INSEVIS

Software Manual

- S7-Panel-PLC
- S7-Compact-PLC
- S7-Panel-HMI
- Periphery
- Software
- Energy Management

Index of contents

Changes to older versions of the manual

Rev. 02 / 2012:
new: chapter Recipe administration and recipe viewer in VisuStage
chapter Remote acces with software „RemoteStage“
chapter Screens with backlightcontrol, clean screen, etc in VisuStage

Rev. 03 / 2012:
changed: chapters „ConfigStage“, „RemoteStage“ and „VisuStage“ completely rebuilt and referred to demo visu 2012_04

Rev. 04 / 2012:
changed: chapters „VisuStage“ new functionls like color/text switching buttons, limited I/O-fields, etc.,
from VisuStage 2.0.2.4 referred to demo visu 2012_04_1

Rev. 05 / 2012:
changed: ConfigStage:explenation of cycling time added (CPU settings), RemoteStage with „Read-In-by-Ethernet“-functionality, VisuStage: improvements at receipt administration and objects placing
(from VisuStage 2.0.1.5 referred to demo visu 2012_04_2, from PLC-OS 2.0.33)

Rev. 01 / 2013:
new: Assigning an IP-adress with ConfigStage 1.0.14.5 and PLC-firmware (operating system/OS) 2.0.35

Rev. 02 / 2013:
new: ServiceStage added

Rev. 03 / 2013:
new: VisuStage V2.0.2.0 described, buzzer added, chapter VisuStage completely reworked
(now referred to new demo visu 2013_01, from PLC-OS 2.0.37)

Rev. 04 / 2013:
new: VisuStage V2.0.2.2 and RemoteStage 1.0.3.3 new features (with PLC-OS 2.0.38, HMI-OS 1.0.5), text buttons and watchdog added, now referred to new demo visu 2013_02

Rev. 05 / 2013:
new: New description for VisuStage 2.0.2.3 / RemoteStage 1.0.3.4 (PLC-OS 2.0.39, HMI-OS 1.0.7) with colour change at Texts, confirmation messages at receipes, sorting at message archive, adjustable font sizes and scales in progress bars and trend archives, new download mechanism, I/O-fields with integer-input with comma, now referred to new demo visu 2013_04

Rev. 06 / 2013:
new: New description for ConfigStage: PDO-/ SDO-Mapping, address overview list (from ConfigStage 1.0.14.7)
description for VisuStage: Use of SFC201-5 from PLC with seperated Panel-HMI
(with PLS-OS 2.0.40 and HMI-OS 1.0.9)

Rev. 07 / 2013:
new: New remote-functions; recipe records: read out/ store, (DB-) archiving: read out/ store
Read in visualization binary over Ethernet directly from Panel (with RemoteStage V1.0.3.7)
New PLC-function: SFC206: read/ write recipe record into PLC with S7, SFC207: archiving DBs
(with PLC-OS 2.0.41 and HMI-OS 1.0.11)

Rev. 08 / 2013:
new: Service Stage 1.0.1.1: Know-how-protection availabe, ConfigStage 1.14.9 with EDS-Import,
(with PLC-firmware 2.1.0 and S7-Lib 2_1_0 and with HMI-firmware 1.1.0)

Rev. 09 / 2013:
new: VisuStage 2.0.3.1: library management, group/ungroup function, RemoteStage 1.0.4.0: PIN-code request at visualization-binary import valid from PLC-firmware 2.1.1 and HMI-Firmware 1.1.1

Rev. 10 / 2013:
new: VisuStage 2.0.3.4 / RemoteStage 1.0.4.2: Rotation of screens possible, Filtering of variables,
Additional display of trigger-and acknowledgement variables at alarm/event ressorces,
from PLC-firmware 2.1.3 and HMI-firmware 1.1.3

Rev. 11 / 2013:
new: VisuStage 2.0.3.5: „Cross Reference“-function and display of list resources at image/text lists.
ConfigStage 1.0.14.10 „Change device“ function added

Rev. 01 / 2014:
new: VisuStage 2.0.3.6 and RemoteStage 1.0.4.3 : Grid/Snap, Screen template/Master foil, function „Screen change with PIN-input“, I/O-Fields: Input in calculator-style (with „comma“-key) inserted
from PLC-firmware 2.1.4, HMI-firmware 1.1.4

Rev. 02 / 2014:
new: VisuStage 2.0.3.9 and RemoteStage 1.0.4.5 : new: Function graph, added: buttondesign @ virtual keyboards
from PLC-firmware 2.1.5 and HMI-firmware 1.1.5
changed: Structure in chapter VisuStage improved

Changes to older versions of the manual

Rev. 03 / 2014:
changed: VisuStage: new Find-, Overview- and CleanUp functions with version 2.0.4.0

Rev. 04 / 2014:
new: VisuStage 2.0.4.2: new function: User Lever Selection at PIN-Input (with firmware 2.1.9 and Remote Stage 1.0.4.7)
changed: better description of how to assign a connection between Panel-HMI ↔ PLC

Rev. 01 / 2015:
new: VisuStage 2.0.4.4: Lean-Version after 30 days, new function: TSAP-configuration, select color of IP-field by variable, insert hexadecimal values into I/O-field (with firmware 2.2.1)

Rev. 02 / 2015:
new: VisuStage 2.0.4.5: set colors / appearance to message texts / backgrounds of the message viewers (with firmware Panel-PLC 2.2.3, Panel-.HMI 1.1.9) , remote visible by RemoteStage 1.0.4.10

Rev. 03 / 2015:
new: CPU-T-inserted, adaptions (extensions) for CPU-T functionality inserted,
changed: new VisuStage-functionality at images, rectangles, texts, progress bars, new ServiceStage functionality: Firmware update by ETH, description: how to make a WLD (with ConfigStage 1.0.14.21, VisuStage 2.0.4.7, ServiceStage 1.0.1.5, RemoteStage 1.0.4.13)

Rev. 01 / 2016:
new: VisuStage: Import Variables from TIA (V 2.0.5.0) with OS 2.3.5 (CPU-V/-P) 2.3.7 (CPU-T)

Rev. 02 / 2016:
new: new up- and downloads in command line mode of RemoteStage 1.0.4.17, online-backup in Service Stage 1.0.1.7 from PLC firmware 2.3.9 (all CPUs) or HMI firmware 1.2.7 CPU-V/-P and 1.2.6 CPU-T

Rev. 03 / 2016:
new: VNC-Server in CPU-T-Panels (and Panel-PLCs), change language and screen by variable
Time synchronization with partner-device with VisuStage 2.0.5.2 and PLC- firmware 2.4.0 (CPU-T) or HMI- firmware 1.2.9 CPU-T
changed: RemoteStage: Description at download recipes and data archives into remote-device improved
ServiceStage: Description at Online Backup expanded

Rev. 04 / 2016:
new: VNC-Viewer in VisuStage described, from VS 2.0.5.2, firmware 2.4.0 (PLC) and 1.2.9 (HMI) -CPU-T only
changed: ServiceStage: Description at Online Backup expanded once more, new manual design line

Rev. 05 / 2016:
new: Multiplex-variables in VisuStage from VS 2.0.5.3, Firmware 2.4.3 (only SPS-T), 1.3.1 (only HMI-T)
IP-request at download in ServiceStage from V 1.0.2.0, 2.4.3 (only CPU-T) / Firmware 2.4.0 (CPU-V/P), (1.3.1-HMI-all)
changed: Description o I/O-fields and date/time-fields separated and improved

Rev. 01 / 2017:
new: VisuStage 2.1.0.0: Gauges, Sliders, Key functions “Delete Arcives”, 1024 events for CPU-T-devices, vertical alignment for multiline texts, access rights for recipe viewer, inserting objects by short cut and popup windows, firmwares: Compact-/Panel-PLCs with CPU-V/-P 2.4.5, Compact-/Panel-PLCs with CPU-T 2.4.8

Rev. 02 / 2017:
new: VisuStage 2.1.0.4: rotate CPU-T-Panel-HMIs and Panel-PLCs, requires firmware Panel-PLC 2.5.1, Panel-HMI 1.4.1

Rev. 03 / 2017:
new: VisuStage 2.1.0.7: for CPU-T-devices: new trend (archive) functions added and described, PLC-firmware 2.5.4 / HMI-firmware 1.4.4, Remote Stage 1.0.4.30 needed for remote functions

Rev. 01 / 2018:
new: VisuStage 2.1.0.13: to be simulated with S7-PLCSIM, new filter windows for resources, key function alternatively to navigation bars at trend,- recipe, message viewer, Remote Stage 1.0.4.33 needed for remote functions
changed: more samples for batch file applications for RemoteStage, description of resource partner devices improved

Rev. 02 / 2018:
new: VisuStage 2.1.0.16: Assign of compilation-no´s (manual / automatical, Notification when operator changes the I/O-field value
changed: SFC206: new function No. 6 added (management of reciepe records on SD-card)
(only for CPU-T-devices and from firmware PLC-T 2.5.7 : HMI-T 1.0.47, RemoteStage version must be 1.0.4.36)

Rev. 03 / 2018:
new: VisuStage 2.1.0.19: Synchronization of S7-variables with S7-/TIA-projects, find & replace of resources with (partly) the same names, Button-function “variable driven multi menue changing” (for CPU-T-devices only, inactive buttons visible now, when no access right, Firmware Panel.HMI-T: 1.5.0, Firmware (Panel-)PLC-T: 2.5.9, Remote Stage 1.0.4.38 needed

Rev. 01 / 2019:
changed: new screenshots from 2019-Stage software inserted

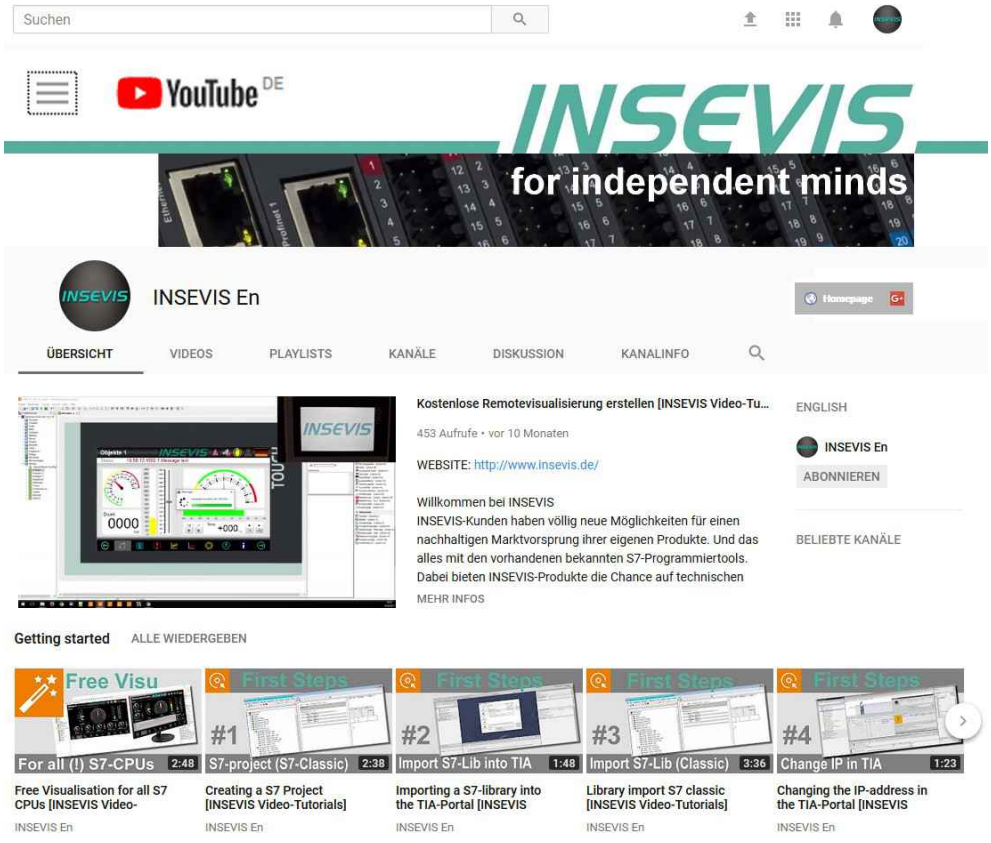
Changes to older versions of the manual

Rev. 02 / 2019:

new: Fixed and variable local port at Ethernet-TCP, ConfigStage from 1.0.14.39,
For T-CPU: indirectly variables for indirectly addressing, 50.000 alarm- and event archives from firmware: CPU-V/P 2.4.9 / CPU-T 2.6.2, VisuStage from 2.1.0.24, RemoteStage from 1.0.4.42

Hint for better understanding by application videos

In the English YouTube-channel INSEV IS En we supply different playlists with handling videos for single details referring to functions, described in this manual. This will help you to get familiar with INSVEIS much faster – PLEASE use it beside this manual!



General instructions

Safety instructions

This manual contains instructions to avoid material damage and must be carefully attended for your own safety. These instructions are identified with a warning triangle with a note of exclamination inside and a signal word *(Signalwort)* below.

Danger	Death, heavy bodily harm or material damage will appear, if appropriated precautions are not taken over.
Warning	Death, heavy bodily harm or material damage will appear, if appropriated precautions are not taken over.
Caution	Bodily harm or material damage will appear, if appropriated precautions are not taken over.
Attention	means, that a unwished results or states can occur, if the appropriated instruction is not noticed.
Important	means the commitment to a special behavior or operation for the safe treatment of the controller / machine.

Qualified personnel

All devices described in this manual may only be used, built up and operated together with this documentation. Installation, initiation and operation of these devices might only be done by instructed personnel with certified skills, who can prove their ability to install and initiate electrical and mechanical devices, systems and current circuits in a generally accepted and admitted standard.

Operation according to regulations

This device might be only used for this operation written in this manual and only in combination with other certified external devices. For a correct operation a proper transportation, storage, initiation and maintenance is necessary.
All valid safety instructions and regulations for the prevent of industrial accidents are to be attended carefully.
The power supply must be connected to a central ground potential in a starlikely wiring.

Maintenance

Modifications / repairs of an INSEVIS device might be done only by special educated and trained personnel of INSEVIS in an ESD-safe area. Every unauthorized opening might cause damages and will terminate all warranty claims.

Data security

Each customer is responsible by himself for protecting his IT-environment against illegal external attacks. INSEVIS shall not be held liable for any direct, indirect or consequential damages respect to any claims arising from the possible illegal external access to their PLCs or HMIs by Ethernet. If you are not sure, how to protect your environment ask for help at professional legal IT-companies.

Copyright

Trade Marks

INSEVIS refers that all trade marks of particular companies used in own documentation as e.g.
- STEP®, SIMATIC® and other as reserved trade mark of Siemens AG.
- CANopen® and other as reserved trade mark of CAN in Automation eG
- WINDOWS® and other as reserved trade mark of MICROSOFT AG

and more reserved trade marks are property of the particular owners and are subjected to common protection of trade marks.

Disclaimer

All technical details in this documentation were created by INSEVIS with highest diligence. Anyhow mistakes could not be excluded, so no responsibility is taken by INSEVIS for the complete correctness of this information. This documentation will reviewed regulary and necessary corrections will be done in next version.

With publication of this manual all other versions are no longer valid.

Essential knowledge and experiences

To understand this documentation basic knowledge and experiences of the automation technology in general and the programming with STEP®7 are essential.

About INSEVIS

S7-system components for industrial automation technology

The range of INSEVIS- product families enables an integrated solution and easy to handle for small and medium automation application with latest technology, very high quality level and with additional interfaces like CANopen® and Modbus, to be configured easily.

The easy integration of INSEVIS-products into the S7-world meanwhile is famous and exemplary. Complex communication settings will be assigned easily and intuitively, so that these properties expand the common S7-world by far. A large and multilingual visualization in a modern design is done by a few clicks and the work flow is known by every WinCCflex user. It can be simulated on the visualization PC and is accessible remote.

The S7-CPUs -V and -P are the base of the successfully INSEVIS product families with Profibus DP Master/Slave.
With the new S7-CPU-T Panel-PLCs and Compact-PLCs are available with Profinet IO Controller.

Step®7-Programability

INSEVIS-S7-CPUs are programmable by STEP 7® - AWL, KOP, FUP, S7-SCL, S7-Graph from Siemens and in general command-compatible to Siemens-CPU S7-315-2PNDP. Some special INSEVIS-blocks expand the functionality and allow outstanding solutions. The S7-programming will be done by good known tools SIMATIC®-Manager or by TIA-Portal® from Siemens always.

Independence

INSEVIS-products does not base on Windows or Linux, they have an own firmware. Thereby the hard- and software can be exactly designed for a perfect co-ordination with this firmware and a low power consumption. Booting times of less than 4 seconds and completely no software licenses and a current drain of <100mA @ 24V are the result of these facts.

Get your software rid of licenses

INSEVIS stands for a clear and honest license policy, what gives the customer sustainable cost benefits. Because of the ownership of BIOS, firmware and PC-software for visualization, configuration and remote access INSEVIS can offer its products completely without licenses.

Made in Germany

Development, PCB-design and -production, test and mounting of all INSEVIS-products - all this is made in Germany. So every product is a proof for the combination of German engineering and economy and is available with a certification of German origin.


Certificato Certyfikat Certificate Certificado Certificat

Zertifikat

TAW Cert

Die Zertifizierungsstelle TAW Cert
Zertifizierungsgesellschaft mbH für QM-Systeme und Personal

bescheinigt hiermit, dass das Unternehmen

INSEVIS
Gesellschaft für industrielle Systemelektronik und Visualisierung mbH
Am Weichselgarten 7
91058 Erlangen

für den Geltungsbereich
Entwicklung, Service und Vertrieb von Systemelektronik und Software für industrielle Automatisierungslösungen

ein Qualitätsmanagementsystem eingeführt hat und anwendet.

Durch ein Audit am 31.07.2014 wurde der Nachweis erbracht, dass die Anforderungen der
DIN EN ISO 9001
(Ausgabe 2008)
erfüllt sind.

Erstzertifizierung: 14.09.2011

Dieses Zertifikat ist gültig bis 13.09.2017

Zertifikat-Registrier-Nr.: 19010511

TAW Cert

DAkkS

Altdorf, den 14.09.2014

Dr.-Ing. Dietmar Winner, Geschäftsführer TAW Cert GmbH

TAW Cert GmbH • Fritz-Bauer-Str. 13 • 90518 Altdorf

Dieses Zertifikat ist Eigentum der TAW Cert GmbH

INSEVIS operates a yearly certified quality management system ref. to DIN EN ISO 9001.

All suppliers of INSEVIS obligate to this quality management and contribute to the high quality level of INSEVIS-products.

Already during planning these families one goal was indicated as most important: to design highest quality and ergonomics into all products.

These products were put into comprehensive validation tests before they were produced in selected and certified production lines.

INSEVIS - Made in Germany

Product family Software

Communication tp PLC / HMI

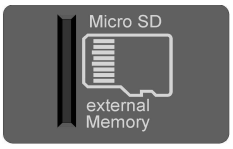
INSEVIS-software communicates to the INSEVIS PLC and Panel-HMI by TCP/IP. The software finds network partner automaticelly and can indicate it by a blink test.

Ethernet
- TCP/IP

TCP / IP
(Remote-) access INSEVIS-CPUs,
Download from VisuStage / ConfigStage,
Service access by ServiceStage

External memory card

If new functions in the S7-program or visualization need an firmware update of PLC/HMI, this can be done by an Micro-SD-card in the standard FAT32-format. Also this card is needed for archiving or updating only, not to run the S7-program. Use this card only for archiving of message data, of data from DBs, of trend data as well as of data of the recipe management and for backup/restore. While updating the PLC-firmware by this card, the S7-data will kept untouched - as they were before.



Most important properties at a glance

Data archiving

Save and archive process data to the Micro-SD-card
and read it back to the PLC after updating S7-program.
Completely without programming device - by using INSEVIS-SFCs
and SFBs. To satisfy the customers for lots of years.

Backup & Restore

Save all data easily; user program, process data,
visualization and archives - protected by password
as a binary file for using in an equal equipped device,
what will proceed with all data from the old PLC

Unlimited languages

INSEVIS supports all languages, what are installed on the PC,
where the visualization is designed. No limitation of the number
of used languages in the visualization-run-time. Always Unicode16-
able. Always be at home in every language of the world.

Free remote account

Use your PC-screen as 2nd panel to display and control your
application remote. Import and save archive and recipe data as txt-
or csv- files. Do it in a multi-instanceable way in your PC, like in a
master display of a control room.

Trend management

4 time based trends with 16 channels each can be started,
stopped and continued manually or by variables.
Display and archive it as you want it to do.
Or display x;y-value couples from DBs in function graphs

Multistructured recipes

Create up to 64 recipes with up to 256 different variables
(elements), what result up to 256 data records per recipe.
Export and import recipes, records and elements
via the Micro-SD-card.

Fault indicating system

Display, indicate and archive up to 1024 alarms and 128 events
in all your project languages, as blinking text line or symbol,
as single- or multi-line message viewer and -archive.
Export this data automatically as csv-file to any network drive.

User management

Manage up to 9 user levers by run-time editable PINs.
Define user based target screens and
change screens depending on user level.
Allow or deny access to „hot keys“ as you want to.

Integrated simulation

Compile your new visualization, get the detailed, linked failure report
to debug it fast. Simulate your visualization immediately
and stimulate variables, alarms and events.
Make your screen shots in jpg-format for your documentation.

Import & export functionality

Import S7-variables including symbols from your
SIMATIC®-Manager.
Export your texts for an external translation as csv-file and read it
back into the project.

Product family Software

Configuration

With the free configuration tool „ConfigStage“ you can config the **additional functions** of the INSEVIS-CPUs and download it into the PLC. The onboard- or decentral INSEVIS-periphery will be added easily by drag´n drop to the periphery slots. Parameters and address areas will be assigned in a box right below.
Also you may assign **S7-CPU-parameters** like in your programming tools from Siemens (like startup, diagnostic, cycle and clock, retententive memory, etc.). A webserver can be configured at CPU-T-PLCs.
With the „ConfigStage“-software can be assigned these interfaces :

- RS232 with free ASCII,
- RS485 with free ASCII and Modbus RTU,
- Ethernet-connections (active S7-connection-RFC1006, TCP, UDP, Modbus-TCP, INSEVIS-Panel-HMI),
- CAN (CANopen® by pre-defined parameters or by imported and mapped EDS-files),

Visualization

Creating modern visualizations by the ergonomic software tool „VisuStage“ is a child´s play now. It imports symbolic variables from SimaticManager or TIA-projects, it exports texts to be translated easily. Exacts error messages help you to debug your project until it can be simulated and downloaded. IN the simulation variables values and messages can be stimulated and simulated visu-images can be copied for documentation. Like a “master foil” there can be created drafts for each application and kept as library items for other projects.

- Program language German or English as well,
- Unlimited number of project languages available in full version,
  (in free lean version only 1 language)
- Alarm- and event messaging system and -archive up to 1024 alarms,
- Trend data sampling, displaying and archiving for 4 trends with 16 channels each,
- Recipe management system with up to 64 recipes with 256 elements in 256 records,
- User management system with 9 layers and password protection,
- Screen saver, backlight switch-off function, clean screen and buzzer,
- Library with 2D- and 3D-symbols, integrated simulation.
- VNC-server for CPU-T-Panel-PLCs

Remote access

With the free-of-charge software „RemoteStage“ there can be made a remote visualization from the binary of a VisuStage-visualization created before. This program is a portable solution but with lots of functions. It communicates via TCP/IP with the Panel-PLC or Panel-HMI and can import the necessary binary from there as well. By using this binary format no one can read back the source code of your visualization.
These archive data can be read in from the Micro-SD-card via Ethernet into the PC and stored there.

- 1024 alarm archives and 128 Eventchives (Panel-PLC and Panel-HMI),
- 4 trends with up to 16 channels (Panel-PLC and Panel-HMI),
- 256 recipe records with up to 256 elements (Panel-PLC and Panel-HMI),
- Data (DB) -archives (Panel-PLC and Compact-PLC)

This procedure is also possible as command line in any batch process. Multiple RemoteStages can be operated in one PC to get a kind of master display with multiple remote screens.

Service tool

The „ServiceStage“ is made to have easy service access to the PLCs. It allows to identify a S7-CPU by its IP-address and to analyze it by diagnostic buffer, to update the user-programs and to set the protection levels. This software is free of licenses, offers lots of service functions easily to be found even if you are not working every day with this software tool. Installed in a minute, useful service functions, absolutely easy to understand and to use. These functions can be solved with the „ServiceStage“

- Device specific data like (ser.-no., firmware version, IP-address (editable), MAC-address, etc.),
- Update firmware (CPU-T only),
- Changing of the operation mode RUN ↔ STOP,
- Set and synchronize date and time,
- Memory diagnostic and comprimation,
- Read out, show and store CPU-diagnostic buffer,
- Download of S7-program, visualization- and configurations binary,
- create backups of visualization and S7-program
- Assign the know-how-protection levels

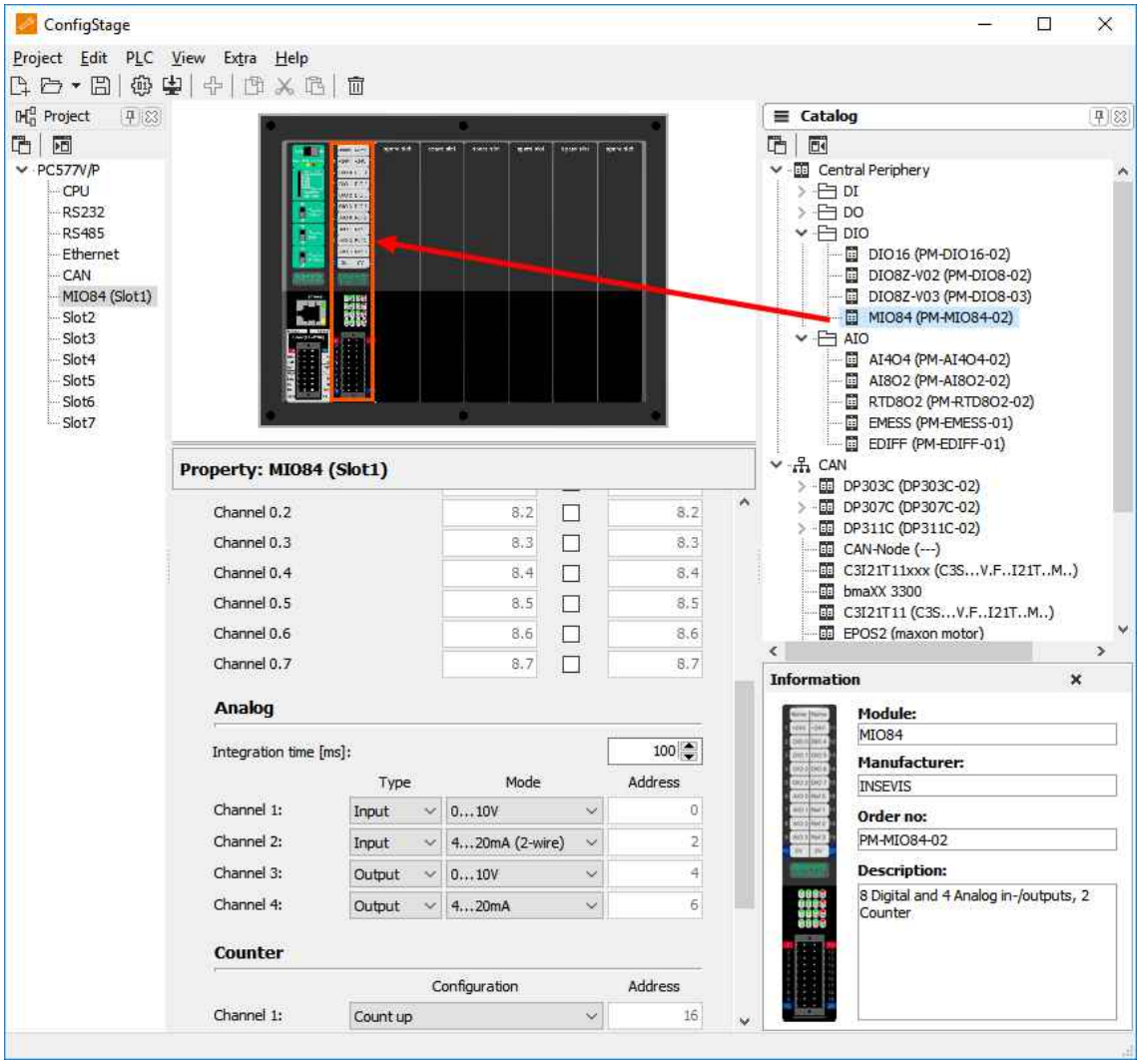
Configuration with the Software „ConfigStage“

It is very easy to configure and parametrize all INSEVIS- PLCs and internal or external CAN-Periphery with the free software tool „ConfigStage“. First you select your device from the list of offered devices. After having selected your device there opens up a window with some areas.

