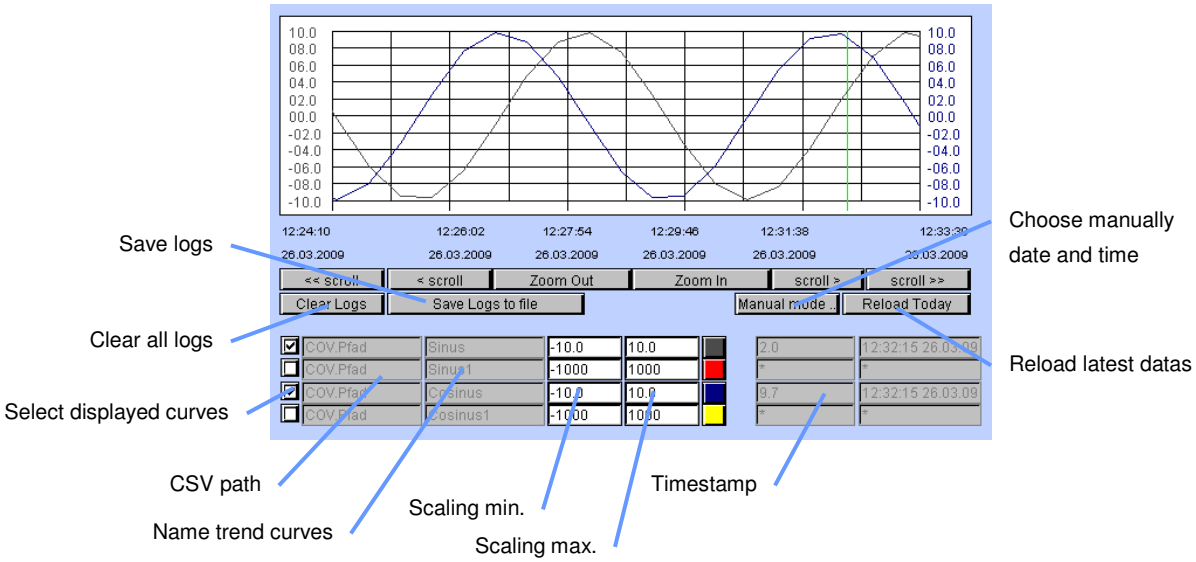
The macro will appear as shown below in the Web Editor:



After configuration you can download the Web Project on the established way into your PCD.

The macro data's are not updated automatically! To be sure that the current data's are in the macro, delete the present macro and insert the macro again.

5 HDLog Macro



The handling of the HDLog trend macros is simple and very similar to other Trend macros:

- You can make use of the **Zoom** and **Scroll** buttons in order to adapt the displayed time range to your own needs. This may cause the client loads new trending files from the PCD.
- **Clear Logs** will erase the trending data, that the clients currently holds in RAM (not on PCD's Flash).
- **Save Logs to file**: Use this button to save the currently loaded trending data into a file on your local harddisk.
- **Stop Load Data**: Abort the loading of new trending files (usually trending data is loaded from more than one file)
- **Reload Today**: Reloads the latest Trend file from the PCD Target
- If you click the colored button a dialogue to change the trend curves **color** will appear

For more detail about HDLog Macros please visit the Online Help in S-Web Editor.

6 Trouble shooting

Symptom	Reason	Solution
If a new HD Log File FBox is placed in a Fupla file and this new curves ar implemented in the Web Macro the following error message or a similare message appears when compiling: Error 2009: WEB_PG.obj: Unresolved external symbol: __stc_id_0000C_var_00___SG_COB_Daten	DLog FBox are generating internal symbols. Theses symbols are only generated if this particular option is activated in PG5. In case this option is not activated it leads to this error message since the internal symbols are missing	Activate this option to generate the internal symbols. In Fupla menu „View“-> „Options“ the options: Use predefined symbols Delete internal symbols when the FBox removed have to be activated to generate the internal symbols. For already placed FBoxes the symbols are not introduced automatically. The FBox has to be deleted and placed again.
A single Fbox with one variable to log was placed as a test. When opening the macro in the Webeditor the table is empty and there is no curve visible. Everything was configured correctly.	The first variable in the FBox has per default the color white. White text on white ground makes it invisible.	Activate the first line and the curve would be visible. Change the color of this curve.