VIDEO-tutorials available
There are available different video tutorial in the ConfigStage play list at INSEVIS Simatic®-®-channel INSEVIS EN. Sample programs are ready to download from INSEVIS web site.

Basic settings

Middle	PLC you selected (from rear side) without any periphery
Left	self constructing project tree with the configurable functions of the CPU, free slots and the periphery already configured
Right	catalog area with all periphery modules and decentral CAN-peripheries available - periphery modules will be moved by drag`n drop to the preferred slot - CAN-head stations will be also moved by drag´n drop to the green area in the CPUs image or to the CAN-pins in the connectors image
Bottom	Configuration area, where the properties wil be configured
Bottom right	Information area of the selected module



Attention

Hint: The Profibus- and CPU-configuration (without INSEVIS-specific settings for Ethernet, serial and CAN) can be made in the Simatic® Manager. The download of the Simatic® Manager overwrites all SDBs completely.
Please do config Profibus and CPU **FIRST** and download it into the PLC. Than configure all the other configurations (CPU with Ethernet, RS232/485, Modbus, CAN and (de-)central periphery and) with the ConfigStage and download it **LATER**. This download does overwrite only the configured SDBs and keeps the Profibus- and CPU-settings oft the Simatic®- Manager.

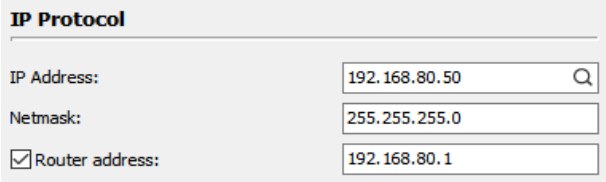
Configuration with the Software „ConfigStage“

Assign the IP-address

ConfigStage can change the IP-address of the target device.

Either

- Click on „Ethernet“ in the project tree
- Enter the IP-address, netmask and router-address (if checked)



or:

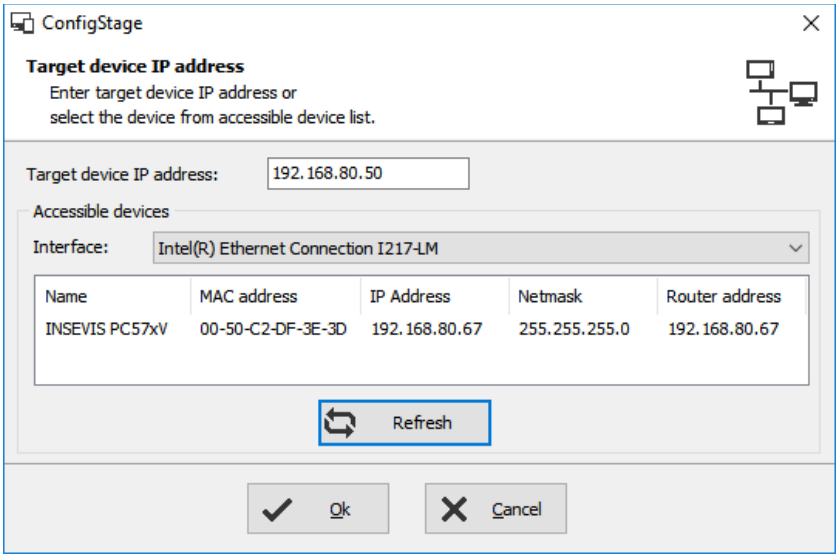
- enter the download-dialog box (F12). (There will be used the service “Accessible devices” like in other INSEVIS-Stages)

In this sample a IP-address 192.168.80.50 was assigned in the configuration, see below.

This new configuration must be downloaded to the old IP-adress 192.168.80.67 once before it is active. This target-IP-address is to be

- entered manually
  or
- selected from a list of accessible devices (press „Refresh“)

For the download the PLC will be switched to STOP mode and restarts later.



Change target device

If an existing configuration should be transferred to another INSEVIS-S7-PLC, it can be done at the „Project“-menu. It helps saving time and prevents errors.

Addressing of the onboard periphery

Standard addressing ind the INSEVIS- PLCs

Without using software tool „ConfigStage“ the following address area will be set up in a standard way:

digital module: 4 byte inputs, 4 byte outputs
analog module: 16 byte inputs, 16 byte outputs

start address \ slot	slot 1	slot 2	slot 3	slot n
digital inputs	byte 0	byte 4	byte 8	byte (n-1)x4
digitale outputs	byte 0	byte 4	byte 8	byte (n-1)x4
analog inputs	byte 128	byte 144	byte 160	byte (n-1)x16 +128
analog outputs	byte 128	byte 144	byte 160	byte (n-1)x16 +128

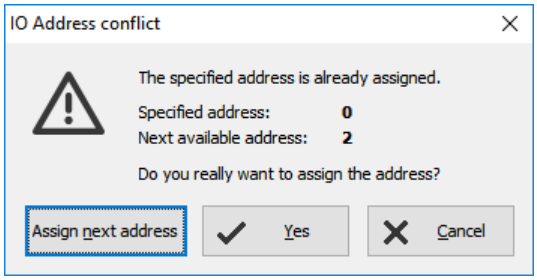
If a functional module FM DIO8-Z is placed, all following digital address areas will be moved for 8 byte more.

Configuration with the Software „ConfigStage“

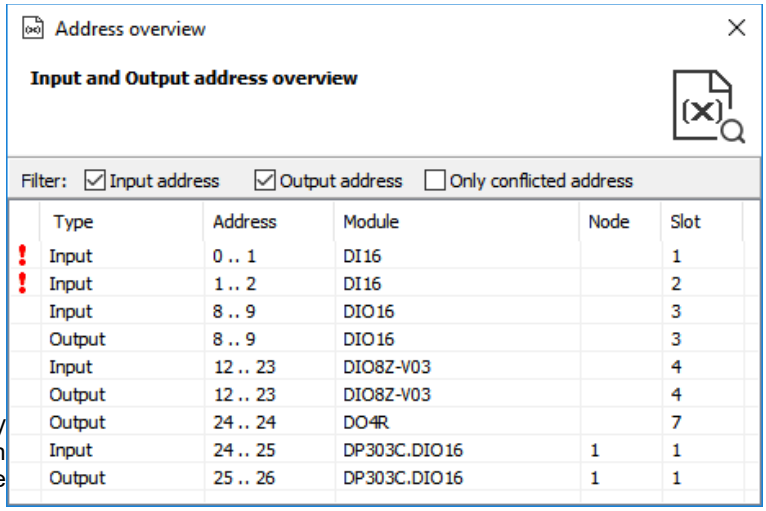
Different addressing in PLCs and addressing of decentral periphery

If decentral periphery is used and/or other should be used other address areas in the PLCs, it will be configured with the software tool „ConfigStage“ and the set up date will be stored in the system data blocks (SDBs).

The used periphery address area can be displayed in an own window.
The pull down menue „View“ → „Address overview“ creates this window with all periphery addresses used.



When addresses will be assigned there is an plausibility check already and only if you skip the warning an address conflict is possible. This conflict is shown in the address overview in red.



CPU settings

The CPU settings are compatible to the Siemens-CPU S7-315-2PNDP in the Simatic®-Manager. Either via project tree or by clicking directly on the image all different CPU properties can be set up easily in the ConfigStage.

General
Insert plant- and location designation

Startup
Box checked: CPU shall start, if the present configuration mismatches to actual configuration
Timeout: multiply this value with 100 milliseconds, the maximal value is limited to 1000 seconds

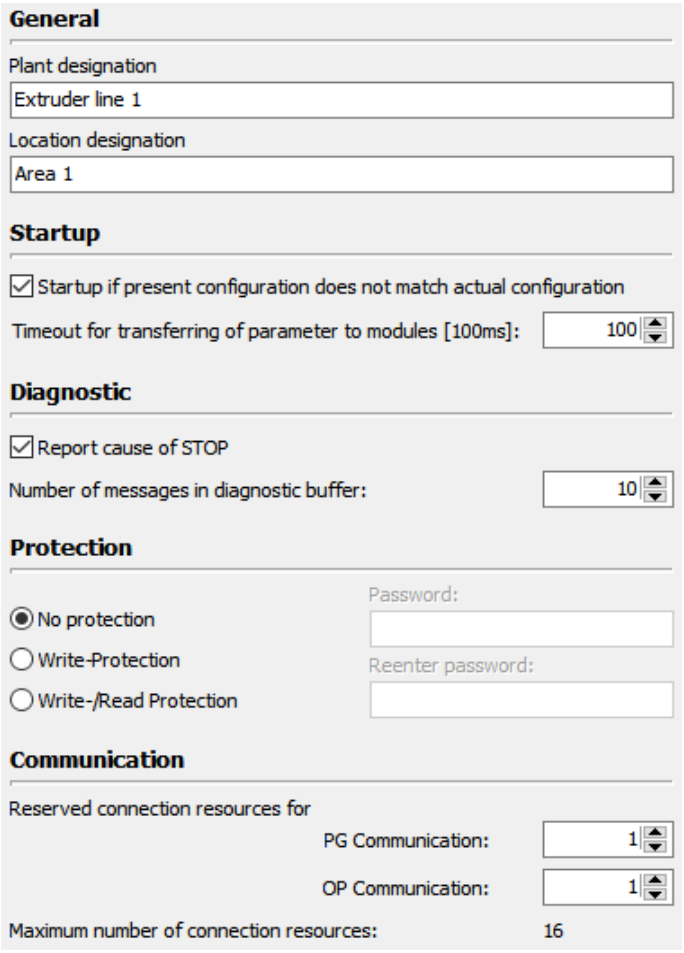
Diagnostic
Box checked: Reports the cause for STOP-condition to the connected devices (PG, host system,...) to be entered in diagnostic buffer too.

Know-how protection
The write or read/write protection.
Password protection from Simatic®- Manager is not affected of it and to activate there.

Communication
INSEVIS-CPUs contain as well as the Siemens CPU 315-2PN/DP system internal **16 passive S7-connections.** 1

Additionally there can be parameterized **up to 16 active S7-connections** by the ConfigStage and numbered by an own ID-number.

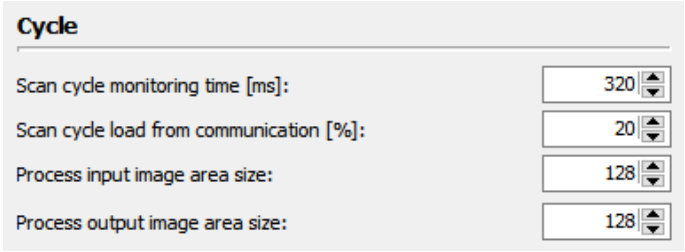
More at **Information about TSAPs**



Configuration with the Software „ConfigStage“

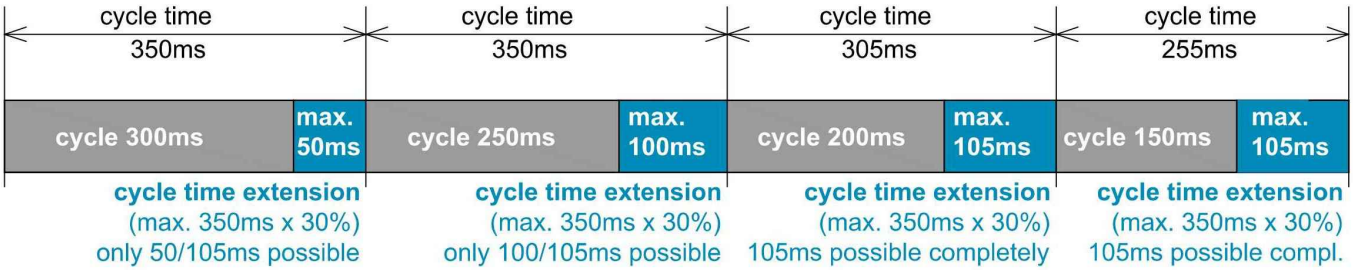
Cycle
Cycle monitoring time:
(Insert it in ms, max. 6000ms = 6 seconds):

Cycle load from communication
(cycle time extension, min. 10% , max. 50%)
for communication (Ethernet, field bus, PG), visualization, file system of Micro-SD®-card)



The declaration of the cycle time in the PG is carried out from control point to control point. This contains communication and visualization. Independent from the S7-program an unsteady cycle time can occur.

For that case it is possible to declare a limit value in relation to the cycle monitoring time, what is used for filling out the „free time“ with time for communication (or visualization, etc).

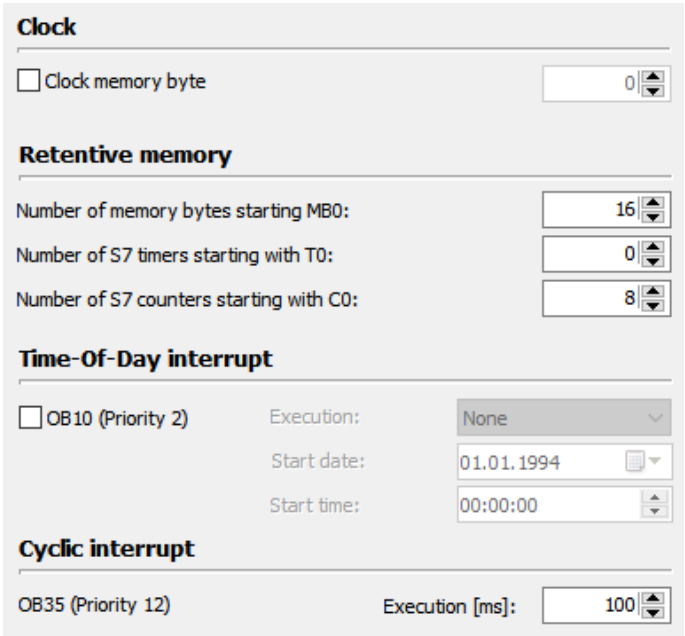


In this sample the cycle time can be extended max. by 30% of 350ms (= 105ms). If this time is not needed for communication (visualization, etc), it is available for other tasks.

Clock
check memory byte and insert its number from value 0

Retentive memory
Merkerbytes:
total 2.048 (thereof 0..15 preset)
Timer and counter:
total 256 (no preset)

Time-Of-Day interrupt
Box checked: Time-Of-Day interrupt activated
Insert interval areas, starting date and starting time



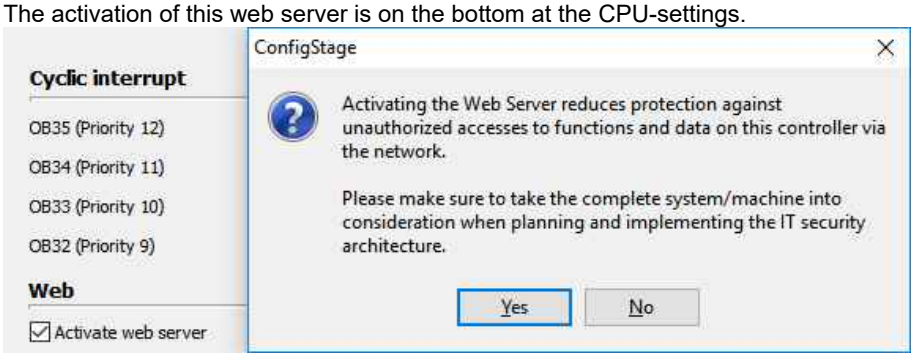
Cyclic interrupt
CPUs -V/P support the OB35 only Value in milliseconds (ms), maximal value is 1 minute (60,000 ms)
CPU -T supports the OB32...OB34 too Value in milliseconds (ms), maximal value is 1 minute (60,000 ms)

WebServer

The PLCs with CPU-T inside contain a static web server, what provides

- general data (serial no., etc.),
- actual entries of diagnostic buffer,
- addresses of I/Os and,
- an fiel to require the actual value of a variable.

The activation of this web server is on the bottom at the CPU-settings.



. 	By connecting to the internet it is possible that unauthorized get access to the PLC and they could manipulate it and cause harms. The programmer and final user are responsible for installung and running suitable security actions to provide this unauthorized access. INSEVIS is not responsible and does not take over responsibility for damages caused by unauthorized access.

Communication settings

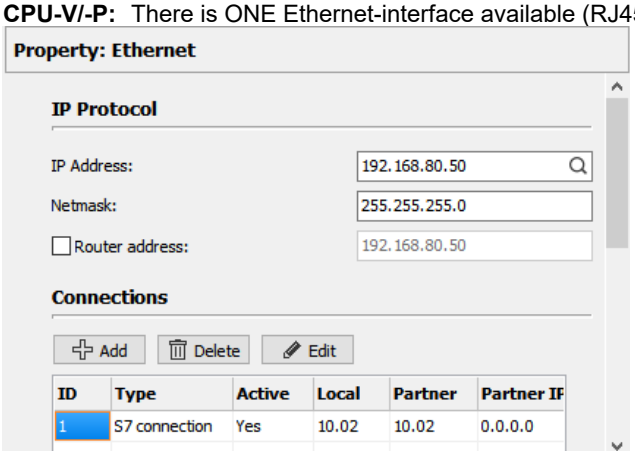
RS232 and RS485

The assign of RS232 and RS485 is self-explanatory. If you select at the RS485 the protocol „Modbus-RTU“, you will be asked to assign the node-ID as well as to map your S7-operands to input-bits and -words and to output-bits and -words.
If „Modbus Server is deactivated, Modbus RTU-telegrams will be received and sended by SFB60/61

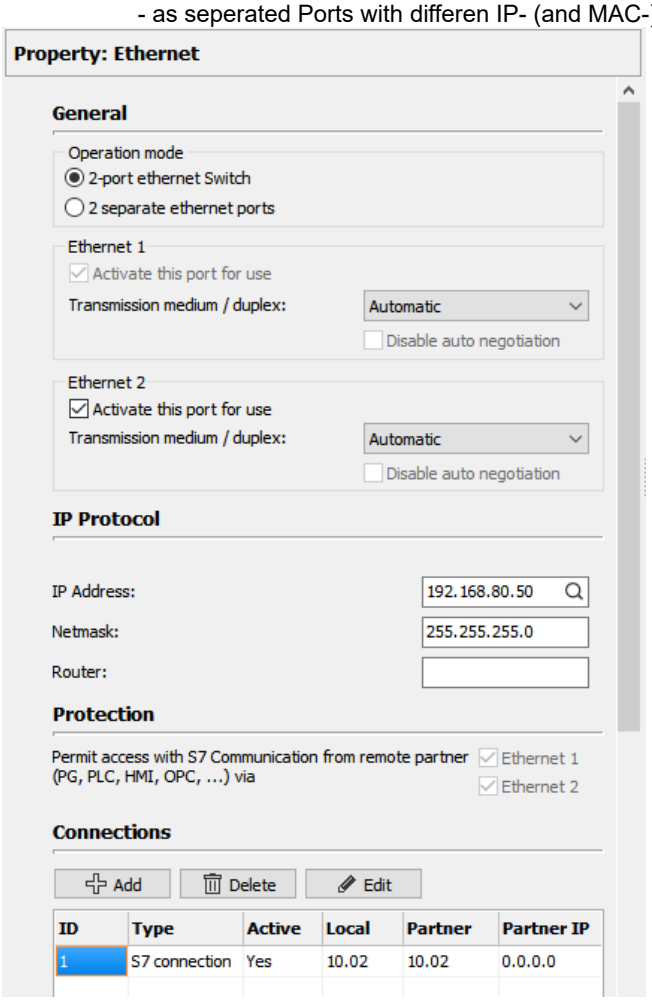
Ethernet

If you want to use the Ethernet-interface, there are to assign up to 16 connections, to select the communicaton protocol and to parameterize it. Each Ethernet-connection gets a connection-ID to be assigned in the S7-program

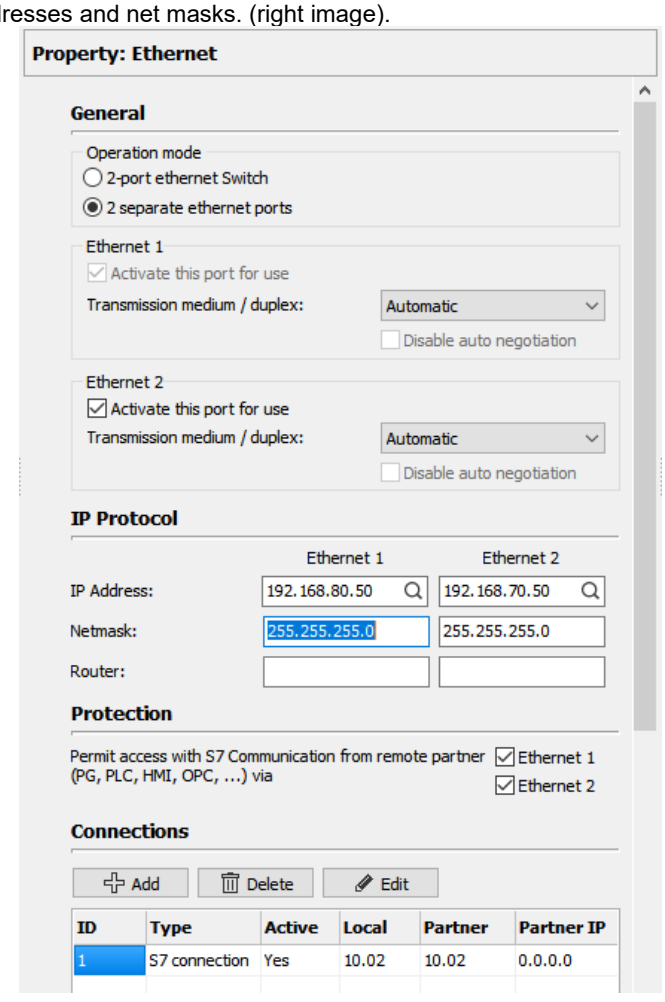
CPU-V/-P: There is ONE Ethernet-interface available (RJ45)



CPU-T: There are TWO Ethernet-interfaces available (RJ45), what can be used either
- as switch with common IP-address (left image) or
- as seperated Ports with differen IP- (and MAC-) addresses and net masks. (right image).



Both ports can be used



Port 2 can not more communicate by S7 (protection)

Configuration with the Software „ConfigStage“

Hint:

To prevent unauthorized access by the „classic“ S7-communication, the ConfigStage allows to switch off this communication at one port. This prevents an unauthorized manipulation of PLC-data.

Every connection gets a connection-ID to assign it to the S7-program. Referring to the connection type the selected connection will be parameterized in separate boxes with these parameters:

parameters at S7-connection (Active)
- Local TSAP,
- Partner-TSAP,
- Partner-IP-address

parameters at INSEVIS-Panel-HMI
- Local TSAP
  (only necessary, if PLC shall change language/pages in HMI)

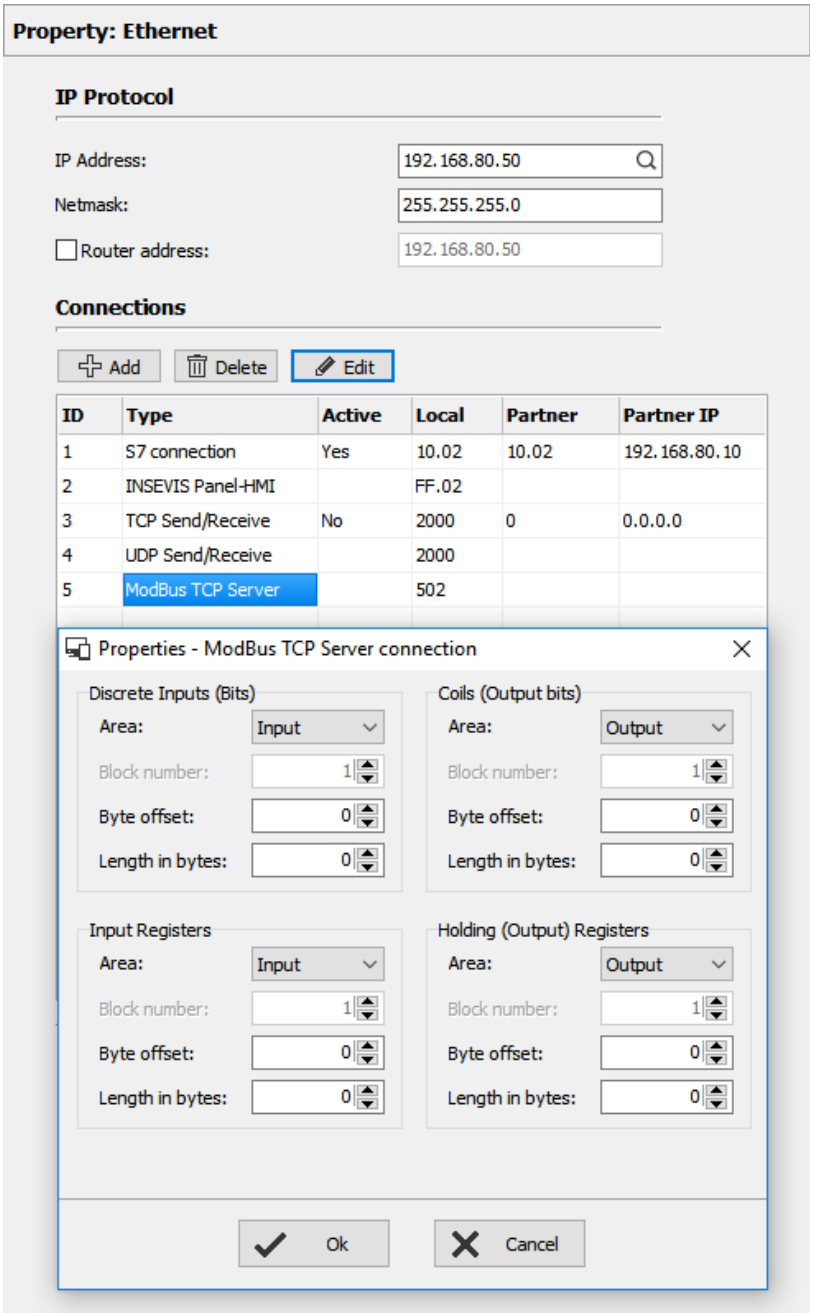
parameters at TCP Send/Receive
- Local port (fix or variable),
- Partner-port,
- Partner-IP-address

parameters at UDP Send/Receive
- Local port

parameters at Modbus-TCP (Server)
Assign of S7-operand areas for Modbus-
- Input bits
- Input words
- Output bits
- Output words

(As sample the „mapping“ at Modbus-TCP-Server)

Modbus-TCP-Client will be programmed by S7, a sample is available at the INSEVIS web sites)

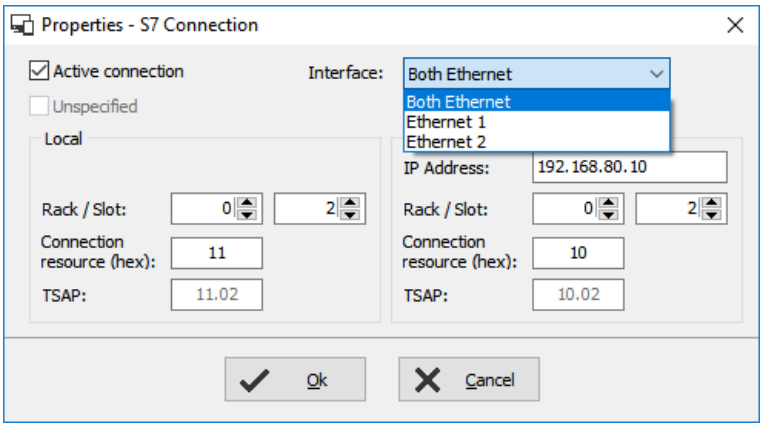


Communication / Information about TSAPs

INSEVIS-CPUs contain as well as the Siemens CPU 315-2PN/DP system internal **16 passive S7-connections.** Their local TSAPs are defined by Siemens-definition xx.yy as follows:

- for PG= 01.02,
- for OP= 02.02,
- for WinCC etc.= 03.01
- xx=01 (for PG),
- xx=02 (for OP) and
- xx=03 (for WINCC etc.)
- yy for all 02 (= Slot2 for CPU)

CPU-T: Assigning properties to one or both of the single Ethernet interfaces (see image right)



Additionally there can be parameterized **up to 16 active or passive S7-connections** by the ConfigStage and numbered by an own ID-number. Here the Siemens-definition is not valid but it is **necessary**

1. to keep the TSAPs unique and
2. to not even use the TSAPs from the system internal passive connections.

Profinet

Profinet settings will be assigned by Simatic®-Manager or TIA®-Portal (like as Profibus settings)

CAN configuration

Decentral INSEVIS periphery

There is **no need to have CAN-knowledge** to include decentral INSEVIS- periphery to the INSEVIS-S7-CPUs.

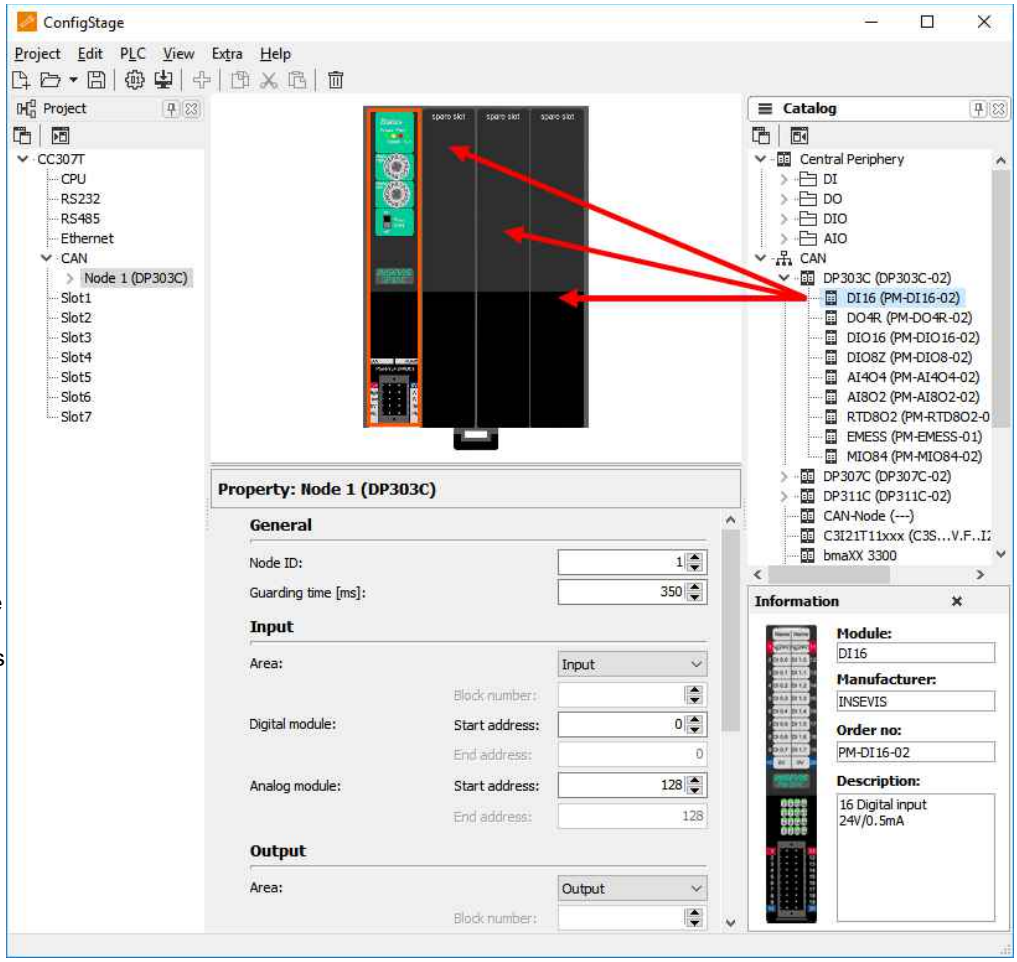
After having placed your INSEVIS head station on the CPU, this module appears in the project tree and in the display.

Now you can insert general start addresses for the head station for in-/outputs (no more possible at the single modules).

The periphery modules will be added per drag´n drop from a special sub area of the catalog tree below the CAN-title.

You type in the node-ID-number you have set up before at the INSEVIS- head stations hardware with the hexadecimal turn-switches.

Also you insert the guarding time you want. Than all i/os will be used in Step®7 like onboard I/Os of an INSEVIS-PLC.



Configuration with the Software „ConfigStage“

Configure decentral external periphery manually

Instead of an INSEVIS- head station you drag´n drop a neutral CAN-node onto your CPU. Then all common settings of for the **node-ID** and the **guarding parameters** will be done.

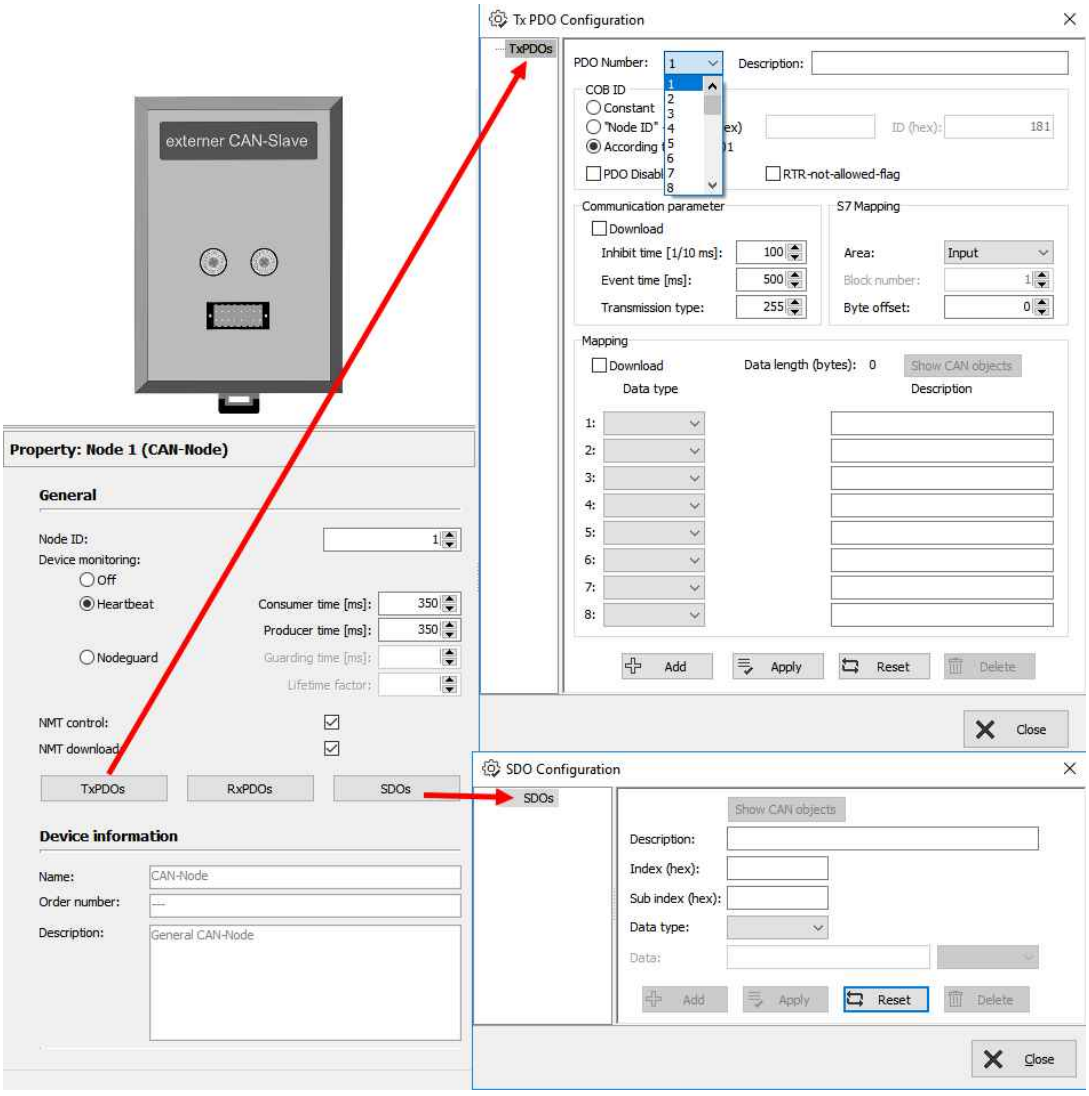
If the field "**NMT Control**" is activated, the node will be started and stopped together with the PLC. Therefore the NMT-messages "goto OPERATIONAL" with change to RUN (after OB100, before first OB1) and "goto PREOPERATIONAL" with change to STOP will be sent to the node.

Is the node not ready while PLC starts, the "goto OPERATIONAL"-message will be ignored. The must be considered in the user program with a state request. Eventually the NMT-commands need to be programmed in the S7-program.

With the check box „**NMT-Download**“ will be assigned, if the communication parameters „Guarding-Time“ / „Lifetime“ / Heartbeat-Time“ should be downloaded to the node during the start up or not. This is useful only, if these parameters are not implemented in the node itself or assigned by other tools

For the process data are available each **32 Tx- and Rx-PDOs**. If more as **4 PDOs** of it will be used, PDO-identifiers of other node-IDs will be used for it. These node-IDs should not be assigned again. (Only CiA-conform TxPDO-identifier are valid.)
Received Tx-PDOs will be buffered and transferred synchronous to the control point to the process image, RxPDOs will be send event- and time-controlled in the control point always.
An 8-byte-data field on a selectable S7-operand is to assign to every PDO.

The Tx-PDO communication parameters define the sending behavior of the node, the Rx-PDO define the sending behavior of the master.



The inhibit-time prevents a to excessive sending, when data are changing permanently; the event-time forces the sending, even if there is no data change.

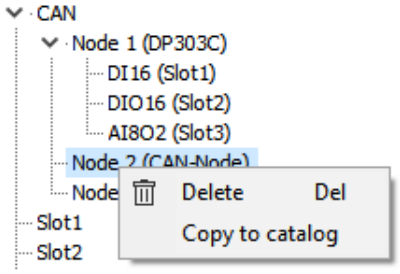
Entering of single CAN-objects (Index, Subindex) in the mapping field is optional, as long the download of the mapping is not activated. Always assign the data type to define the telegrams length and to allow a real byte swapping.
With activated download of complete mapping-parameter the PLC configures the content of the PDS during start up.

To assign more configurations in the start up, **SDO**s can be defined (e.g. for operational modi or metering ranges, etc.).

Create library elements of your CAN-slaves

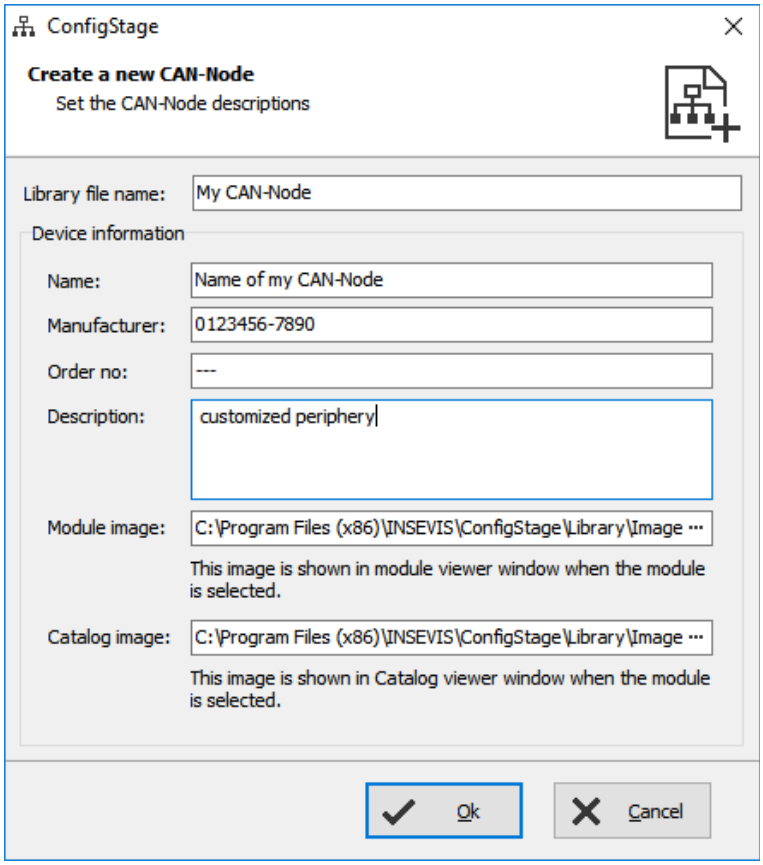
Optional: If this „mapping“ is made, the new configured CAN-node (CAN-slave) can be stored locally in the ConfigStage to use this part as a library element with pre-defined values.

Therefore click with the right mouse key on the just configured CAN-node.



Then a new mask opens. Insert all information (and image) and acknowledge with „OK“,

So you will get an own CAN-slave, pre-defined for further use and with your internal information.



Attention

The nomenclature **TX** (Transmit) and **RX** (Receive) are at CANopen®-PDOs always from the CAN-nodes view (slave). It means, with a TX-PDO a node sends its input data to the PLC and with a RX-PDO it receives its output data.

Configuration with the Software „ConfigStage“

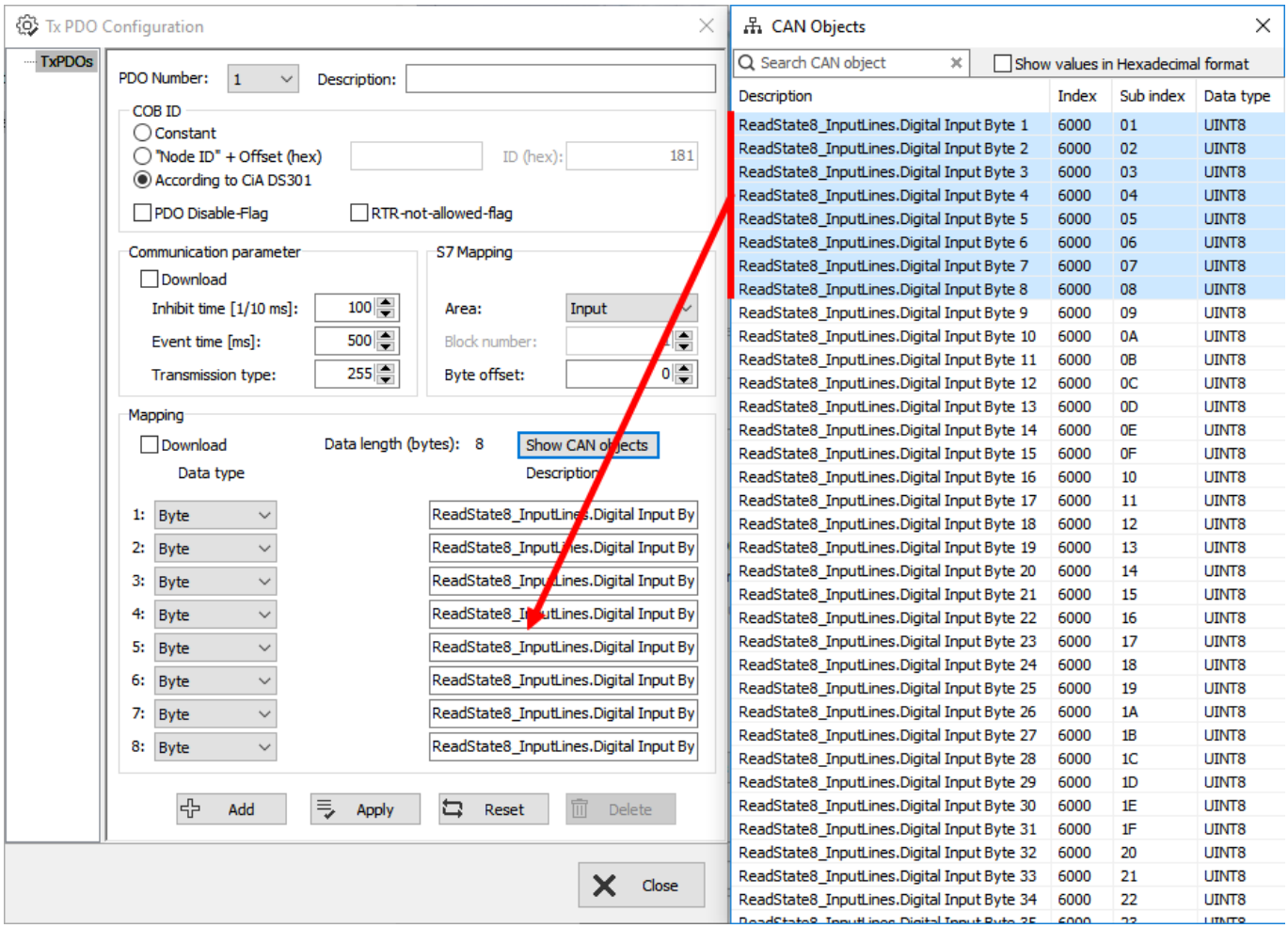
Configure decentral external peripherie by EDS-file

You need a EDS-file of the external CAN-slave you want to configure. Import it like shown here:

Than a new window opens like described above (Create library elements of your CAN-slave). After having assigned texts, order information and images there is an „empty“ library element, what must be configured like described in following items.

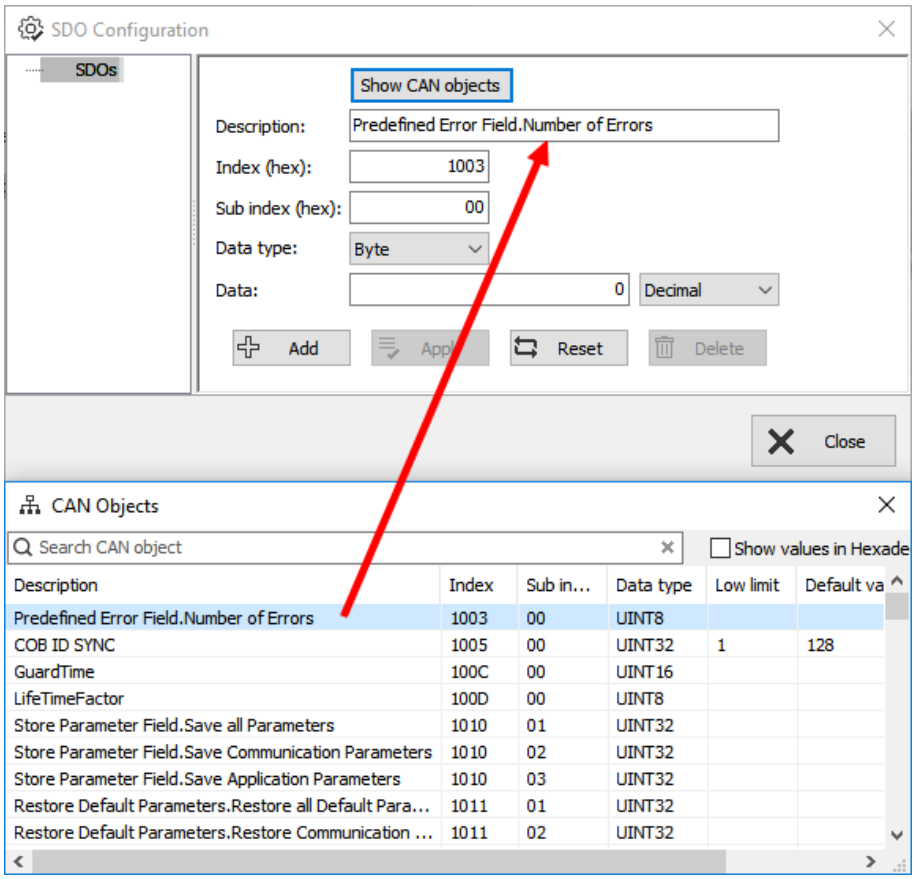
PDO configuration

By „Show CAN objects“ an object browser opens up with all CAN-objects available. These were filtered from the EDS-file automatically. Move single or multiple CAN-objects by Drag´n Drop into your configuration.



SDO- configuration

By „Show CAN objects“ an object browser opens up with all CAN-objects available. These were filtered from the EDS-file automatically.
Move single or multiple CAN-objects by Drag´n Drop into your configuration. In the „Data“ field assign your parameter value.



Decentral external periphery / motion controller pre defined

Pre-defined CAN-devices, especially motion controller, allow the S7-user an immediately access to these devices.
Because this configuration data is open to change, it could be adapted to customers needs or extended easily.

INSEVIS offers on its website free of charge various DataBlocks to drive complex motion controllers as e.g. Parker C3, Maxon EPOS2. With these DBs it is possible to control different complex systems with one S7-program

The special advantage is the architecture with different small DBs für each function (jog, acc, dec, home,...). This allows to swap these motion engines with only a few efforts to adapt the S7-program. Normally you can re-write your program, when you replace one drive-specific large DB of one motion vendor to another large DB of another motion vendor.

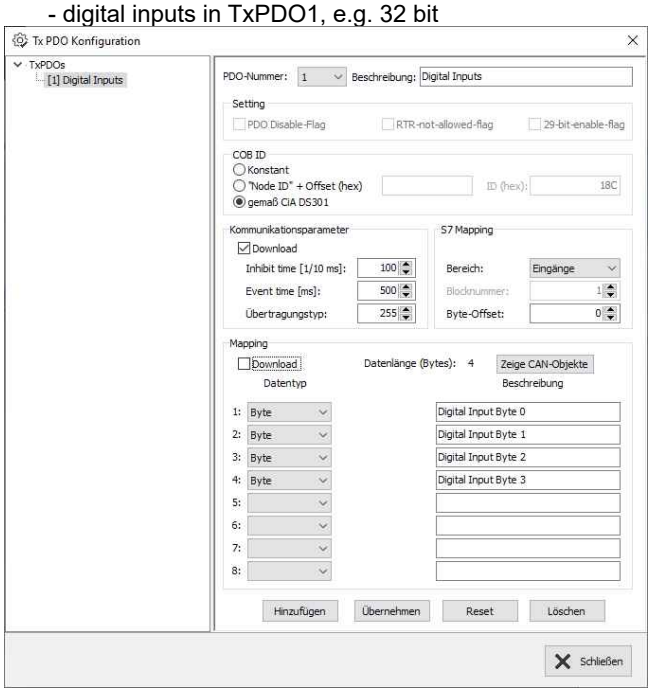
The complete description with demonstration program and data blocks is available at our website

Configuration with the Software „ConfigStage“

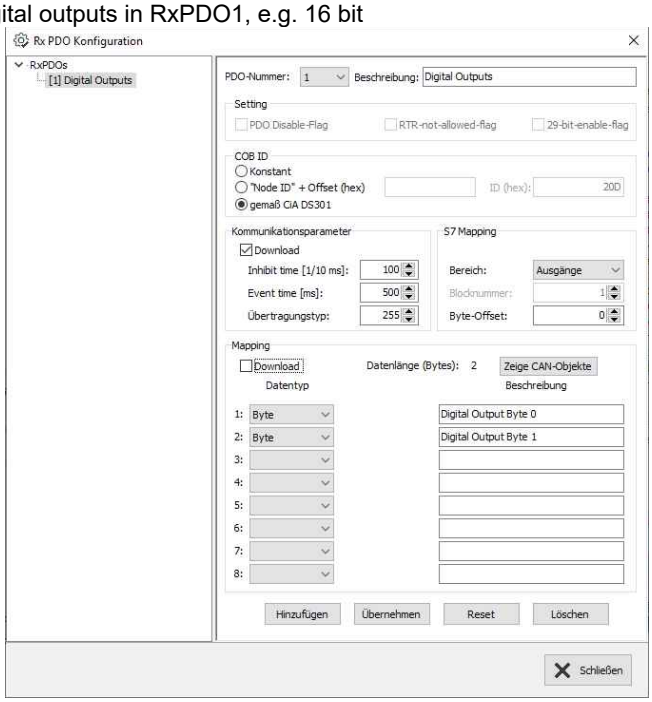
Samples for external CANopen devices

Sample for decentral CANopen periphery ref. to DS401
If a device with digital and analog In- and outputs is used referring to CANopen-Profile DS401, the in/outs are

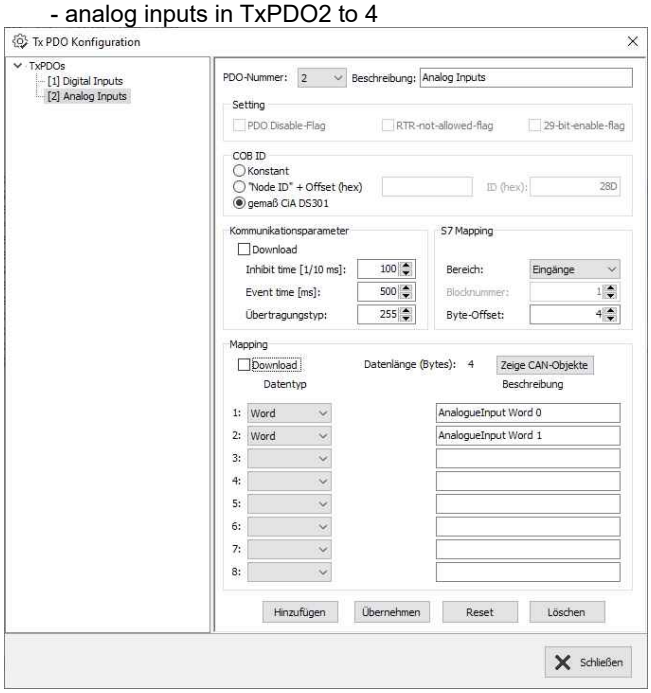
- digital inputs in TxPDO1, e.g. 32 bit



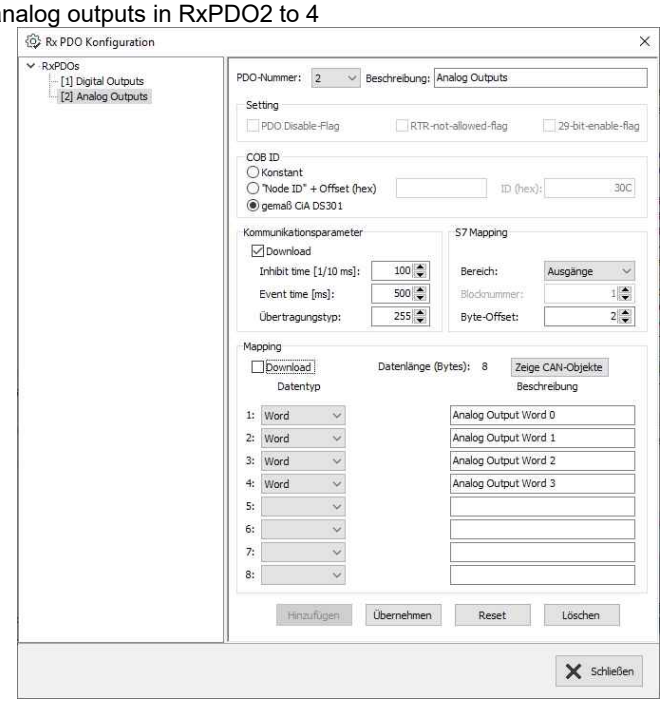
- digital outputs in RxPDO1, e.g. 16 bit



- analog inputs in TxPDO2 to 4



- analog outputs in RxPDO2 to 4



(Images in German language but self explaining)

Therewith the in- and outputs can be used on the configured S7-address (in this sample from EB0, AB0) as usually.

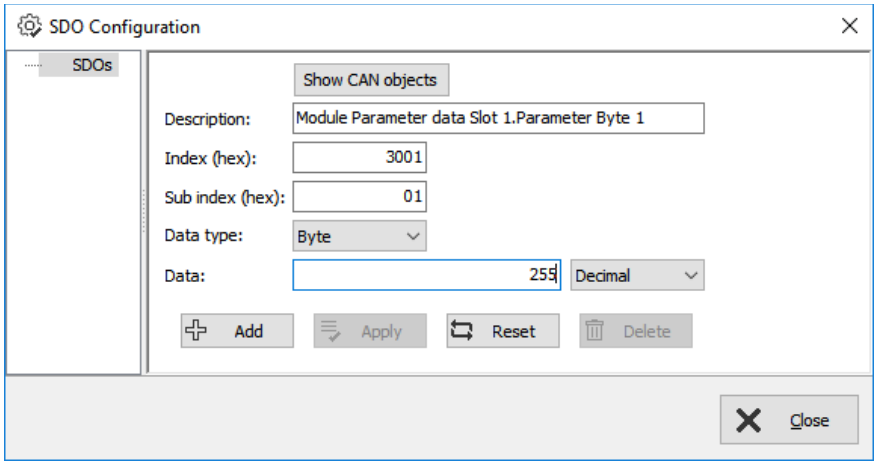
.

Attention

The PDO-number 1 is reserved for digital I/Os only.
The analog I/Os can be mapped starting from PDO-number 2

Configuration with the Software „ConfigStage“

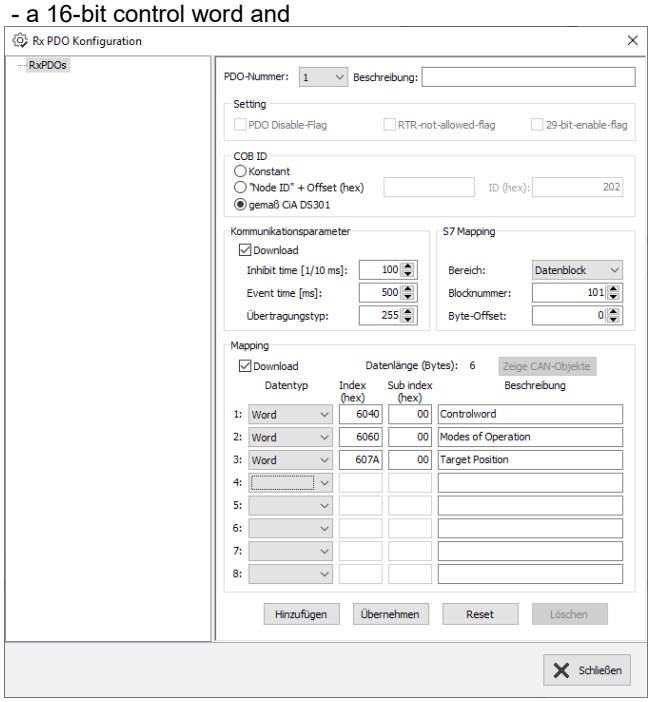
To transfer parameters (e.g. metering ranges for analog modules), SDOs need to be configured specific referring to the vendor.



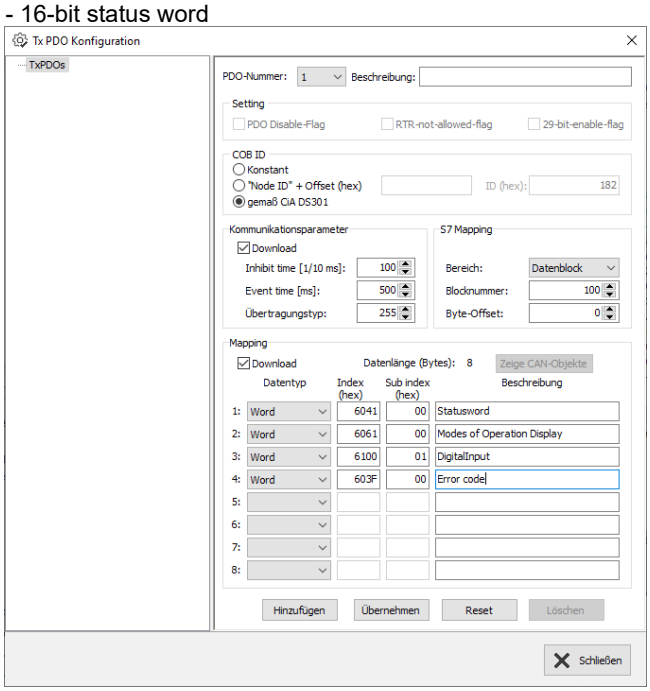
Sample configuration CANopen-drive controller ref. to DS402

If a CANopen-drive controller ref. to profile DS402 is used, at least the controller-internal state machine must be managed by

- a 16-bit control word and



- 16-bit status word



(Images in German language but self explaining)

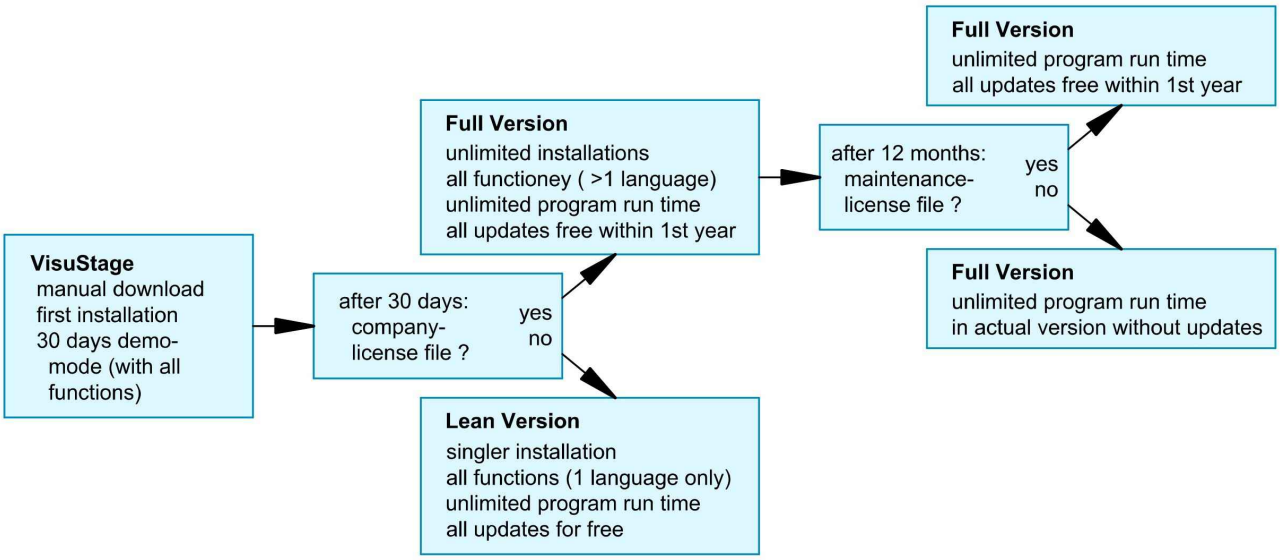
Assign these both words to S7-operands by the PDO-mapping and than the controller can be driven by the S7-program.

Download and licensing

The actual version of VisuStage is free to download at INSEVIS websites in the download area. INSEVIS-programs do not check the internet for new versions, so pleas visit INSEVIS websites for new features by yourself.

At the first installation VisuStage asks for the license file. If not typed in, the software runs for 30 days with all functions as demo version and asks later again for that file. At the folders “Help” → “Info” can be added the path to a license file always ti upgrade a lean version into a full version.

This company license can be multiple times used within one company for multiple installations. (Open visustage.exe once as administrator in Windows 7. So you have to enter the license path only once).



System functions

The S7 Operating system provides the system functions (SFC) to control the visualization by your S7 program. These SFCs are described in the referring PLC-manual (Compact or Panel-PLC) at the chapter “System functions”. To use these SFCs you need the **S7-Library** from INSEVIS. It can be downloaded at download-area of INSEVIS websites for free.

Communication between PLC and external Panel-HMI

In a Panel-PLC these SFCs will be used from a common CPU for PLC- and HMI-functions as well.
If you use PLCs with external HMI please note followig:

ATTENTION:
Only single SFC-jobs can be processed.
If the parameter "BUSY" of the corresponding SFC returns the value FALSE, the job is finished and a new SFC can be processed,
The configuration of connection parameters of INSEVIS-Panel to INSEVIS-PLC or external PLC is explained at the chapter “Resource Partner-PLC-device” in this manual

Use these data in the S7-program (e.g. LADDR := W#16#1 for the panel-connection with ID-No. 1)

Here the PLC can change the screens in an external panel (e.g. with the connection-ID-No. 1

```
CALL „SFC 201
     LADDR     :=  W#16#1
     SCREEN    :=  MW1006
     RET VAL   :=  MW1008
     BUSY      :=  #busy
```

General settings of the program shell

Top: **Standard functions bar** (self explaining or explained by tool-tips)

Alignment functions (2 and more objects)

FIRST mark the Master-element,
THAN mark the others, what shall be aligned to the master
than choose the alignment property you want (left, horizontal centered, right, top, bottom centered, bottom)

Size functions

FIRST mark the Master-element,
THAN mark the others, what shall be aligned to the master
than choose the size item (width, height)
or assign multiple dimension properties to different selected objects (right)
with key-combination of CTRL+arrow-keys size of marked objects can be changed pixelwise

Alignment functions (1 or 3 and more objects)

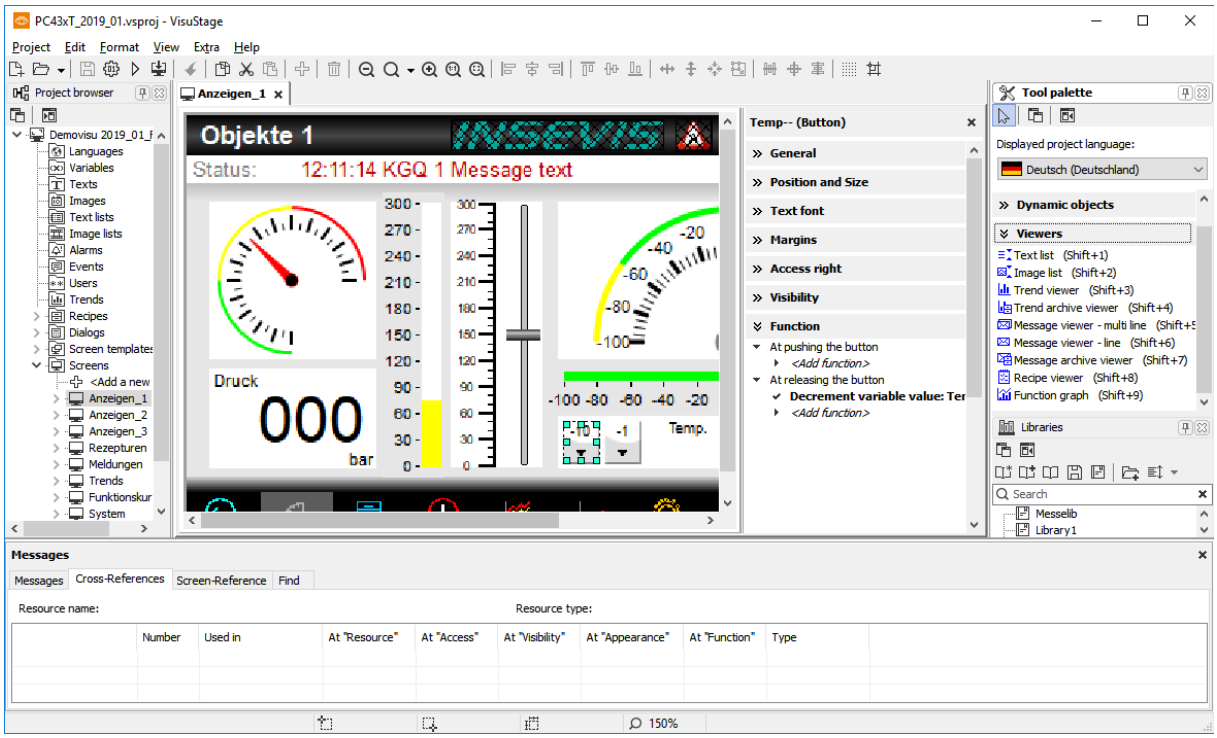
FIRST mark the Master-element,
THAN mark the others, what shall be aligned to the master
FINALLY the element, what should mark the outer border of the grid
than choose the alignment property you want (same horizontal distance, center a single object, same vertical distance)

Grid-/ Snap functions (self explaining)

At Extra / Settings assign grid size
(de-) activate grid and snap by mouse click

General settings (without figure, self explaining)
It is recommended to hide the panels bezel to save window-space on your VisuStage-PC.
Grid and snap functions make it easier to design new screens

Top: General functions and drop down menus,
Left: Project browser with resource settings (here the resources will be set up and parametrized) and screens
Middle: Window of the projected screen, display of the objects parameters of the the selected object
Right: Tool bar with project language, function catalog with all objects what are available, Library catalog
Bottom: Message window (for messages, references, queries and filter results), to be switched on/off by F6-key



Visualization with the software „VisuStage“

General functionality

VisuStage imports S7-PLC-variables from Simatic®-Manager or TIA® Portal and uses it in different visualization objects in different screens. It can synchronize these S7-variables to the S7-project automatically.

The visualization source file will be compiled into a binary, what will be transferred to the Panel-HMI or Panel-PLC by Ethernet. The firmware in the Panel-HMI/-PLC creates the images and touch fields at the touch display there. No source date can be read back from the Panel-HMI/-PLC.

There is possible to get a free remote visualization of all S7-PLCs on a PC-screen by RemoteStage, what requires the visualization binary.

The following descriptions refer to the actual sample project what is available at the download area at INSEVIS websites. It requires the newest VisuStage-version and the newest operating systems at the devices. It is hardly recommended to use this project together with this documentation to understand it better.

Recommended procedures

A systematic working procedure reduces errors and decreases the programming efforts

- Import your S7-variables from the S7-symbol table or directly from your S7-DBs including symbols and synchronize it with your S7-project
- Assign objects for multiple screen use in different template screens, what you can use in every single screen.
- If you have finished entering all texts in your project language, you may export them into a *.csv-file and forward it to a translator into any other language you need. It is only necessary to keep the *.csv structure then you can re-import this file again - and you have your next language texts.
- Collect all special pictures for your visualization theme before you start. (We strongly recommend the file format "png", because it works with a good compression and it allows definition of transparency by an alpha-channel. This is very important, if you want to see your background color on rounded corners and not any image colors.)
- Use the grid- and snap-function.

Save your resources

It is very important to have an eye on the memory size, required by the visualization. In general it is better to tune your visualization with some easy hints, before you decrease the PLC performance with an unsuitable visualization.

- Multiple use of buttons
  (if you use exactly the same buttons (resolution, image) you save lots of memory size because they will stored only one time as 1 object. It dies not matter, if symbols or texts belonging to this items or not.)
- Do not overlap dynamic objects
  (This function is not allowed by program cycle. You better navigate your images by dialog boxes with coords.)
- Better to have less screens with more common objects than to have lots of nearly empty screens.
  (Every new screen is stored as image and requires memory space.

Keep the overview

You need to know, what resources are „active“ and what are „blind passengers“.

- Filters reduce the number of displayed resources to get a bettor overview.
- With „cross reference“-function (right mouse button in the resource-menu) the use of variables, texts, images, text lists, image lists and trends can be displayed. Delete resources you do not use.
- Delete unused resources with the „CleanUp“-function at the rider „Edit“

Transfer your work to other projects

When you invested much time to create a very special head- or bottom line or navigation:

- Use the library function to export often used groups to you PC for a further use in other projects.
- Use the screen template function for Headlines or footes, etc.

YouTube **VIDEO-Tutorials available** You find detailed explanations in the VisuStage-Playlist at the INSEVIS YouTube®-channel „INSEVIS EN“. This manual refers to e referencial visualization, what is available for free download at the download area at INSEVIS- web sites.

Visualization with the software „VisuStage“

Project settings

At the menu „Project“ basic settings will be made.

Version counter

- Manual assignment of a compile-no. or automatic counter (can be displayed by text field)

Assign the target IP-address

- The connection between the PLC and the PC with visualization software „VisuStage“is done by Ethernet TCP/IP. That´s why it is necessary to enter the IP-address of the target Panel-PLC/HMI to identify the device whereto the visualization should be send.
- **(here you do not change the IP-address data of the Panel-PLC / HMI !)**
- Double click on „Project“
- Enter the data
- Acknowledge

File formats

VisuStage creates 3 file formats:

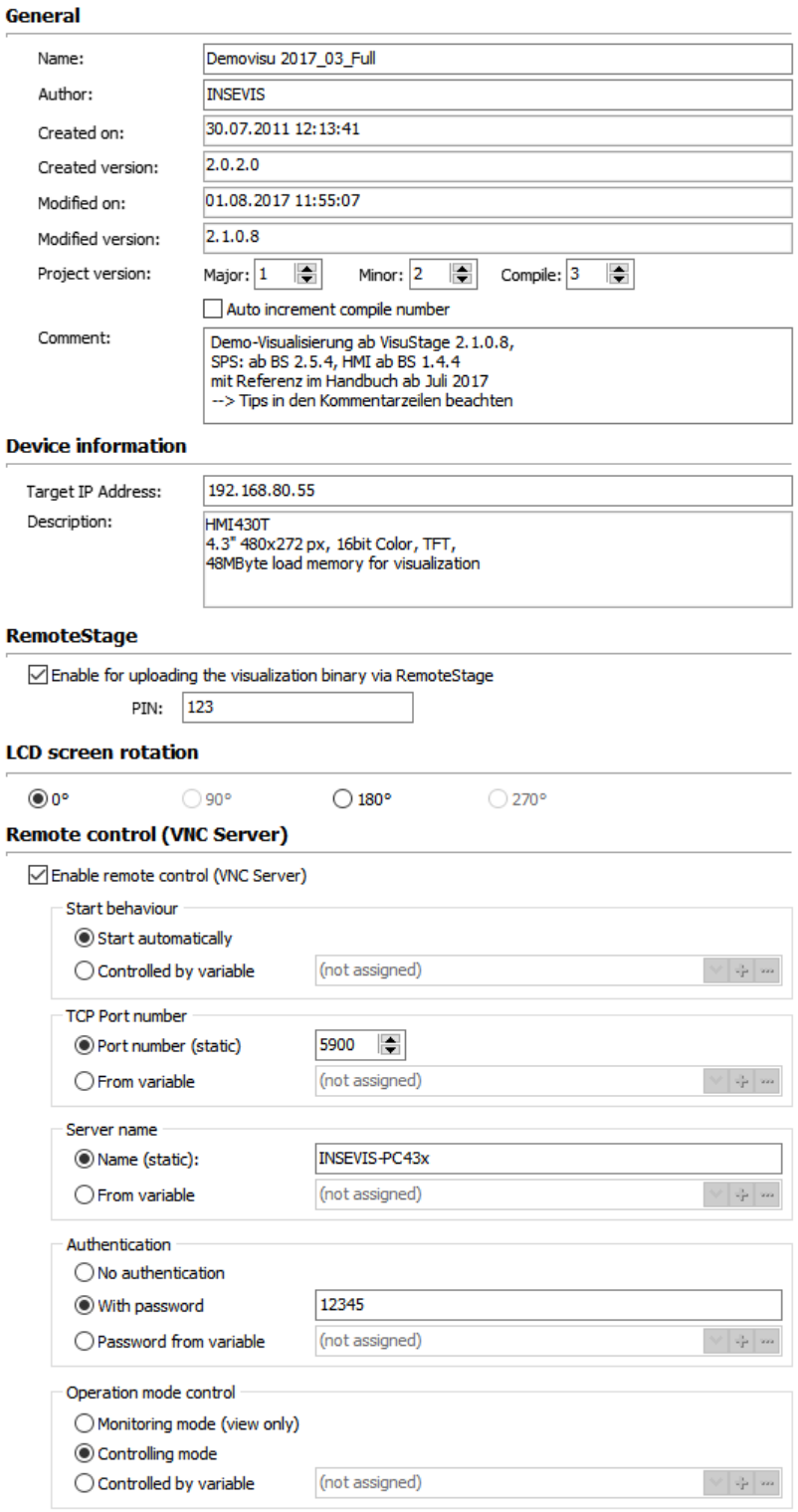
- ***.vsproj** contains the source code of the visualization
- ***.res** contains the resources of the visualization
- ***.bin** contains the compiled binaries to be downloaded into the panel

Data protection at binary upload

- Request a PIN-code, when RemoteStage shall be able to upload the binary of your visualization.
- Requested from RemoteStage before uploading visualization binary
- Must be activated when using “Online backup” function in ServiceStage

VNC-Server (CPU-T devices only)

- Select to start the VNC-Server always or controlled by variable
- Static / dynamic port number (default port 5900 recommended!)
- Password settings (Needed in VNC-Client/Viewer)
- Content in VNC-Client/Viewer
  - passive (1:1 display only)
  - active (controls the HMI)
  - changeable by variable (e.g. key switch)



ATTENTION:
Using a VNC-Client/-Viewer as app makes possible a mobile application. The settings of operational and security functions depend on each app.
Every user is responsible for data security by itself! Do not use VNC-Server without authentification and care for access of identified and known devices by yourself

Visualization with the software „VisuStage“

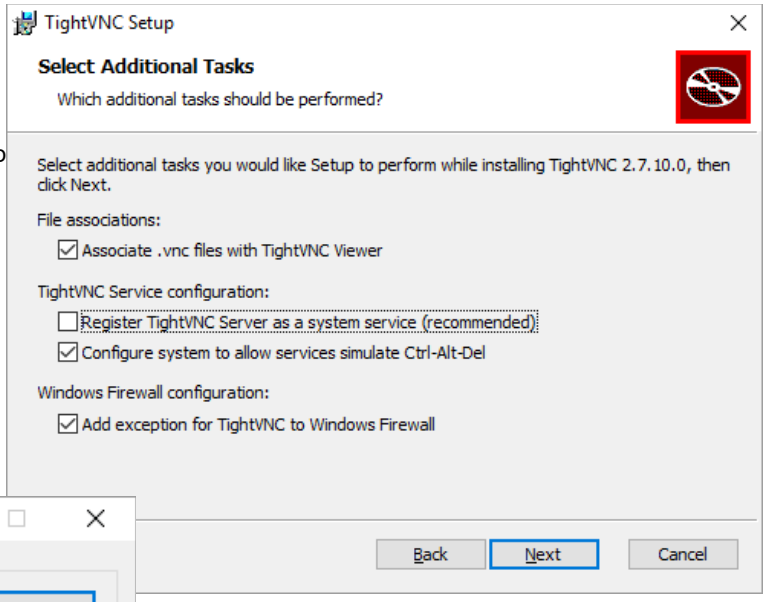
Configure a VNC-Viewer/-Client

When select a VNC-Viewer/-Client care for following issues:

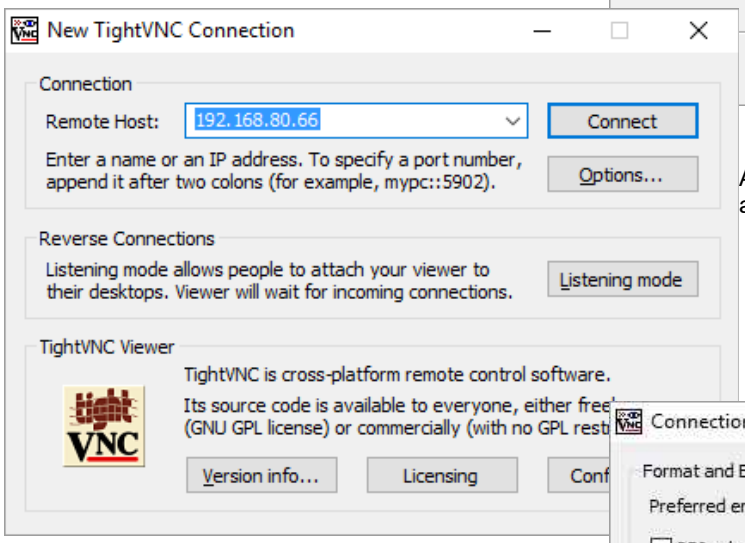
- Supporting RFB V 3.8 with encryption ZRLE, RAW-protocol
- Deselecting of „Clipboard transfer“ (copy & paste for texts)

See a setup and configuration sample for the free **Tight VNC-Viewer** to get the most important settings from installation to remote visualization

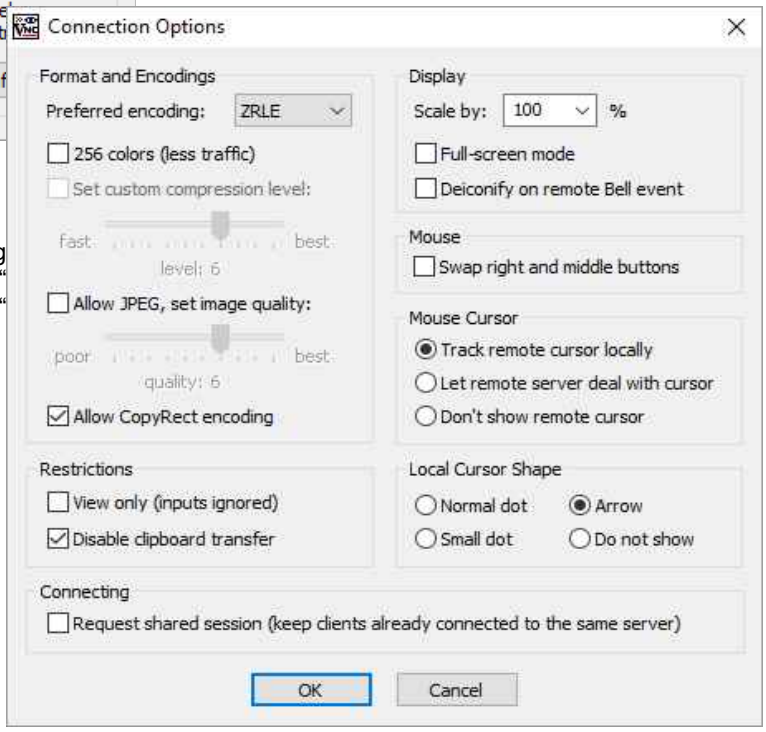
Deselect server function during program setup



Hint: Images are made at installation of Tight VNC-Viewer. This is a free software easy to install and configure, so that we can recommend it.

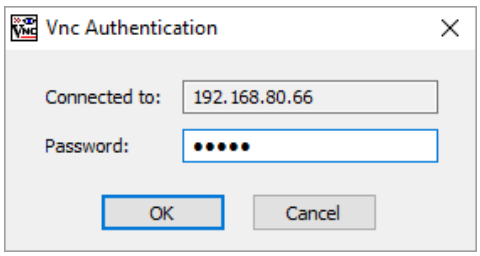


Assign IP-address of the remote devise and go to „Options“



assign ZLRE-Encoding
deselect „Clipboard Transfer“
deselect „Shared Session“

Insert password what was assigned in VisuStage



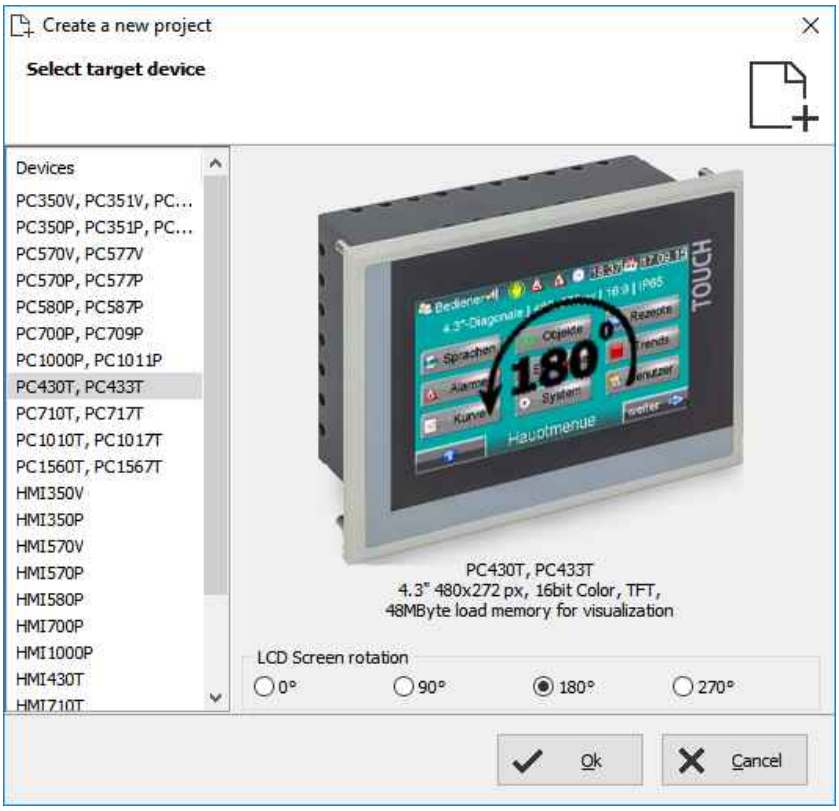
Change screen orientation or resolution

At the menu „Project/change target device“ it is possible to adapt the project to another target system.

This could be:

- other Panel-PLCs or Panel-HMIs from INSEVIS)
- a free resolution for using PC-monitors as remote panel
- other orientations of the same device (in 90-degree-steps for CPU-P-versions only)

This procedure is only made arithmetical and needs manual reconditioning to get an attractive visualization and to reduce the binaries memory size (e.g. font sizes, bottom sizes, etc.).

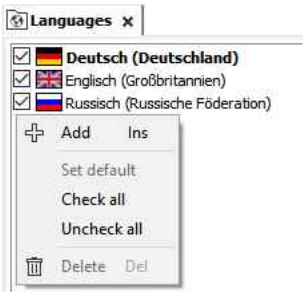


Create and administrate resources

Resource languages

All languages installed on your PC are available for VisuStage-projects. These will be stored as bmp. If an other PC without these installed languages will be used to compile and download to the Panel-PLC/HMI, the missing languages can not not be displayed correctly.

- Add / delete a language: → by right mouse key
- Select the project language: → by right mouse key opens up a pull down menu
- Select a reference: language (marked bright) → by right mouse key „Set default“



Hint:
Text- and image resources are connected to the language, where they were assigned/imported. If this language is deleted, all (text- and image) resources will be deleted after confirming it in a confirmation window.

Resource variables

Beside the manually input of variables there are 2 better opportunities to import S7-variables from the S7-program

1) Import the variables by the system data file (*.sdf) of Simatic®-Manager

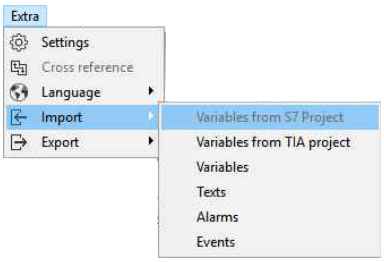
(without symbols)

- Create a S7- symbol table by the Simatic®-Manager
- Import it as a variables list **(importable in sdf-file format)** by:
  → Extra
  → Import
  → Variables

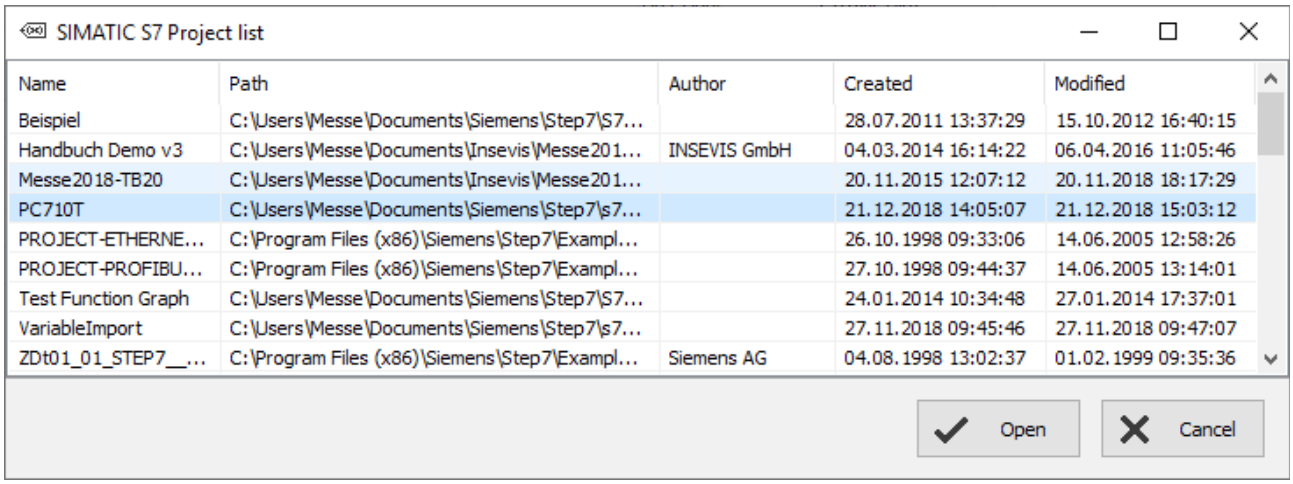
2.) Import the variables directly from the DBs of the S7-project

(including symbols)

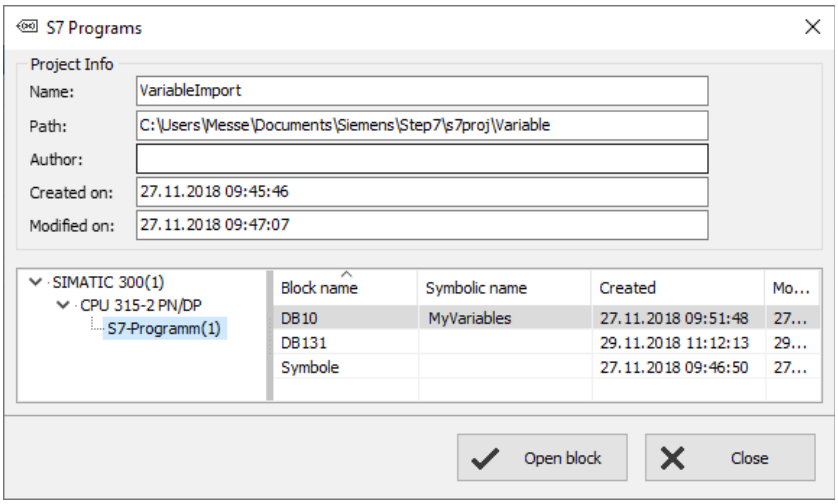
- Start it by
  → Extra
  → Import
  → Variables from S7-Project
  (Simatic®-Manager must be installed on this PC)



- Mark and open the corresponding project



- Choose the required data blocks from the S7-program list **(no instance data blocks).**



- Mark the required variables (also multiple) and import it.

VIDEO-Tutorials available Therefore is a **VIDEO** available in the VisuStage-Playlist at the INSEVIS YouTube®-channel „INSEVIS EN“.

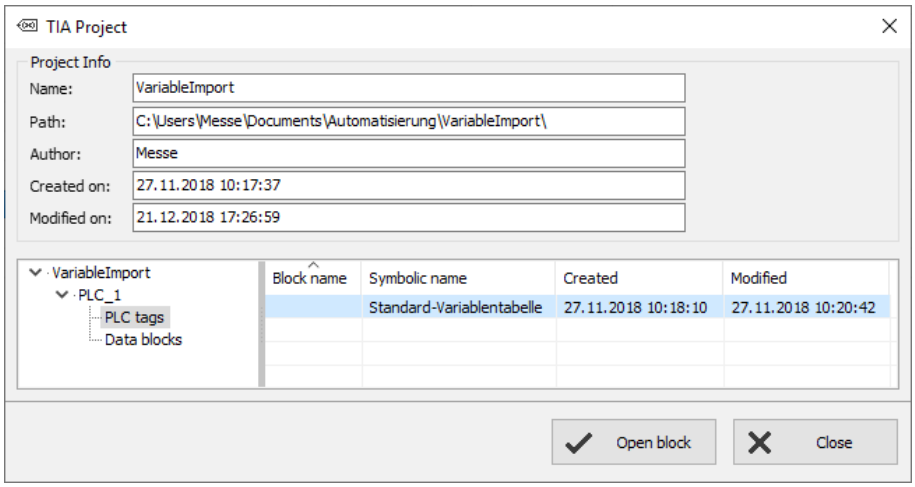
3.) Import the variables directly from the TIA®-project (including symbols)

3.1) Import the variables directly from S7-3xx-CPUs from TIA®-project

TIA®-Portal does not need to be installed on this PC, just only TIA®-project must be closed while importing.

- Start it by
  → Extra
  → Import from TIA®-project

Than a window opens to select the TIA®-project.

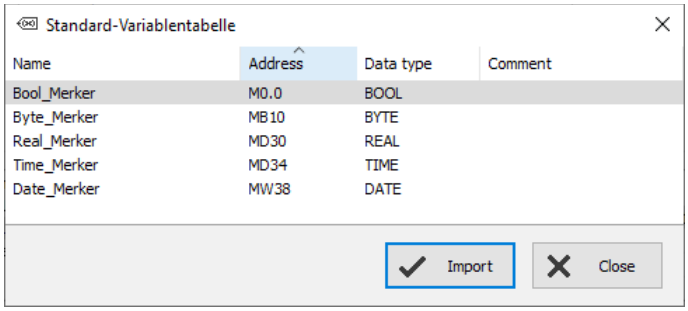


SELECTION

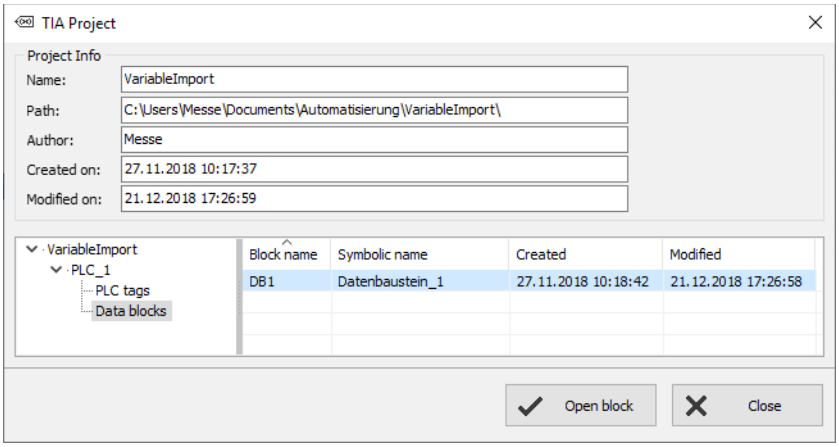
→ of the **Station** (here INSEVIS SPS)
→ and than of the **CPU** (here PLC_1)
and than

EITHER
of the **symbol table** (here SPS-Tags)

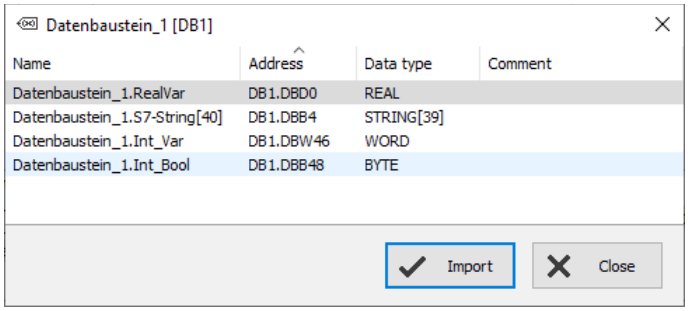
1. In the right window all variable tables will be displayed
2. Open up a variable table and see all existing variable lists.
3. Selection of the variable lists by marking (multiple marking by Shift or Ctrl)
4. Import the selected variable lists



OR
of the **data blocks** (here Data Blocks)



1. In the right window all data blocks will be displayed
2. Selection of the data block by marking (only single blocks)
3. Open a data block
4. Selection of variable from a data block by marking (multiple marking by Shift or Ctrl)
5. Import the selected variables from the data blocks



3.2) Import the variables directly from S7-12xx and 15xx CPUs from TIA®-project

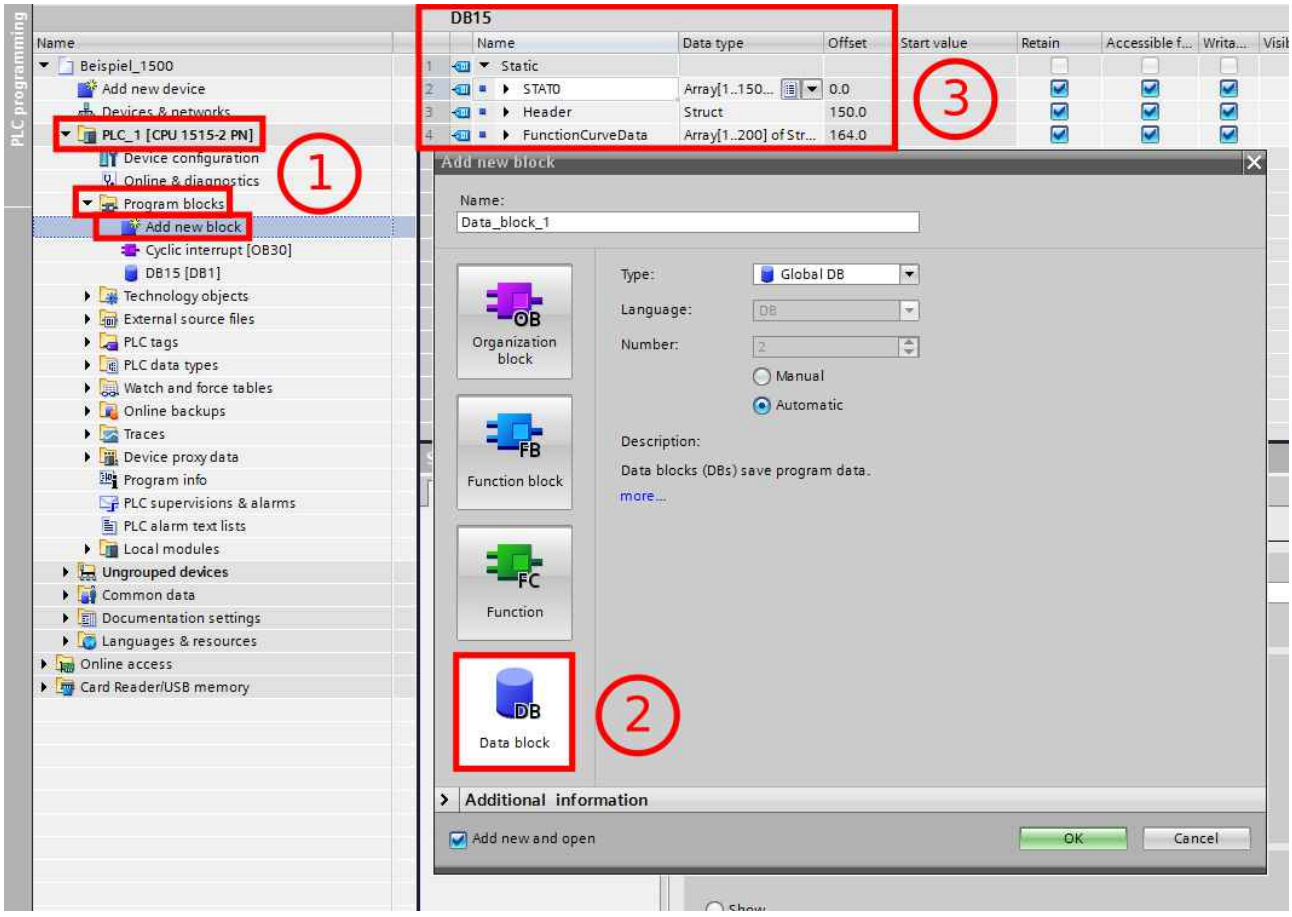
To import variables from projects which are based on CPUs from the 1200 and 1500 series they have to be stored inside a data block.

To achive this execute the following steps in your TIA project:

1. Select your CPU -> Program blocks -> Add new block

2. Select in the opened menue the type "Data block" and enter a name.
   Press OK to create the data block

3. In this new data block you can now create variables with name, data type and offset which can later be imported into the VisuStage.

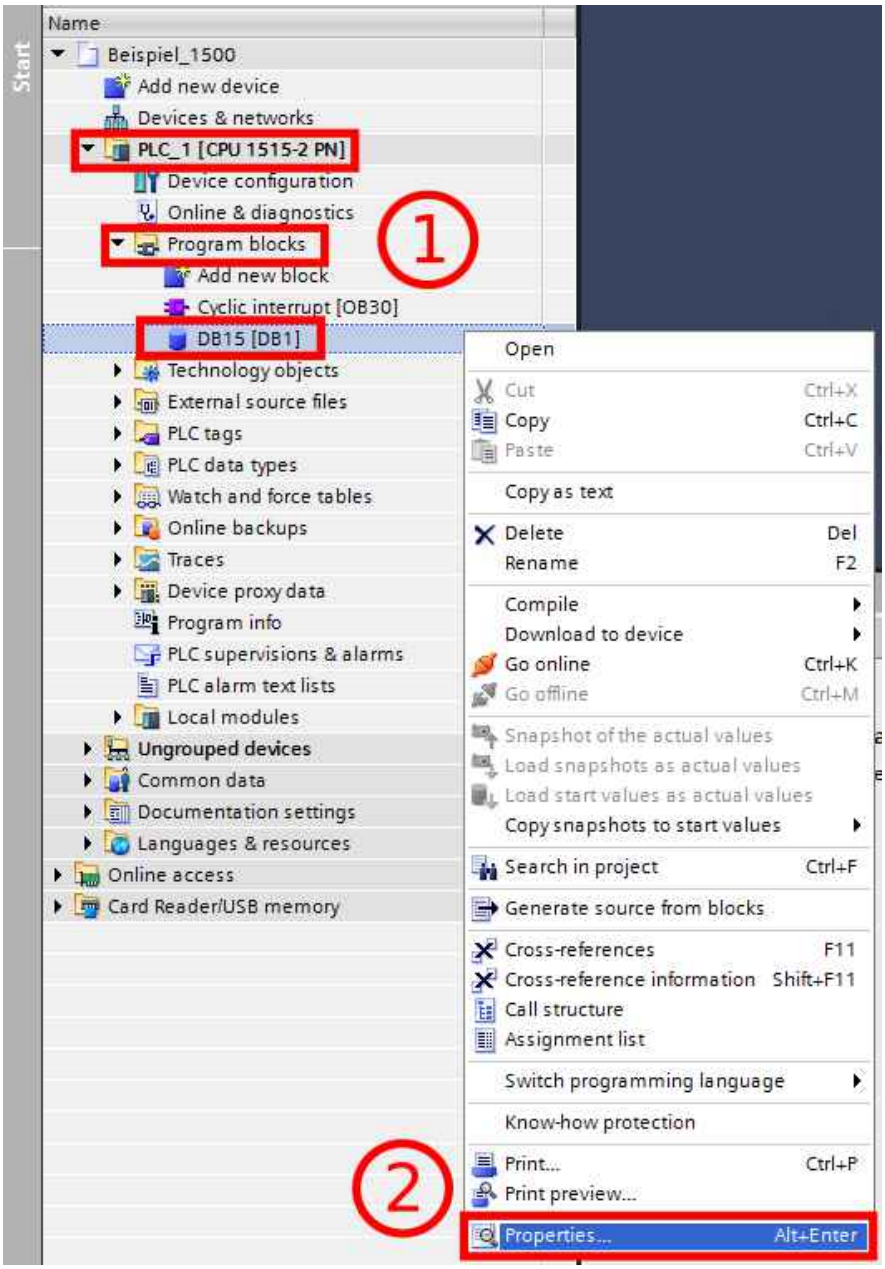


Visualization with the software „VisuStage“

To ensure a flawless communication between RemoteStage and S7-CPUs 12xx / 15xx, the block access must not be optimized. (only for S7-12xx and 15xx)

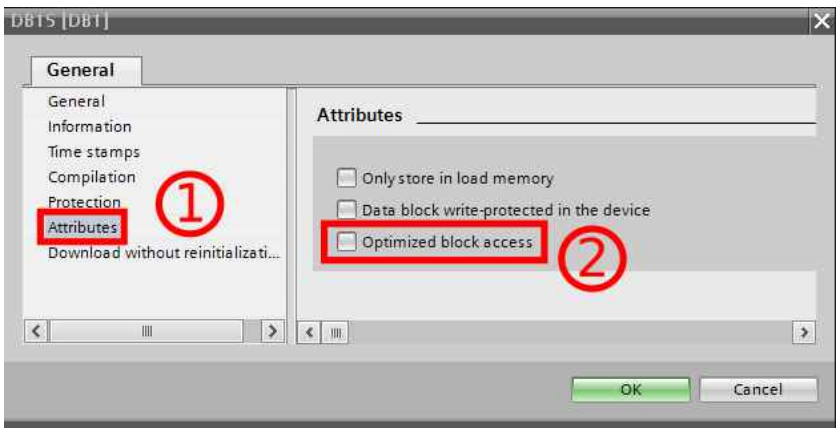
To achive this execute the following steps in your TIA project:

1. Select your CPU -> Program blocks
2. Do a right click on the concerning block and select "Properties..."



Execute the following steps in the opened window:

1. Select "Attributes"
2. Deactivate the option "Optimized block access"



Visualization with the software „VisuStage“

In following cases VisuStage wants a confirmation before it starts a variable import:

- A variable with the same name exists already, but with another address or data type
- A variable with the same address exists already, but with another name or data type
- A variable with the same name and address exists already, but with another data type

ATTENTION:
When VisuStage overwrites the variables, the connections between variables and its objects will be kept.
When deleting the variables manually these connections will be deleted as well.

The **Export** of the variables is done in the same formats as well:

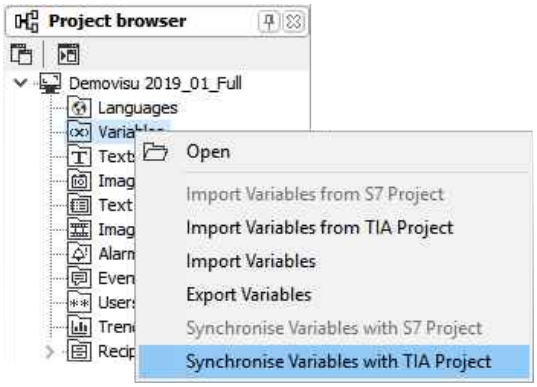
- sdf- file format (System data format, variables only), or in
- sym- file format (Symbol table format with variables and data blocks)

Synchronization of variables with TIA®-Portal/ Simatic®-Manager

By inserting, deleting and other manipulating of S7-variables in programming systems TIA®-Portal and SimaticManager the absolute addresses in referring S7-programs change. To synchronize these changes easily with the variables in the VisuStage-project as function „Synchronize with S7 /TIA® Project “ is available.

Go to resource „Variables“ or
directly into table of variables

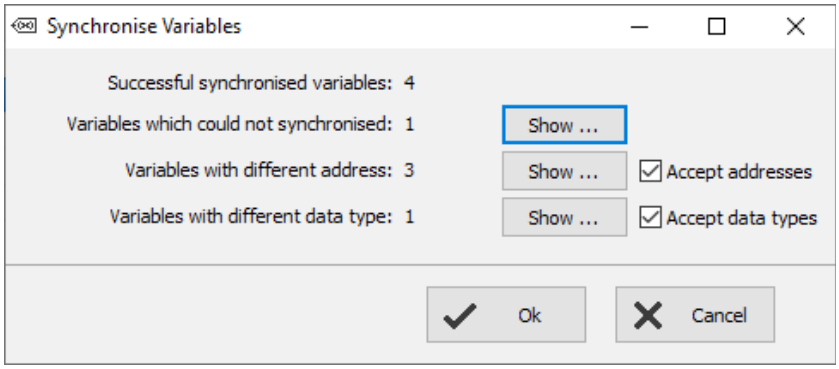
- right mouse key opens Pull-Down menue
- if Simatic-®Manager is installed on this PC, synchronization with S7-Projects is possible
- to synchronize with TIA® projects insert the path to this project (It must be compiled and closed before)
- all variables of the VisuStage project will be detected and synchronized with S7/TIA now



As result a synchronization table will be displayed, where

In the 1st line

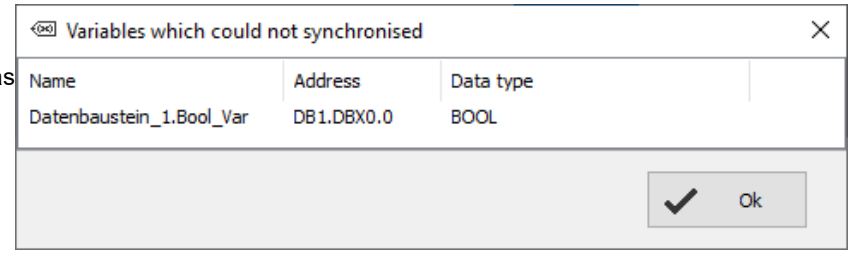
- Successfully synchronized variables (without differences – where nothing was changed) are mentioned/displayed only.
- There is nothing to do for that variables, just for your information.



Visualization with the software „VisuStage“

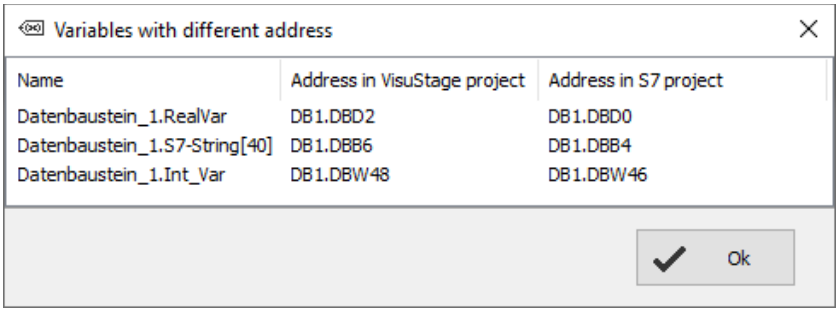
In the 2nd line:

- Not synchronized variables (where the symbolic variables name was not available in the S7-/TIA®-project) are mentioned/displayed only.
- These must be **deleted manually**, to keep the overview (First delete the connection in the visualization, otherwise you will earn compile errors)



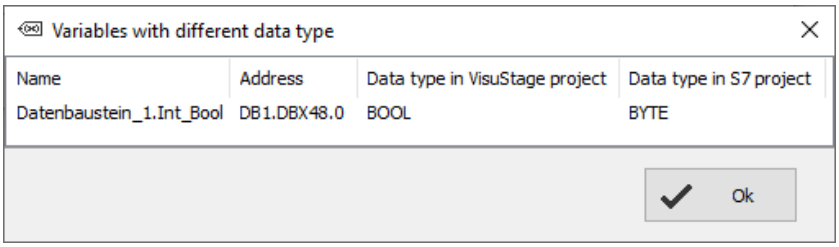
In the 3rd line:

- variables where at least the absolute address (or also the data type) was changed in the S7-/TIA®-project will be displayed.
- This is a proposal for modification only and **must be accepted** by checking a hook in the check box, than all these variables will be synchronized with referring variables in VisuStage-project automatically.



In the 4th line:

- variables where only the data type was changed in the S7-/TIA®-project will be displayed.
- This is a proposal for modification only and **must be accepted** by checking a hook in the check box, than all these variables will be synchronized with referring variables in VisuStage-project automatically.



If there was created new variables in S7-/TIA®-project, import them or add it manually new.

Visualization with the software „VisuStage“

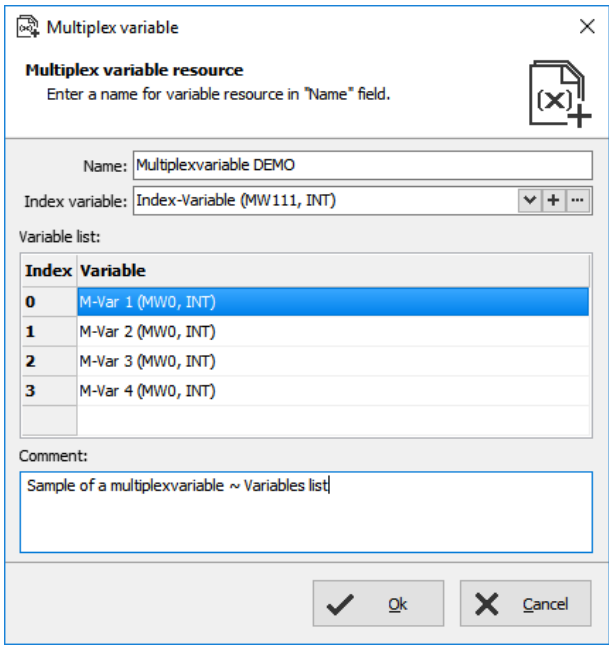
Multiplex variables (variables list)

With multiplex variables it is possible to use one I/O-field multiple times. Depending on the value of the index variable only the pre-assigned and referring the multiplex variables will be showed at run time.

At the resource “Variable”, at the rider “Multiplex variables” can be created (see sample right beside). It work similar to text- and image lists, but only with variables.

Only whole-number variables will be accepted as index variable, the variables in the variable list are free (STRNG-types are not to mix with other types). It also can be DBs, Merkers, inputs or outputs.

Index	Variable
0	Variable (DB1.DBW0, INT)
1	Variable1 (DB4.DBW10, INT)
2	Variable2 (DB10.DBW0, INT)



Indirect variables

Alternatively to the Multiplex variables (quasi the list of variables) the number of variables can be reduced by far, if the address range can be manipulated individually at run time by one or more variables.

The indirect variables allow by help of one or more variables a multitude of memory cells in the address range of the PLC. These variable memory areas can be written or read out, without defining a fixed variable for each before.

Sample with data type BOOL

Fix addressed
(512 variables)

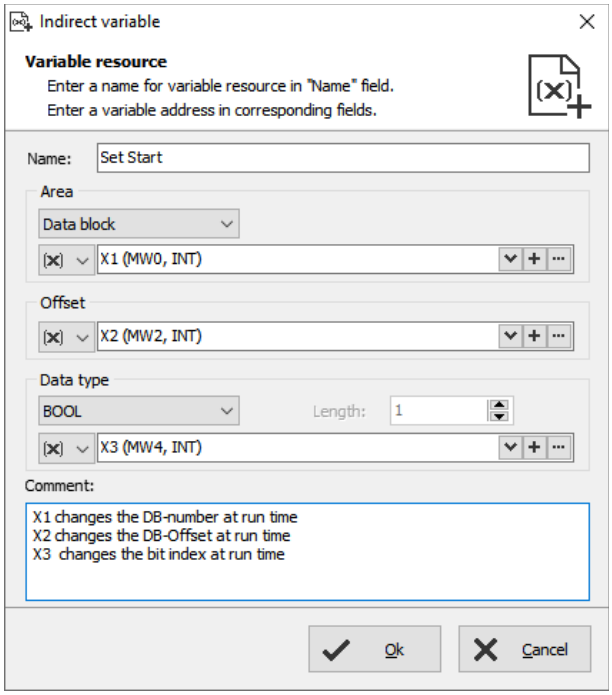
DB 0 DBX 0 . 0
DB 0 DBX 0 . 1
…
DB 0 DBX 0 . 0
DB 0 DBX 0 . 7

DB 0 DBX 1 . 0...7
DB 0 DBX 2 . 0...7
…
DB 0 DBX 6 . 0...7
DB 0 DBX 7 . 0...7

DB 0 DBX 0...7 . 0...7
DB 1 DBX 0...7 . 0...7
…
DB 6 DBX 0...7 . 0...7
DB 7 DBX 0...7 . 0...7

indirectly addressed
(4 variables)

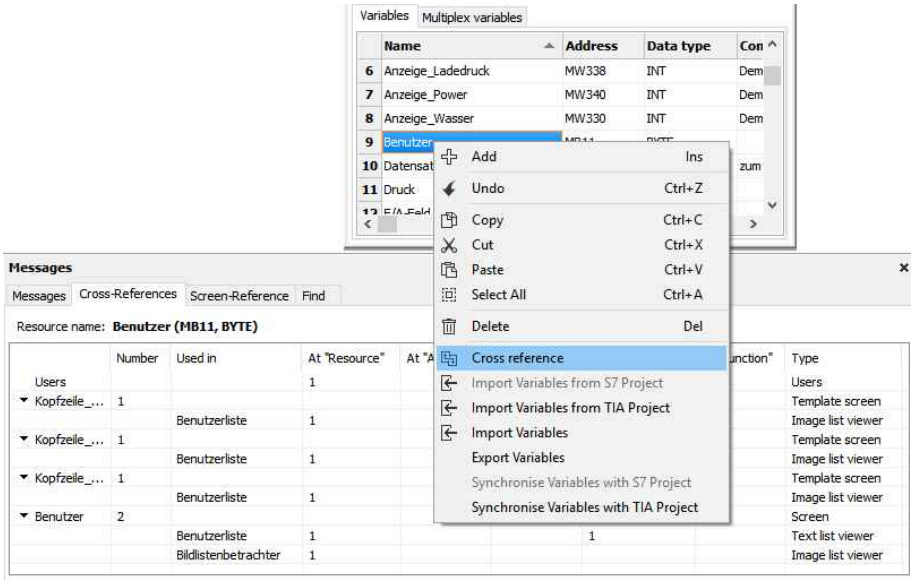
DB X1 DBX X2 . X3
X1 = 0...7
X2 = 0...7
X3 = 0...7



Cross references for variables

To keep the overview about the variables used in the project, there is a function „Cross reference“ (mark a variable and use right mouse button). All variables will be displayed referring to their usage in resources or in menu objects.

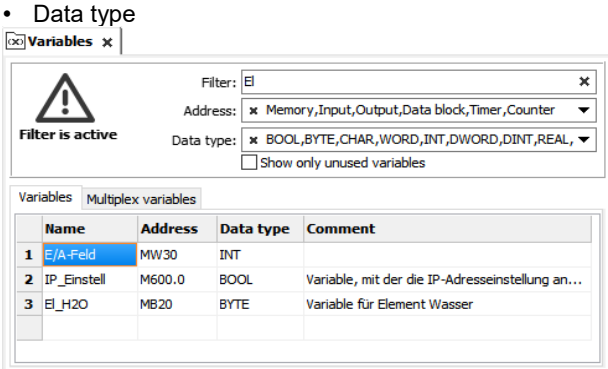
By a double click on an item you get automatically into the menu, where it is used. For sample the “Benutzer” variable was used. Close/open the message window by key „F6“.



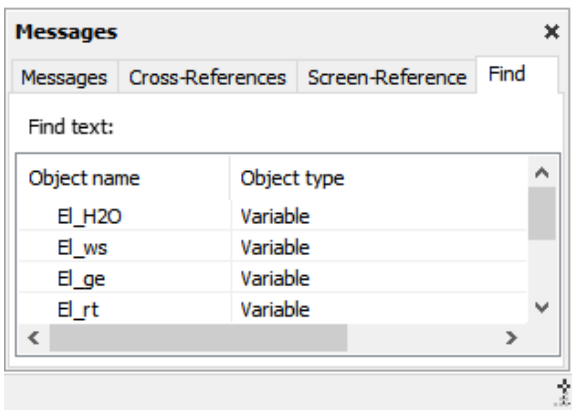
Set filter or find variables

Variables can be filtered for:

- Name
- Address- and
- Data type

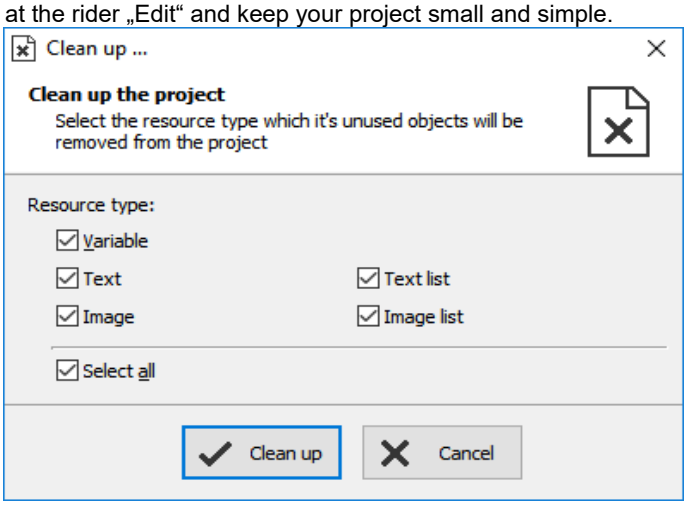


The result is shown in the message window (show/hide with key „F6“)



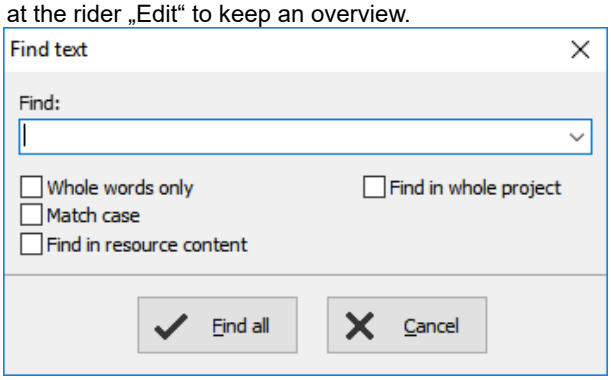
Clean up unused variables

Delete unused resources with the „CleanUp“-function at the rider „Edit“ and keep your project small and simple.



Find variables by text phrases

Find resources with the „Find“-function <CTRL+F> at the rider „Edit“ to keep an overview.

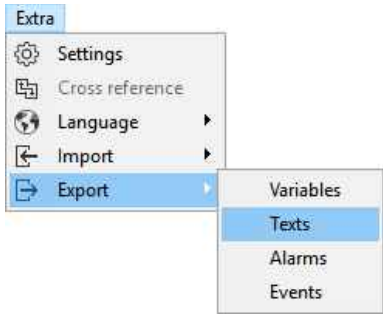


Resources Texts and Text lists

Texts

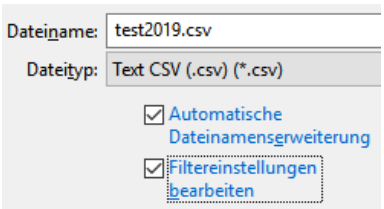
Will be created in the project language and can be imported or exported as a csv-file
(This helps for external translation.)

- Export by:→ Extra → Export → Texts
- Choose the languages to be exported
- select your csv-format and save the csv-file.
- Open/import it with a table calculation program (csv-settings must be the same!)
- Edit the text while keep the structure as it is (no cells may be removed or added!)
- Import by → Extra → Import → Texts



In the first lines there are system texts. Is a text created in the project language only and not in another language, it will be displayed in all other language as it was created in the project language (see line 5).

Hint:
If import is failed, your table calculating program removed the field delimiters or text separators. To prevent this, do „Save as“ and activate the „Assign filter settings“ function.



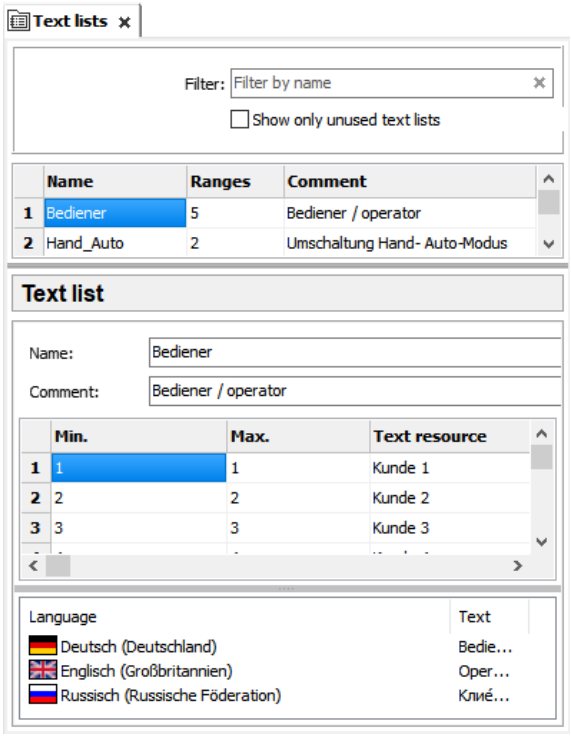
Hint: at some Windows7 installations it is necessary to check “Quote / Set All text cells”

Text lists

(when different texts should be displayed depending on a variable, e.g. in the user administration - operator, master etc.)

Will be created manually

- first define the list,
- than add existing text resources or create new ones
- than add limiting values **(Min/Max)** for each element of the text list

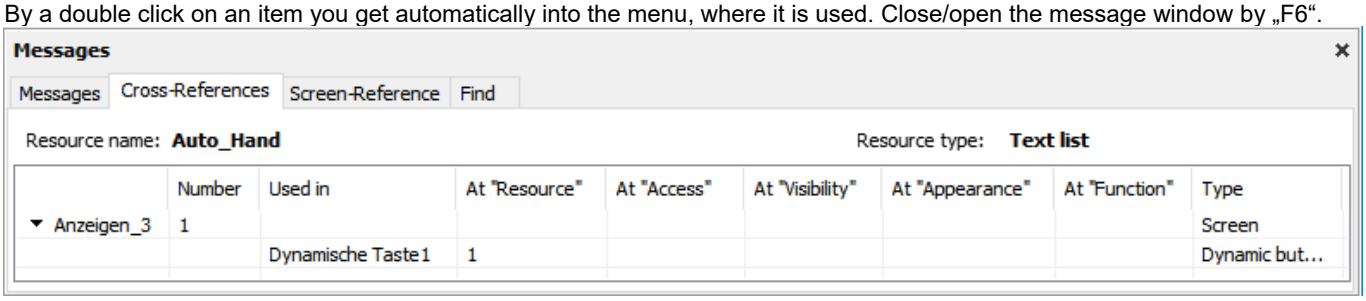


ATTENTION:
If there is active another value as these what are assigned in line 1...n, than ALWAYS this text resource will be displayed, what is assigned FIRST (in first line / line 1).

Cross references for texts / text lists

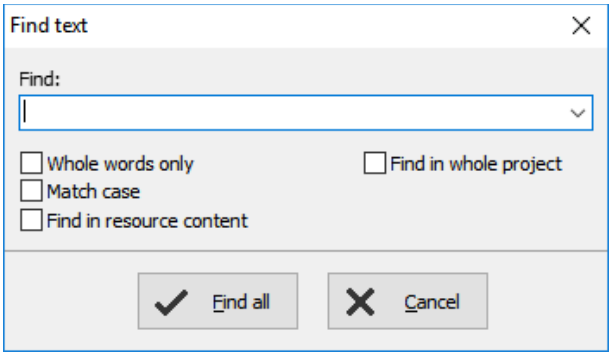
To keep the overview about the texts/ text lists used in the project, there is a function „Cross reference“ in the resource pool. (Go to resources Text/ text list, mark a text/ text list and use right mouse button). All texts / text lists will be displayed referring to their usage in resources or in menu objects.

By a double click on an item you get automatically into the menu, where it is used. Close/open the message window by „F6“.



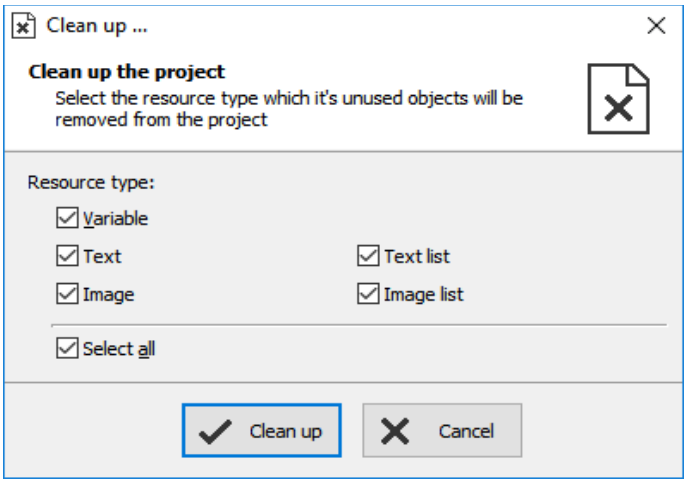
Find texts / text lists by text phrases

Find resources with the „Find“-function <CTRL+F> at the rider „Edit“ to keep an overview.



Clean up unused texts / text lists

Delete unused resources with the „CleanUp“-function at the rider „Edit“ and keep your project small and simple.



Resources Images and Image lists

Images

INSEVIS delivers some sample images with the VisuStage.
Creating own images is a child´s play by any free software.

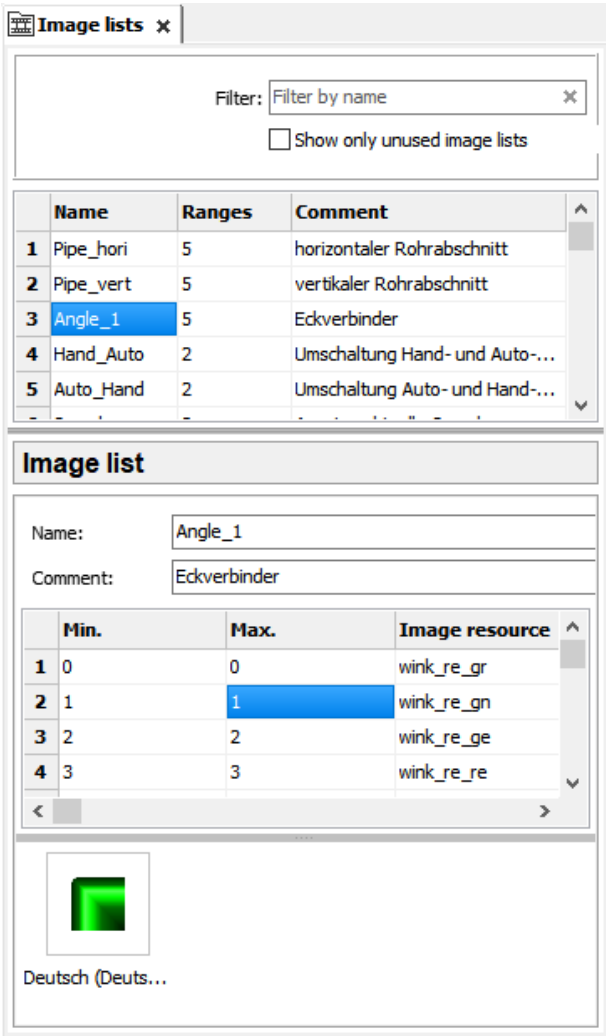
- Recommended file format: PNG because of the transparent alpha-channel.
  Substitute a color by transparency and save the image as PNG (Interlaced / Automatic recommended).
- Images of the project-language will be used for all other languages as well
  → shown half transparency
- It is possible to use other images in other languages instead the image of the project language
  → by right mouse key assign a new one and it will be shown with full color

Image lists

These lists are the best tool for color changes of an object or toggling images caused by changing variable values.

Will be created manually

- right mouse key in the field **Name**,
  (add the new name of the image list)
- Add limiting values for each element of the image list
- Assign an existing image resource,
  (or add a new one in this field directly)

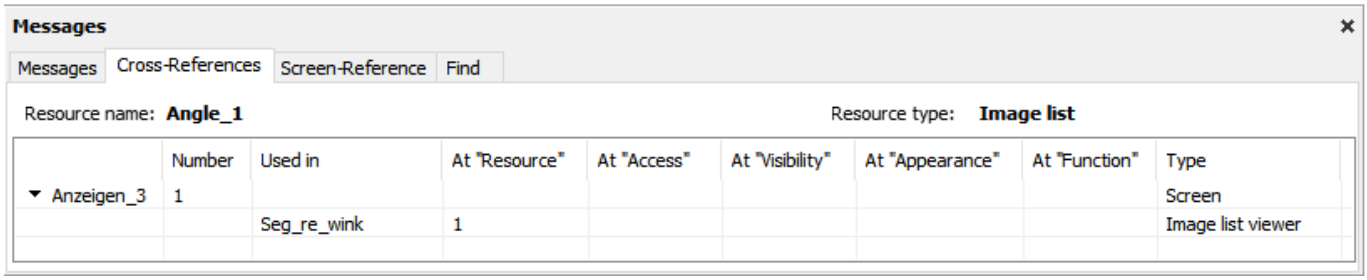


ATTENTION:
If there is active another value as these what are assigned in line 1...n, than ALWAYS this text resource will be displayed, what is assigned FIRST (in first line / line 1).

Cross references for images / image lists

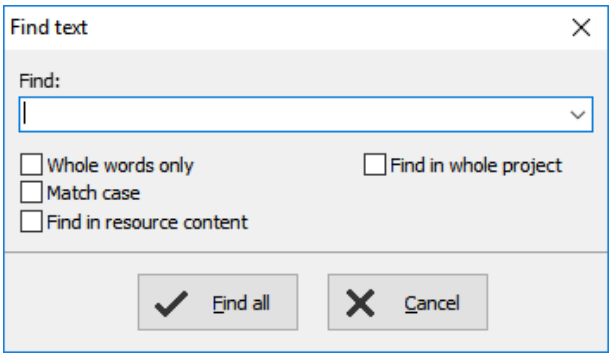
To keep the overview about the images / image lists used in the project, there is a function „Cross reference“ (mark a image / image list and use right mouse button). All images / image lists will be displayed referring to their usage in resources or in menu objects.

By a double click on an item you get automatically into the menu, where it is used.
Close/open the message window by key „F6“.



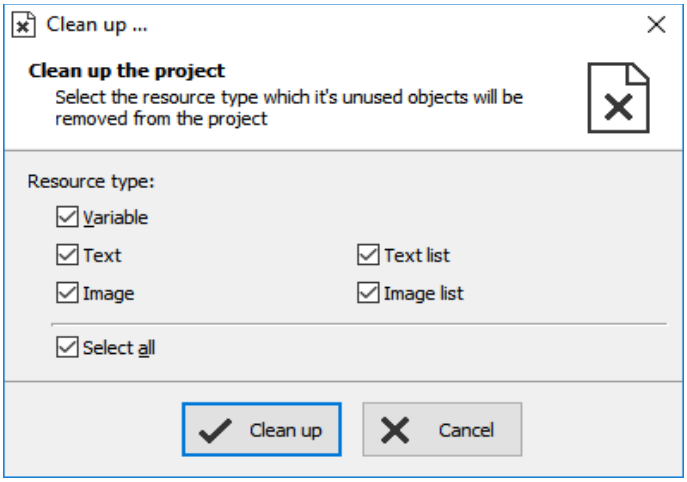
Find images/image lists by text phrases

Find resources with the „Find“-function <CTRL+F>
at the rider „Edit“ to keep an overview.



Clean up unused images/image lists

Delete unused resources with the „CleanUp“-function
at the rider „Edit“ and keep your project small and simple.



Multiple replacement of resources

If you organize your symbolic stringently you can swap multiple resources

- Variables,
- Texts,
- Text lists,
- Images,
- Image lists.

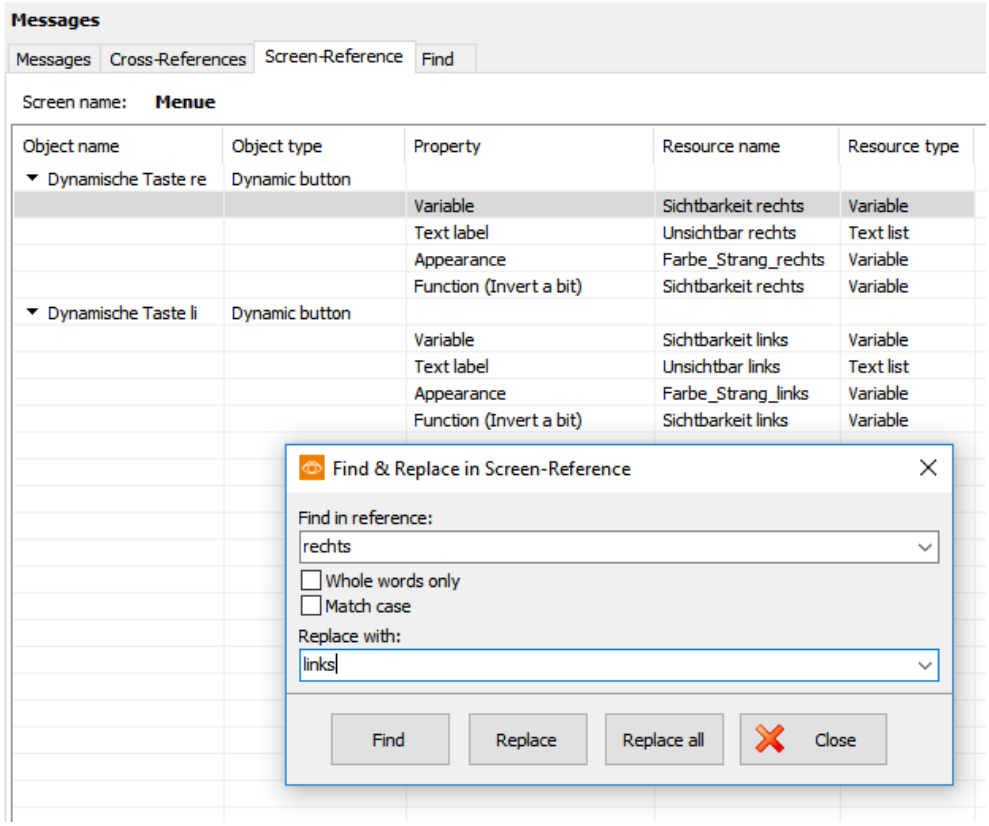
If they have similar symbolic phrases in their name.

In the sample on the right a „Dynamische Taste re“ is described with different properties by different resources „*** rechts“.

After copying an object like this it is necessary to swap all resources at the new copied object step by step. This needs time while multiple copying.

The function „Find & Replace“ allows a fast swapping.

Click with the right mouse key directly on the screen background (not on an object!), than select “Show references” and the message window opens up (close with F6, refresh by closing and re-opening)



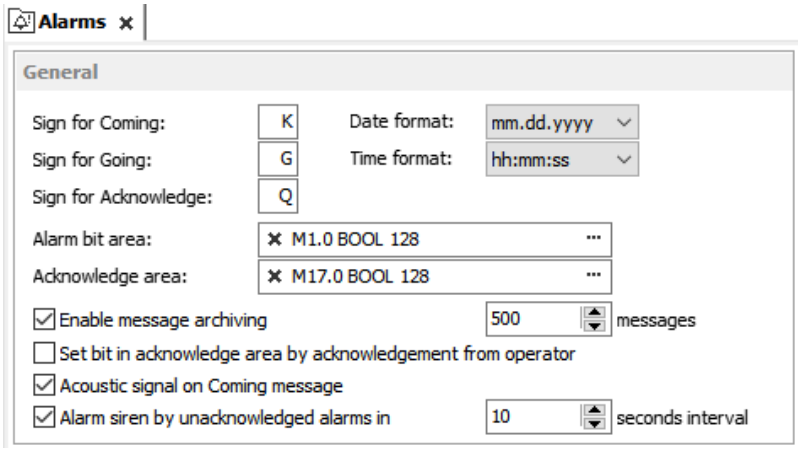
There all resources such as with „rechts“ in their name will be replaced into others like such as with „links“ in their name.
(… but only, if you organized you symbolic stringently ...)

Resource Messages (Alarms and Events)

Alarms / Events

It can be processed
- with CPU-V 128 alarms and 128 events
- with CPU-P/T 1024 alarms and 1024 events

and archiving 500 (CPU-V/-P) or 50.000 (CPU-P) messages (each: alarms and events).
(These archives can be deleted from Micro-SD-card by a VisuStage button function)



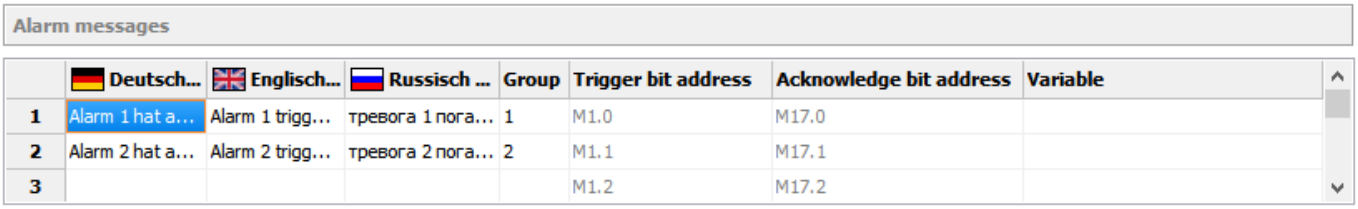
- Can be imported or exported as a csv-file (This helps for external translation)
- Import by → Extra → Import → Alarms / Events
- A new creation proceeds in project languages set default before.
- To archive it enable message archiving by a check mark and insert a micro-SD-card (Archiving is done in a binary file format. RemoteStage converts this binaries into csv, alt automated in batch files)
- Acoustic signal means a single sound by an internal buzzer
- Alarm siren means an one-second-sound of the internal buzzer, what is played once between 10 and 600 seconds.

Alarm-(Event-) Bit area (Trigger bit address area) is 128 bit at CPU-type V and 1024 bit at CPU-type P **and must be in a row without gaps!**
Each bit belongs to a message (alarm/ event) (bit 0 to Alarm/Event 1, bit 1 to Alarm/ Event 2, etc...)
The message state can be controlled by the S7-Program by a bit from this area.
With bit=1 this message appears as „coming“.
With bit=0 this message will be interpreted as„going“.

Acknowledge bit area (only for alarms) is 128 bit at CPU-type V and 1024 bit at CPU-type P. too **and must be in a row without gaps!.**
Each bit belongs to an alarm (bit 0 to alarm 1, bit 1 to alarm 2, etc...)
The alarm state can be controlled by the S7-Program by a bit from this area.
With bit=1 this alarm appears as „acknowledged“.
With bit=0 this message will be interpreted as „not acknowledged“.
Both areas may not overlap each other (error message appears at compiling)

ATTENTION:
The block for Trigger- and Acknowledge areas **MUSST EXIST** in the PLC and must have at least that size 128/1024Bit, otherwise messages will not be displayed!
If the acknowledge bit is **activated**, it must be **reset** in the PLC after a while, otherwise the next of these alarms appears as „acknowledged“.
If it is **not activated** and you create and use a visualization with the RemoteStage there will be set no bit in the PLC when you acknowledge the alarm on the RemoteStage-visualization and on any other panels/HMI this alarm stays **not acknowledged** there.

Alarm/ Event-Message box



	Deutsch...	Englisch...	Russisch ...	Group	Trigger bit address	Acknowledge bit address	Variable
1	Alarm 1 hat a...	Alarm 1 trigg...	тревога 1 нога...	1	M1.0	M17.0	
2	Alarm 2 hat a...	Alarm 2 trigg...	тревога 2 нога...	2	M1.1	M17.1	
3					M1.2	M17.2	

- Alarms of the same **Group** are acknowledged together / Alarms of Group 0 are acknowledged **automatically**.
- **Trigger bit / Acknowledge bit areas** are displayed for better information only and are not changeable in this view!
- An additional **variable** *(only for Panel-PLCs not for Panel-HMIs)* offers to display a dynamic optional error code as decimal number. (e.g. an calculated value of an special factor for customers needs as decimal number) → This is not a trigger variable for the message!
- Events can be displayed ascending or descending in the archive viewer
- By “Variable” a variables value (INT or REAL with (fix) 2 decimal places) can be displayed at the end of the message line.

Resource User administration

There can administrated be up to 9 users with passwords by 8 digit - PIN-codes. Users with level 9 have all access rights, those with level 1 have least access rights.

In the upper mask can be assigned

- the target screens, whereto the project should change after login/ logout or

  if there shall be called the PIN-input dialog directly after touching a button with access rights.

  and

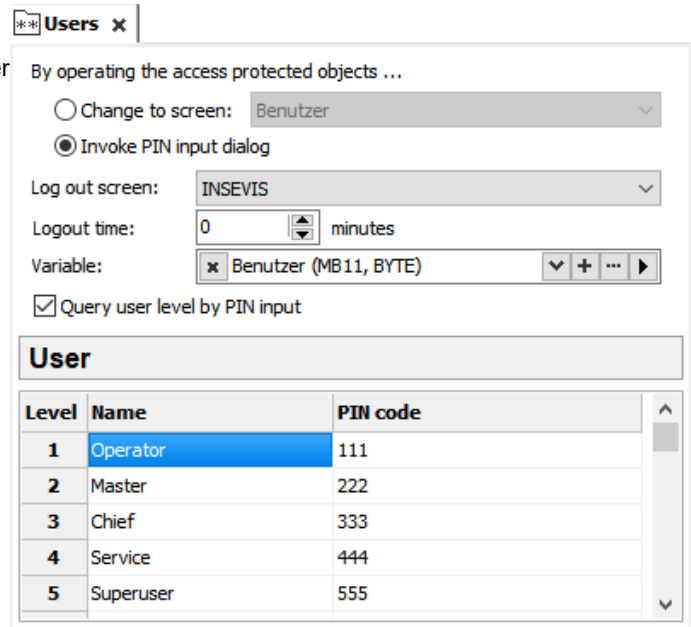
- an automatic logout time (in minutes).
  (With logout time 0 is assigned no automatic logout.)

  and

- a variable, what informs the PLC, what user level is active yet

  and

- an additional query to identify the user level before PIN input

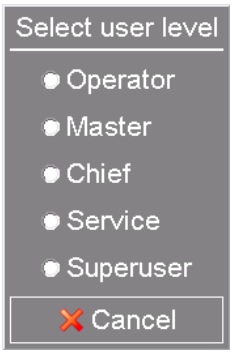


In the lower mask can be assigned

- the user names and PIN-codes of each levels (1...9).
- A new user will be added by entering its name and PIN-code

“Query user level by PIN input

Just before entering PIN code it is possible to activate a identification mask, where the user enters his level.



All lines can be displayed single-lingual or -by selecting different text resources- multi lingual in every project language. To be assigned at the resource “Dialogs / user level select”

Hint:
- The target menu screen after successfully log in will be assigned at the dynamic object „**PIN-input field**“
- With the **PIN-Change dialog- function** a PIN can be changed by the operator (his level stays the same). If this PIN is forgotten, a new upload of the visualization binary can set it back to delivery state.
- For a **user-level-referring screen** change use the function „Change screen with PIN input“ on a button.

Change user level by SFC215 "LOGIN"

The SFC215 "LOGIN" enables the user level change by S7-User program at Runtime.

Parameter	Declaration	Data type	Description
LADDR	INPUT	WORD	Logical base address = 0 (for all Panel-PLC) Logical base address = 1..16 (Connection ID number to Panel-HMI)
LEVEL	INPUT	BYTE	User level (1..9) 0 = Logout current user level
RET_VAL	OUTPUT	WORD	Error code W#16#0000 – No error W#16#8002 – VisuStage is not running W#16#8005 – Level is invalid or not configured W#16#8xyy – General error codes (compatible to STEP 7) only for Panel-HMI: W#16#7000 – Job is in process W#16#7001 – Invalid connection state e.g not connected W#16#7002 – Job is not accepted, because another job is proceeded actually W#16#7003 – Connection resource occupied (temporarily locked) W#16#8001 – Invalid connection ID number or connection is not configured
BUSY	OUTPUT	BOOL	TRUE: Job is in processing

S7-User program example to change user level 7

Target: Change to user level 7

```
UN    M   1502.4                  // if change request is not set, then
BEB                               // end the function

CALL  SFC  215
 LADDR  :=MW2000                  // VisuStage connection ID number.
                                  // In Panel-PLC (e.g PC710T) must be W#16#0.
 LEVEL  :=B#16#7                  // User level, could be 0..9
                                  // 0= Logout current user level
 RET_VAL:=MW1000                  // Return / result code
 BUSY   :=M1702.3                 // TRUE = Reading is in process

U     M   1702.3                  // Job is in process
BEB
R     M   1502.4                  // reset request signal

L     MW  1000                    // return / result code
L     0                           // no error
==I                               // If no error, then
BEB                               // end the function

L     MW  1000                    // error occurred
                                  // error evaluation
                                  // ...

BEA                               // end of function
```

Resource Partner-PLC (for HMI only)

INSEVIS HMIs run with data types of S7-300-family only. They use Ethernet S7-communication (Put/Get) to communicate The HMI communicates with its partner device by via Ethernet S7-communication. IN that communication INSEVIS-HMIs are the ACTIVE part. The referring partner-device will be identified by IP-address and TSAP (made of rack-no. / slot-no. of CPU / ID-no. of this connection resource). One HMI can only communicate with ONE partner-device (CPU).

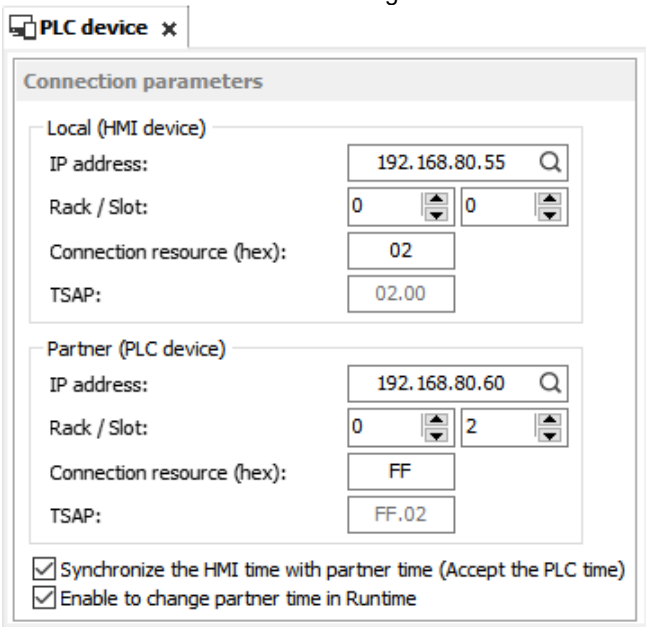
Connection setting in the HMI

- Either assign it in the BIOS of the Panel-HMIs (put out the Ethernet-cable, wait for the logo in the screen and than press left/right/left side of the screen) or
- in VisuStage-project at the resource partner device

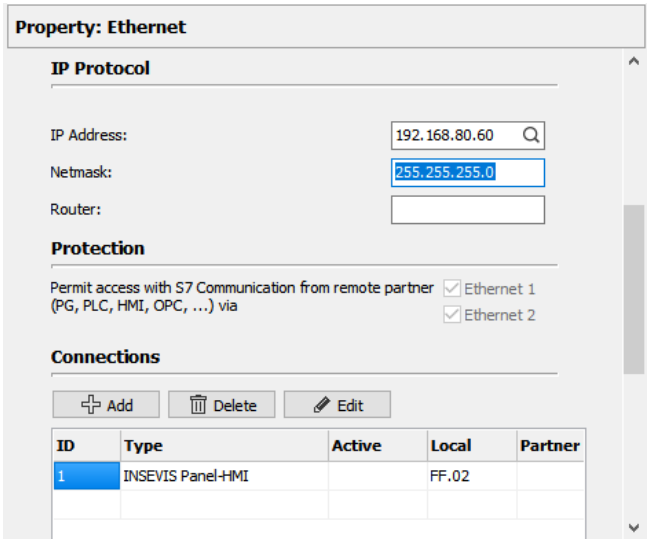
Connection settings in the Partner-device

- If the **PLC do not shall change screens or languages in the INSEVIS-HMI**, no connection must be assigned there. The PLC is using connection resource with ID-no 02 (reserved for OP-communication).
- If the **PLC shall change screens and languages at the INSEVIS-HMI**, an Ethernet connection with connection resource ID >03 must be assigned (e.g. in ConfigStage or in Siemens-programming tool)

below: assignment of connection parameter at HMI´s view in the VisuStage



below: assignment of connection parameter at PLC´s view in the ConfigStage



For INSEVIS-Panels and Siemens-CPUs

1. Assign the IP-address of the partner-PLC into the field „Partner-PLC“ in VisuStage-project or in HMI-BIOS
2. Configure the TSAP by assigning **rack-no / CPU-slot- no/ ID-no** of the connection resource
   for Siemens-CPUs 300/ 400 it is **0, 2, 02,**
   for Siemens-CPUs 1200/1500 it is **0, 1, 02** → allow “Put/Get” communication
   → do not use optimized DBs

Partner-PLC Synchronization (for HMI only)

When assigning partner device a time synchronization between panel and PLC is highly recommended.

1st check box: The HMI will be synchronized to the PLC-time
2nd check box: The PLC-time can be changed by the panel at runtime

Attention:
If you do not synchronize panel and PLC the difference between both devices may lead to unexpected program behavior.

Resource Dialogs

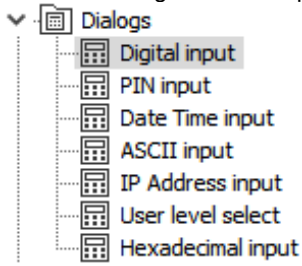
The dimension and the design of the virtual keyboards appearing at

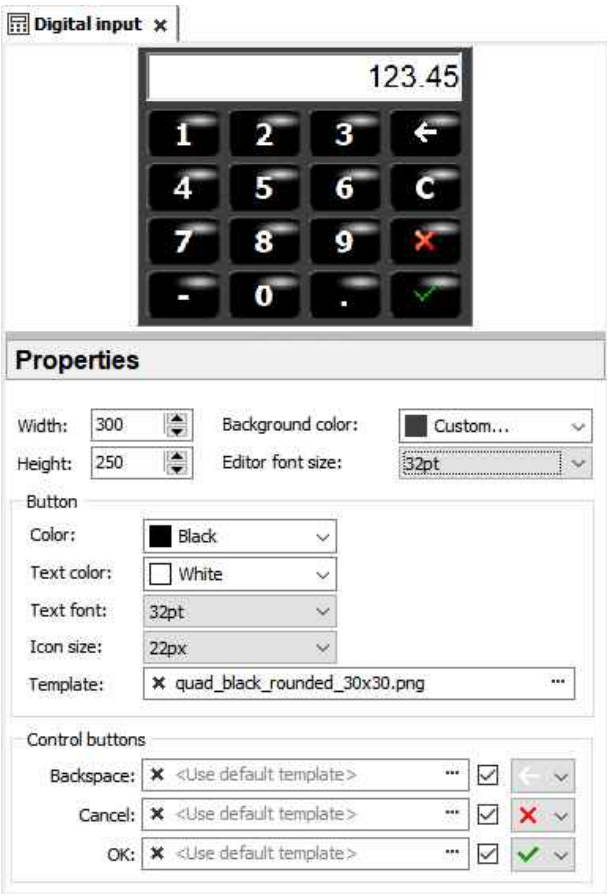
- I/O-field,
- Login field,
- Date-/Time field
- Stringinput field
- IP-address field
- User level select

can be adapted to ones needs in the resource „Dialogs“.

The size of the single keys is generated by the size of the whole object (Do not assign a size larger than the LCD-resolution!)

All other settings are self explaining.

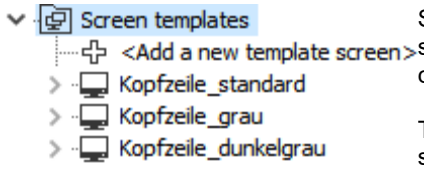




Hints:
At small panel diagonals it is very important benefit for the operator to easy enter his values that there is available a fitting virtual keyboard. This is not available at most other HMIs and a strong benefit for your solution.

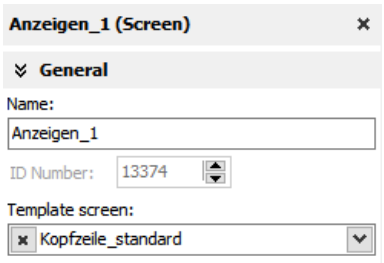
At the resource “user level select “ all lines (Header, single user levels and the cancel-button) can be displayed single-lingual or -by selecting different text resources- multi lingual in every project language.

Resource Screen templates



Screen templates (no image) can be created as a special resource and
can be uses once in every screen.

Therefore you activate this template screen in the settings of a screen you selected. Than choose one of the screen templates you made before.



Every modification in the screen templates will be taken over automatically into every screen this template will be used. Use this e.g. for top or bottom menus, headlines and so on.

Resources Trends

There can be processed 4 trends with 16 channels each. This represent values by time, smallest time base is 1 sec. All 16 channels of one trend need to have the same data format.

Trends will get a name - here “Druck” (pressure), what will be used for displaying and storing at RemoteStage as file name.

Samples: here you enter the number of samples in the circular buffer in runtime (100...200)

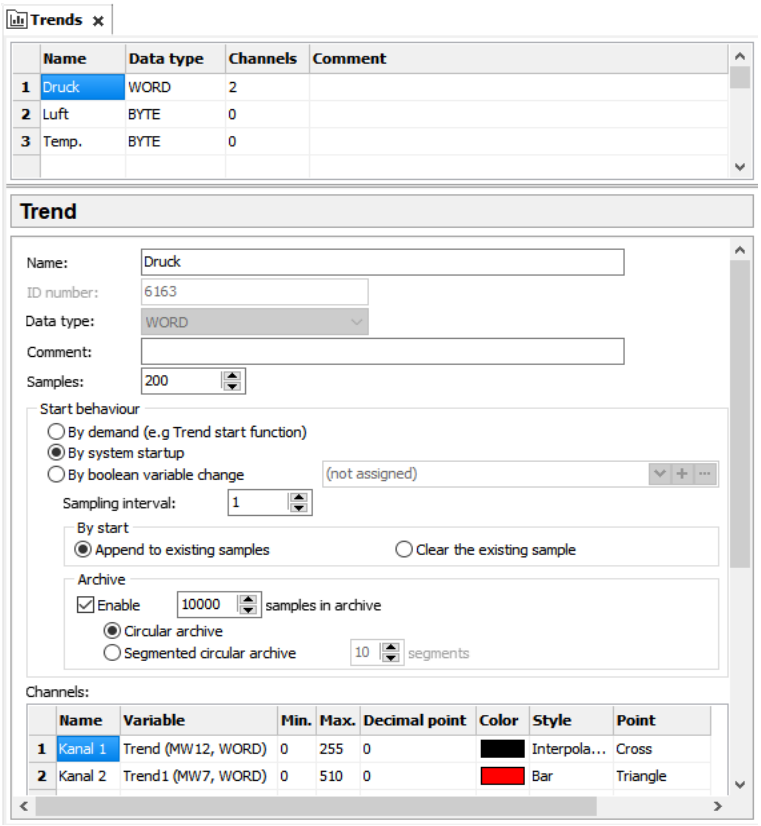
Start behavior: Beside S7-SFCs there are 3 additional ways to start a trending

- manually / by demand by assigning a function “Trend Start” to a button
  → Configuration at the function (limited archiving functionality to stay compatible to old versions)
- with each system start
  → Configuration at the trend resource settings
- depending on a variable
  → Configuration at the trend resource settings

If **Archive** was activated, you can

- enter the number of samples you want to archive in the **Circular archive** (max. 65635 samples per each trend channel) or
- combine up to 10 circular archives on the Micro-SD-card to an **Segmented circular archive** to 656.350 samples per each trend channel to display it in the trend archive viewer.

When number of samples exceed these limits, they will be overwritten in the FIFO system.

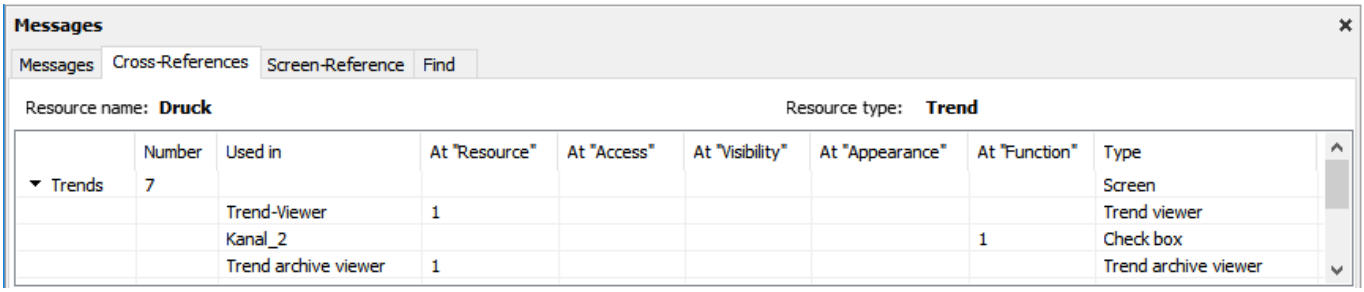


To configure the trend channel values, assign min/max values, decimal point, color, style (interpolated – shortest connection between 2 sample values, bars (vertically), stepped) and design of the sample point markers (diverse).

Archives will be archived to the external Micro-SD-card only. Each trend will be saved as own file. This binary will be converted by the software „RemoteStage“ on the PC into a csv- format either manually or in “Planned Tasks” of your Windows-PC. These archives can be deleted from Micro-SD-card by an special SFC, assigned as function to a button.

Cross references for trends

To keep the overview about the trends started, stopped, continued or displayed) in the project, there is a function „Cross reference“ (mark a trend and use right mouse button). All trend handling will be displayed referring to their usage in resources or in menu objects. By a double click on an item you get automatically into the menu, where it is used. Close/open the message window by key „F6“.



Starting the trend sampling with SFC 202 "TRENDSRT"

To start the configured Trend use SFC202 "TRENDSRT". The sampling interval and number of samples are assigned to the trend.
After starting, operating system samples the configured operand values in given interval and stores to Micro-SD card if „ARCHIVE“ parameter set to „TRUE“. If „CYCLIC“ parameter is „FALSE“, the „COUNT“ samples are one time sampled and trend automatically changes to „STOP“ state.

Trends are written to „**trend_xxx.bin**“ whereas xxx is Trend ID number. This archive file is based on „Ring-Buffer“ mechanism with „COUNT“ samples.

(Trend data can be get out of the PLC by SD-card only. In future versions a download by Ethernet will be possible.

Parameter	Declaration	Data type	Description
LADDR	INPUT	WORD	Logical base address = 0 (for all Panel-PLCs) Logical base address = 1...16 (connection-ID-No. to the Panel-HMI)
TREND	INPUT	INT	Trend ID number, (from VisuStage configured @ resources)
INTERVAL	INPUT	WORD	Sampling interval in seconds. 1..65535 second are allowed.
COUNT	INPUT	WORD	Number of samples to sample / to archive. 1..65535 are valid.
CYCLIC	INPUT	BOOL	TRUE: It cyclically samples the COUNT samples. FALSE: One time samples the COUNT samples, then stops the sampling
ARCHIVE	INPUT	BOOL	TRUE: Sampled values are stored in microSD card FALSE: No archive
RET_VAL	OUTPUT	WORD	Error code W#16#0000 – No error W#16#8002 – VisuStage is not running/configured W#16#8003 – Invalid „TREND“ ID number W#16#8004 – Invalid state / Already started. W#16#8005 – Invalid „INTERVAL“ value W#16#8006 – Invalid „COUNT“ value W#16#8xyy – General error codes (compatible to STEP®7) only for Panel-HMI: W#16#7000 – Job is in process W#16#7001 – Invalid connection state, e.g not connected W#16#7002 – Job not accepted, because another job is proceeded actually W#16#7003 – Connection resource occupied (temporarily locked) W#16#8001 – Invalid connection ID number or connection is not configured
BUSY	OUTPUT	BOOL	Busy flag, TRUE Job is in processing

If a trend is started once and the PLC has got a power OFF, the trend starts after power ON by itselfe automatically.

→ Here you will find more for parameterizing of the objects Trend viewer and trend archive viewer

S7-program sample for using the SFC202

Purpose: Start trend (ID number =6163) with configuration:

- 1s interval,
- cyclically,
- with archiving,
- ring buffer size 65535 samples (set of values)

```
      UN    M   1500.2      // if request is not set, then
      BEB                   // end the function

      CALL  SFC  202
       LADDR   :=W#16#0     // VisuStage connection ID number.
                            // In Panel-PLC (e.g PC700P) must be W#16#0.
       TREND   :=6163       // ID number of trend, which is configured in VisuStage
       INTERVAL:=W#16#1     // every 1s samples the values
       COUNT   :=W#16#FFFF  // max. no. of samples (set of values) 65535 (dez) => FFFF (hex)
       CYCLIC  :=TRUE       // cyclically samples as ring buffer.
                            // Buffer size is given in COUNT parameter
       ARCHIVE :=TRUE       // enables the archiving in micro SD card
       RET_VAL :=MW1000     // Result / return code
       BUSY    :=M1700.2    // TRUE = Request is in process

      U     M   1700.2      // If Start the trend is in process, then
      BEB                   // end this function
      R     M   1500.2      // reset request signal

      L     MW  1000        // return / result code
      L     0               // no error
      ==I                   // If no error, then
      BEB                   // end the function

      L     MW  1000        // error occurred
                            // error evaluation
                            // ...

      BEA                   // end of function
```

Stopping the trend sampling with SFC 203 "TRENDSTP"

The trend sampling can be stopped by SFC 204 “TRENDSTP“ function call.

Parameter	Declaration	Data type	Description
LADDR	INPUT	WORD	Logical base address = 0 (for all Panel-PLCs) Logical base address = 1...16 (connection-ID-No. to the Panel-HMI)
TREND	INPUT	INT	Trend ID number, (from VisuStage configured @ resources)
RET_VAL	OUTPUT	WORD	Error code W#16#0000 – No error W#16#8002 – VisuStage is not running/configured W#16#8003 – Invalid „TREND“ ID number W#16#8xyy – General error codes (compatible to STEP®7) only for Panel-HMI: W#16#7000 – Job is in process W#16#7001 – Invalid connection state, e.g not connected W#16#7002 – Job not accepted, because another job is proceeded actually W#16#7003 – Connection resource occupied (temporarily locked) W#16#8001 – Invalid connection ID number or connection is not configured
BUSY	OUTPUT	BOOL	Busy flag, TRUE Job is in processing

S7-program sample for using the SFC202

Purpose: Stop the trend with ID number 6163

```
      UN    M   1500.3          // if request is not set, then
      BEB                       // end the function

      CALL  SFC  203
       LADDR  :=W#16#0          // VisuStage connection ID number.
                                // In Panel-PLC (e.g PC700P) must be W#16#0.
       TREND  :=6163            // ID number of trend, which is configured in VisuStage
       RET_VAL:=MW1000          // Result / return code
       BUSY   :=M1700.3         // TRUE = Request is in process

      U     M   1700.3          // If top the trend is in process, then
      BEB                       // end this function
      R     M   1500.3          // reset request signal

      L     MW  1000            // return / result code
      L     0                   // no error
      ==I                       // If no error, then
      BEB                       // end the function

      L     MW  1000            // error occurred
                                // error evaluation
                                // ...

      BEA                       // end of function
```

Continue the trend sampling with SFC 204 "TRENDCNT"

The previously stopped trend sampling could be continued by calling SFC 204 “TRENDCNT“.

The sampling interval must be new assigned. The number of samples and sampling mode (cyclical overwriting, archiving) are kept as last assigned.

Parameter	Declaration	Data type	Description
LADDR	INPUT	WORD	Logical base address = 0 (for all Panel-PLCs) Logical base address = 1...16 (connection-ID-No. to the Panel-HMI)
TREND	INPUT	INT	Trend ID number, (from VisuStage configured @ resources)
INTERVAL	INPUT	WORD	Sampling interval in seconds. 1..65535 second are allowed.
RET_VAL	OUTPUT	WORD	Error code W#16#0000 – No error W#16#8002 – VisuStage is not running/configured W#16#8003 – Invalid „TREND“ ID number W#16#8004 – Trend was not started or Sampling count reached to zero. W#16#8xyy – General error codes (compatible to STEP®7) only for Panel-HMI: W#16#7000 – Job is in process W#16#7001 – Invalid connection state, e.g not connected W#16#7002 – Job not accepted, because another job is proceeded actually W#16#7003 – Connection resource occupied (temporarily locked) W#16#8001 – Invalid connection ID number or connection is not configured
BUSY	OUTPUT	BOOL	Busy flag, TRUE Job is in processing

→ Here you will find more for parameterizing of the objects Trend viewer and trend archive viewer

S7-program sample for using the SFC204

Purpose: Continue / resume the trend with ID number 6163

```
UN    M   1500.4          // if request is not set, then
BEB                       // end the function

CALL  SFC  204
 LADDR   :=W#16#0         // VisuStage connection ID number.
                          // In Panel-PLC (e.g PC700P) must be W#16#0.
 TREND   :=6163           // ID number of trend, which is configured in VisuStage
 INTERVAL:=W#16#1         // every 1s samples the values
 RET_VAL :=MW1000         // Result / return code
 BUSY    :=M1700.4        // TRUE = Request is in process


U     M   1700.4          // If Resume the trend is in process, then
BEB                       // end this function
R     M   1500.4          // reset request signal

L     MW  1000            // return / result code
L     0                   // no error
==I                       // If no error, then
BEB                       // end the function

L     MW  1000           // error occurred
                         // error evaluation
                         // ...

BEA                      // end of function
```

Query the trend status with SFC 205 "TRENDSTA"

To query the trend status use SFC205 “TRENDSTA” function. It reports about trend sampling and/or trend archiving status.

Parameter	Declaration	Data type	Description
LADDR	INPUT	WORD	Logical base address = 0 (for all Panel-PLCs) Logical base address = 1...16 (connection-ID-No. to the Panel-HMI)
TREND	INPUT	INT	Trend ID number, (from VisuStage configured @ resources)
RET_VAL	OUTPUT	WORD	Error code W#16#0000 – No error W#16#8002 – VisuStage is not running/configured W#16#8003 – Invalid „TREND“ ID number W#16#8xyy – General error codes (compatible to STEP®7) only for Panel-HMI: W#16#7000 – Job is in process W#16#7001 – Invalid connection state, e.g not connected W#16#7002 – Job not accepted, because another job is proceeded actually W#16#7003 – Connection resource occupied (temporarily locked) W#16#8001 – Invalid connection ID number or connection is not configured
BUSY	OUTPUT	BOOL	Busy flag, TRUE Job is in processing
TREND_STATUS	OUTPUT	BYTE	Trend status code B#16#00 – Trend sampling is not initiated B#16#01 – Trend sampling is initiated and running B#16#02 – Trend sampling has finished/stopped
ARCHIVE_STATUS	OUTPUT	BYTE	Archiving status code B#16#00 – Trend archiving is not initiated B#16#01 – Trend archiving is initiated and running B#16#02 – Trend archiving has finished successfully B#16#03 – SD card is not inserted or not recognized B#16#04 – Trend archiving stopped: Could not create file B#16#05 – Trend archiving stopped: Could not read file B#16#06 – Trend archiving stopped: Could not set file size B#16#07 – Trend archiving stopped: Could not write header to file B#16#08 – Trend archiving stopped: Error on file seek B#16#09 – Trend archiving stopped: Could not write samples to file

→ Here you will find more for parameterizing of the objects Trend viewer and trend archive viewer

S7-program sample for using the SFC205

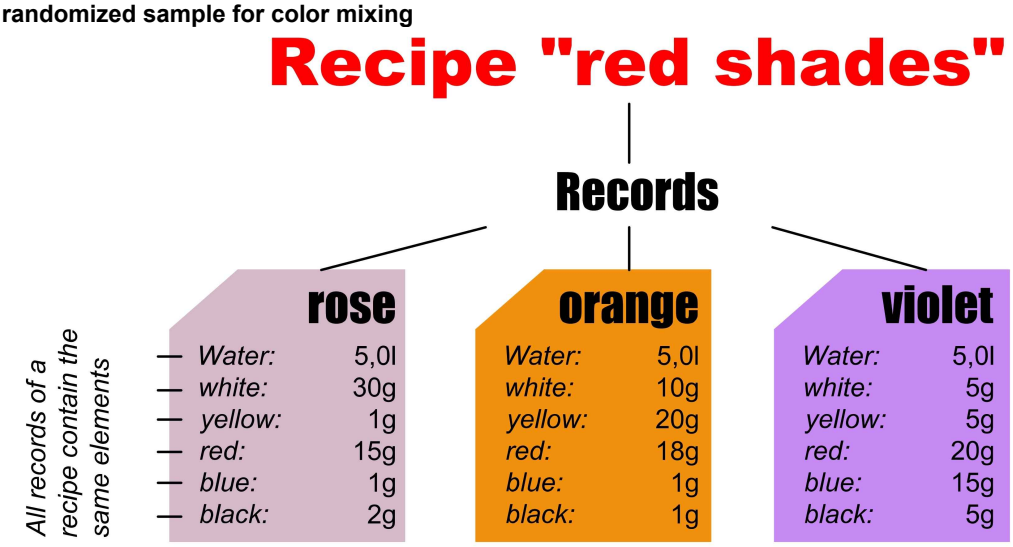
Purpose: Check the status of trend with ID number 6163

```
UN    M   1500.5          // if request is not set, then
BEB                       // end the function

CALL  SFC  205
 LADDR          :=W#16#0  // VisuStage connection ID number.
                          // In Panel-PLC (e.g PC700P) must be W#16#0.
 TREND          :=6163    // ID number of DRUCK trend, which is configured in VisuStage
 RET_VAL        :=MW1000  // Result / return code
 BUSY           :=M1700.5 // TRUE = Request is in process
 TREND_STATUS   :=MB2008  // Trend status code
 ARCHIVE_STATUS:=MB2009   // Trend archiving status code

U     M   1700.5          // If Start the trend is in process, then
BEB                       // end this function
R     M   1500.5          // reset request signal

L     MW  1000            // return / result code
L     0                   // no error
==I                       // If no error, then
BEB                       // end the function


L     MW  1000            // error occurred
                          // error evaluation
                          // ...

BEA                       // end of function
```

Resource recipe administration and recipe viewer

INSEVIS-Panels/HMIs and Panel-PLCs may administrate
- with CPU type V up to 64 recipes with each up to 128 records with each up to 128 elements and
- with CPU type P up to 64 recipes with each up to 256 records with each up to 256 elements.

Structure of a randomized sample for color mixing

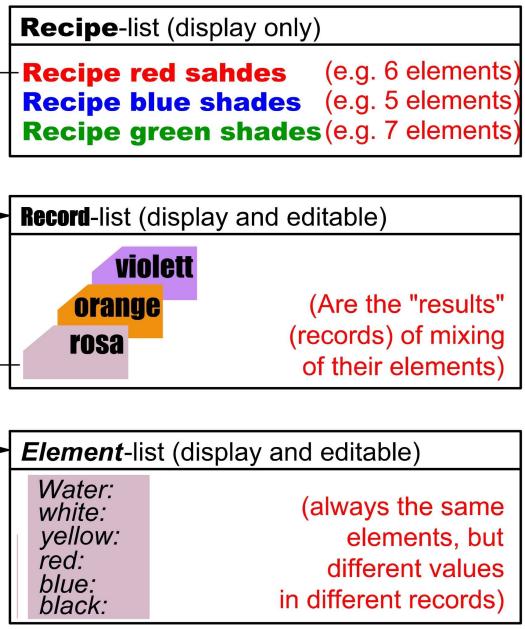


The different kinds of color shades (**red shade**, **blue shade**, **green shade**) are **recipes**.
Each recipe contains of always the same **elements** (e.g. **red shades** contains of *water, white, yellow, red, blue, black).*
Depending on the relation of the elements several **records** of the recipe **red shades** are generated (e.g. the colors **rose**, **orange**, **violet**).

The user selects a recipe from the **recipe list** first.
(in this sample the recipe **red shade**)
There can not be created new recipes at runtime, because new elements are needed for that. But for those elements some new machine parts must be integrated and wired (e.g. hatches, scales and so on...) first.

The record list shows existing records. A record can be added, selected for further operation, saved as or deleted here.
(in the sample te records (colors) **rose**, **orange**, **violet**)
If you create a recipe in the VisuStage, you assign a value for each element and so the first record is created automatically, buit not named and stored. Save it with a new name and so create your records.

Select a record to change its elements in the element list. The values of all elements (assigned to this recipe in the VisuStage) can be changed and stored here
(in the sample the elements *water, white, yellow, red, blue, black)*



INSEVIS-specific hints for recipe administration
1. INSEVIS- Panel-PLCs store the records in the Micro-SD-Card.
2. There is only one recipe viewer allowed and useful in a screen window.
3. If the visualization is changed and download again, the recipe structure wil overwritten by itself. But the record data on the Micro-SD-Card will be kept. So all stored records of the recipes can be kept while you update your visualization.
4. Because of the data storage on the Micro-SD-card (external memory) there no simulation of the recipe administration with SimuStage is possible.
5. The access administration is made by a button with own access rights, who changes the screen into the menu of the recipe viewer.
6. With SFC206 you can combine e.g. a bar code reader input with a special recipe record. The reference table (what bar code uses what recipe record) is to program in S7.
7. Export of recipe records is available with RemoteStage 1.0.3.7

Visualization with the software „VisuStage“

Development of recipes in a randomized sample for color mixing

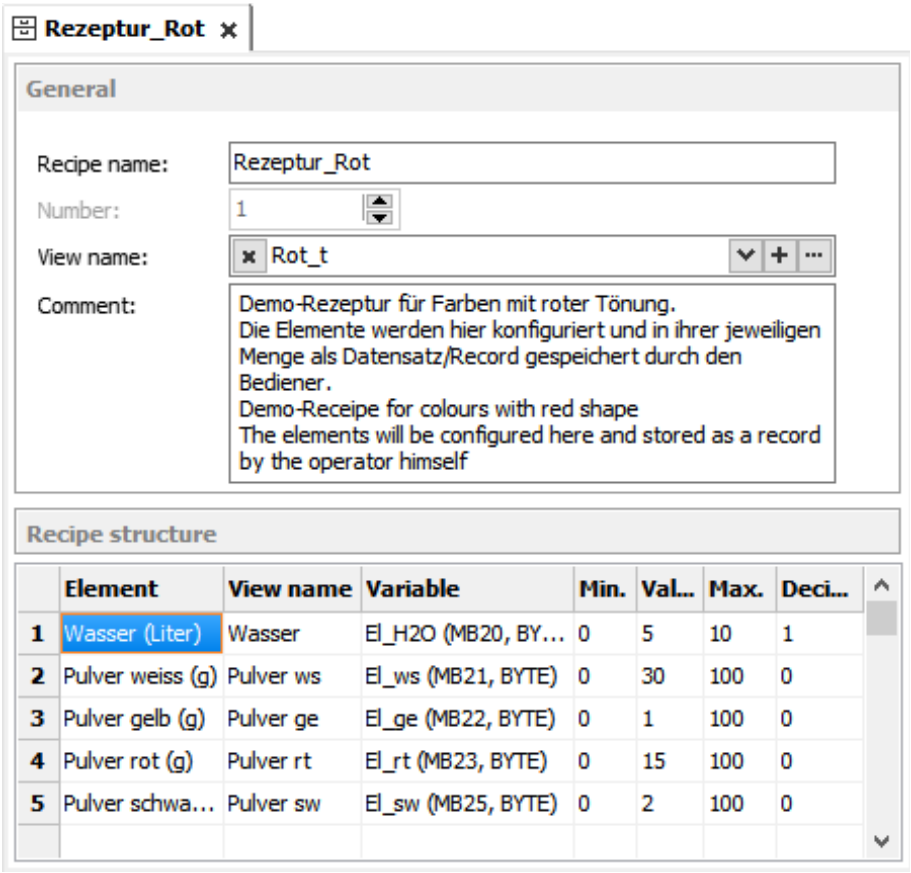
Choose „Add a new recipe“, parameterize it in a new window as written below:

General settings

Recipe name:	internal name of the recipe (independ of project language)
View name:	displayed name of the recipe (depends of project language)
Comment:	Insert your additional comments here
(Number)	automatic increased internal number of the recipe (not changeable)

Recipe structure

Element	internal name of the element (independ of project language)
View name:	displayed name of the element (depends of project language), Here the physical user unit can be displayed too (e.g. kg, sec., cm, etc.)
Variable	Assigning of a variable to this element (if you show user units, than scale this variable to fit with the displayed unit. So the operator can work very comfortable)
Min.	Input of the minimal value of the element (If the operator inserts a lower value, it will replaced by the the minimum value automatically)
Value	Input of the element value (thereby the elements of the first record will be pre-assigned and kept in the memory until the record is first time saved as...)
Max.	Input of the maximal value of the element (If the operator inserts a higher value, it will replaced by the the maximum value automatically)
Decimal point:	Insert the number of decimal places of the value



	Element	View name	Variable	Min.	Val...	Max.	Deci...
1	Wasser (Liter)	Wasser	El_H2O (MB20, BY...	0	5	10	1
2	Pulver weiss (g)	Pulver ws	El_ws (MB21, BYTE)	0	30	100	0
3	Pulver gelb (g)	Pulver ge	El_ge (MB22, BYTE)	0	1	100	0
4	Pulver rot (g)	Pulver rt	El_rt (MB23, BYTE)	0	15	100	0
5	Pulver schwa...	Pulver sw	El_sw (MB25, BYTE)	0	2	100	0

Hint:
The FAT16/32 file system of the Micro-SD-card does not accept some characters in the file- or folder names

These are: \ / : * ? " < > | This characters will be ignored.

Recipe handling with SFC 206 "RECIPE"

With the SFC206 “RECIPE” recipe records can be

- read in from Micro-SD-card and written to the PLC and
- written from the PLC to the Micro-SD-card.

It means, you can combine e.g. a bar code reader input with a special recipe record. The reference table (what bar code uses what recipe record) is to program in S7.

Parameter	Declaration	Data type	Description
REQ	INPUT	BOOL	TRUE assign and start job
LADDR	INPUT	WORD	Logical address 0 Panel-SPS (intern VisuStage RT) 1..16 HMI- Connection ID number
RECIPE	INPUT	INT	Recipe ID number (from VisuStage configured @ resources)
REC_NAME	INPUT	STRING	Recipe record name
FUNCTION	INPUT	BYTE	Function number 1 Read record from SD and write to PLC (SD → PLC) 2 Read record from PLC and write to SD (PLC → SD) 3 Read record from PLC and overwrite to SD (PLC → SD) 4 Delete record from SD 5 Check record existence in SD 6 Get number of records in SD (Output parameter „RETVAL“ returnes number of available records)
RETVAL	OUTPUT	WORD	Status code of job
BUSY	OUTPUT	BOOL	TRUE= Job is in process
DONE	OUTPUT	BOOL	TRUE= Job is done successful
ERROR	OUTPUT	BOOL	TRUE= Job is failed, error code in RETVAL

Status code meaning

RETVAL	BUSY	DONE	ERROR	Description
W#16#0000	0	1	0	Job is successfully done
W#16#7000	1	0	0	Job is process
W#16#7001	0	0	1	Connection is in invalid state (e.g. not connected)
W#16#7002	0	0	1	Job is not accepted, due to previous job is still in process
W#16#7003	0	0	1	Connection resource is temporary locked
W#16#7004	0	0	0	REQ Parameter is FALSE
W#16#8001	0	0	1	Invalid connection ID number
W#16#8002	0	0	1	Visualization is not running (on Panel-HMI) or recipe not configured
W#16#8003	0	0	1	Invalid RECIPE ID number
W#16#8004	0	0	1	File system is not ready (eg. SD card is not inserted)
W#16#8005	0	0	1	Could not access to record file in SD card
W#16#8006	0	0	1	Invalid file content
W#16#8007	0	0	1	Record file exists in SD card
W#16#8008	0	0	1	Recipe path not found in SD card
W#16#842A	0	0	1	Invalid format in REC_NAME parameter
W#16#852B	0	0	1	Invalid function ID number in FUNCTION parameter
W#16#8xyy	0	0	1	General error code (S7 compatible)

S7-program sample for using the SFC206

Purpose: Create (overwrite if record file exists) a new recipe record file in micro SD card.

```
CALL  SFC  206
 REQ      :=M1500.6              // TRUE = Request to create a new recipe record
 LADDR    :=W#16#0               // VisuStage connection ID number.
                                 // In Panel-PLC (e.g PC700P) must be W#16#0.
 RECIPE   :=1                    // Recipe number, in VisuStage configured
 REC_NAME:=DB205.RECORD_NAME     // Recipe record name
 FUNCT    :=B#16#3               // Write Record to SD card,
                                 // if record exists, overwrite it
 RET_VAL :=MW1000                // Result / return code
 BUSY     :=M1700.6              // TRUE = Request is in process
 DONE     :=M1002.0              // TRUE = Successful created
 ERROR    :=M1002.1              // TRUE = Error occurred

U     M   1700.6                 // If Recipe record is in process, then
BEB                              // end this function
R     M   1500.6                 // reset request signal

U     M   1002.0                 // If successful done, then
BEB                              // end the function

UN    M   1002.1                 // if no error occurred, then
BEB                              // end the function

L     MW  1000                   // error occurred
                                 // error evaluation
                                 // ...

BEA                              // end of function
```

Hint:
The FAT16/32 file system of the Micro-SD-card does not accept some characters in the file- or folder names

These are: \ / : * ? " < > | This characters will be ignored.

Hint to function 6
The input parameter „REC_NAME“ can carry wildcards as:

*	any ASCII character(s)
?	only one ASCII character
<ASCII character>	specific ASCII character

For sample:

- REC_NAME = “**ab***“ returns the number of all records, what start with **ab**
  (no matter what and how much character follow)
- REC_NAME = “**a?b**“ returns the number of all records with 3 characters
  (what start with **a** and end with **b** and contain on character in the middle (no matter what))
- **REC_NAME = “*“ or an empty S7-String return the number of all records**

Visualization with the software „VisuStage“

Basic functions

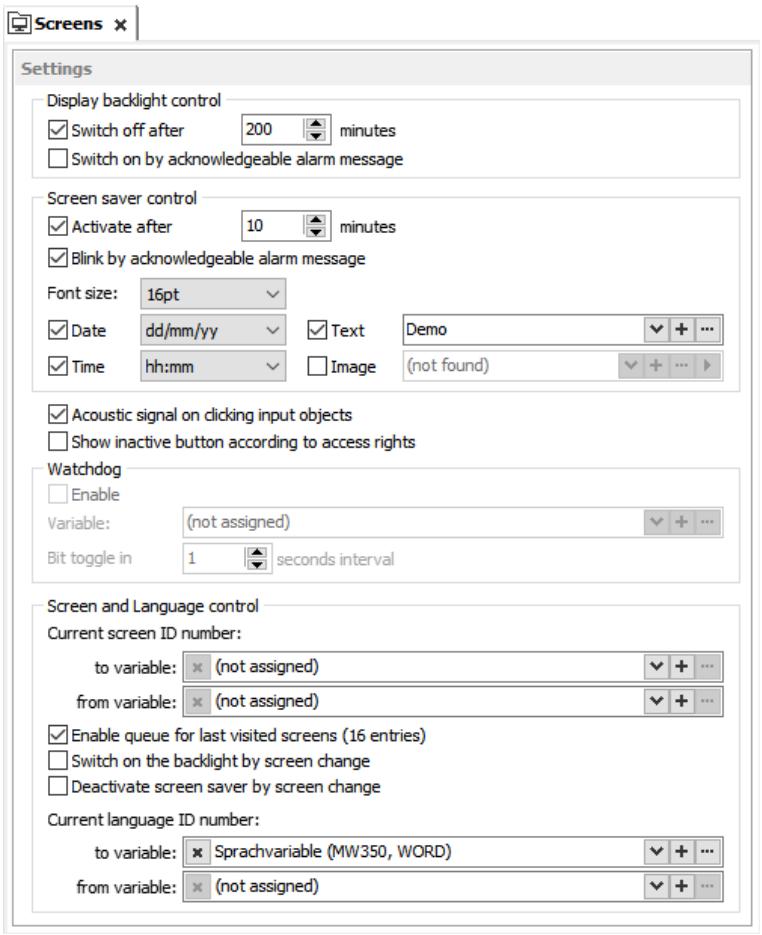
Copy/Cut, Paste, Delete, Group/Ungroup

There can be selected any objects by left mouse click and be copied/ cut out/ grouped/ ungrouped by right mouse key. Copied objects will be pasted in the same screen, they will get an X-Y-offset of 5 pixels to keep orientation.

Screens

The item „Screens“ shows an overview of all existing screens of the visualization. Here will be made general settings for

- **Display backlight**
  - Autonomous switch off
  - Alarm message after switch on
- **Screen saver**
  - Autonomous switch on
  - To be switched off by a programmed screen change by S7-program
  - Blinking, when alarm message is active
  - Design of a display of date/time, image or text, what should be displayed during the screen saver timer period
- **Acoustic signals** by an integrated buzzer
- **Watchdog**
  to control the connections to the PLC with a toggeling (live-) bit (for Panels-HMI only)
- **Control** of
  screens and languages by variables
  (writing actual screen/language ID to variable or change screen/language by its ID from variable)
- **Activation** of a log of
  the last 16 screens visited before
  (for button function “Change Screen”
  → <Previous screen>)



Hint:
Make the dimension of the screen saver ***much smaller*** that the whole resolution is to let the screen saver „walk“.

Background image

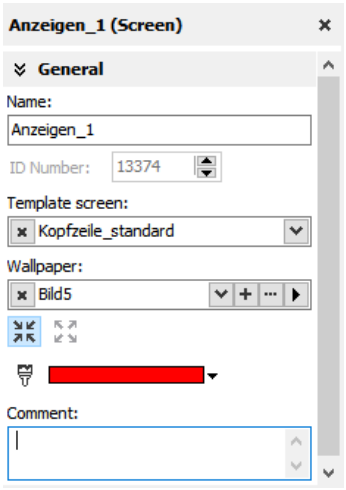
There can be used colors or images as background of each screen. Images need much mode memory and are recommended only it it is really necessary.

The ID-number of the screen will be used by the PLC, when a screen change is to be ordered by the PLC (of course not available in the HMIs). This ID is not to be changed manually.

A template screen can be selected and assigned.

A background color or a background image can be selected. (Image needs more memory than a simple color.)

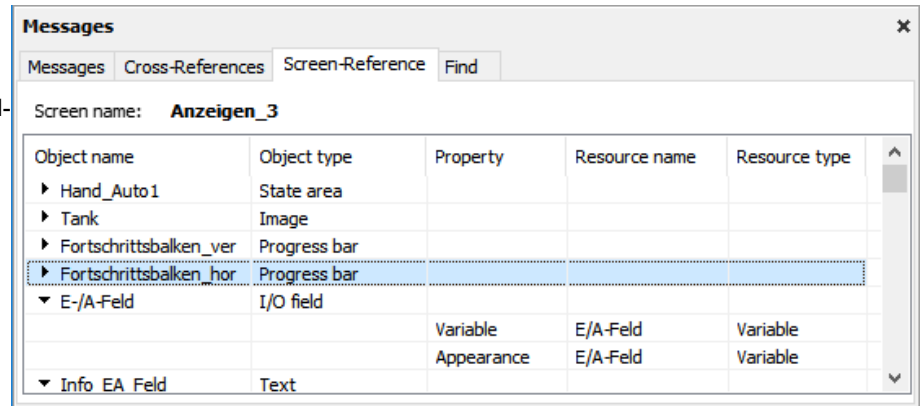
This box appears after clicking into an empty (no objects) area of the screen.



Display of used resources in a screen

The function „Screen-reference“ displays all resources used in the marked screen.

- Mark a screen in the left screen tree by left mouse key
- Right mouse key opens up a pull-down menu, select „Screen-reference“
- In the message window all resources of this screen will appear

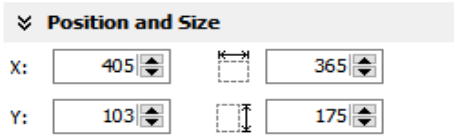


Clean Screen

The Clean screen will be started with a function (to be chosen by the rider „Function“) and there also the time period will be assigned.

Placing an object

Select the required objects at the catalog tree (right) and add them to the screen in a window by left mouse key.
Make the fine placement by the box „Position and Size“ in pixels or by key-combination SHIFT+arrow-keys (8 pixels each click)
Note that the zero-point (X;Y = 0;0) is the **TOP LEFT CORNER**

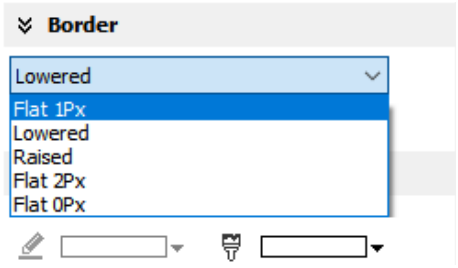


Text font

Here you can assign the font and size as well as the color and the style (Italian, Bride) of text

Border

Assign here the outline and mostly the rear color of your object
- flat = assign frame and background color without 3D-effect
- lowered = assign frame and background color with 3D-effect “low”
- raised = assign frame and background color with 3D-effect “high”
- none = transparent

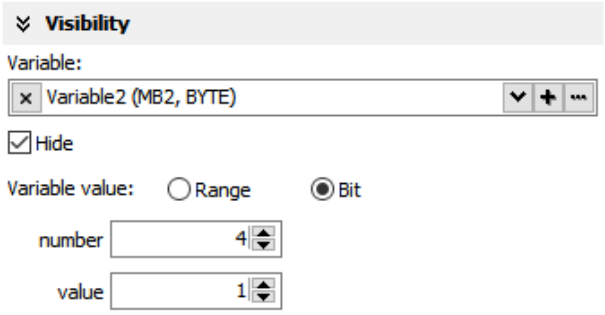


Margins

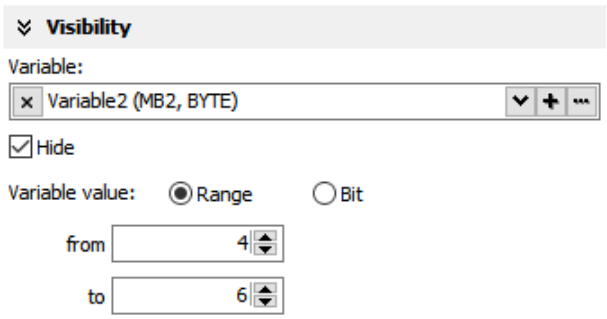
Assign the distance between texts/labels or symbols on a button to the frame of this object (in pixels).

Visibility

The visibility of objects can be controlled by a variable and is to be assigned easily



In this sample an object is hidden,
when the 4th bit (counting from right)
will have the binary value 1,
in all other cases it is visible

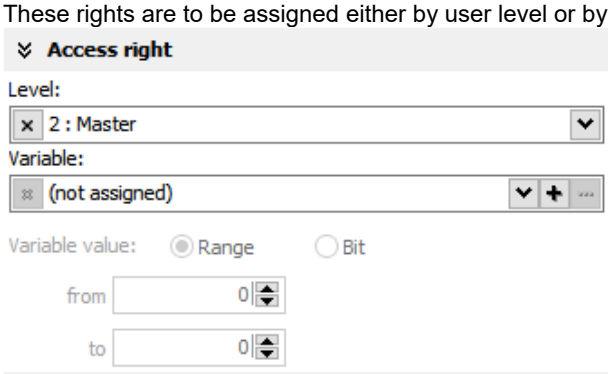


In this sample an object is hidden,
when the variables value is between 4 and 6,
in all other cases it is visible

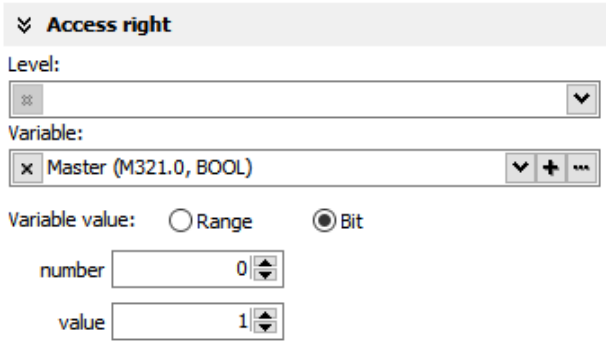
Hint: Depending on type of variables, some inputs can stay empty (e.g. the masking, if a boolean variable was selected).

Access rights

These rights are to be assigned either by user level or by a variable.



In this sample an object is accessible,
for every user below the level 2 (Master)

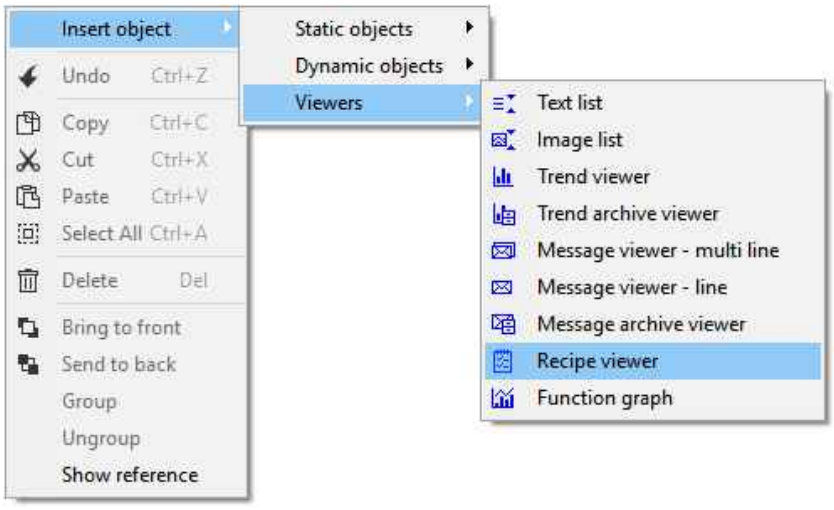


In this sample an object is accessible,
when the variables value is 1

Insert objects

Objects can be inserted by

- selecting in the right catalog window and clicking with left mouse key in the menue window
- a key combination without mouse in the menue window (to see right beside the object in the catalog-window)
- by right mouse key in the menue window by a popup window (see image right)



Group / Ungroup objects

Group objects is necessary to fix multiple objects in an preassigned position by the right mouse key. It makes sense e.g. to create library elements. The group can be split by right mouse key again.

The PLC can request what screen menu is active ad can force the VisuStage to change into another screen.

Query the current the screen ID number with SFC 200 "SCR_GET"

The currently shown screen ID number can be retrieved by using SFC 200 “SCR_GET“

Parameter	Declaration	Data type	Description
LADDR	INPUT	WORD	Logical base address = 0 (for all Panel-PLCs) Logical base address = 1...16 (connection-ID-No. to the Panel-HMI)
RET_VAL	OUTPUT	WORD	Error code W#16#0000 – No error W#16#8002 – VisuStage is not running/configured W#16#8xyy – General error codes (compatible to STEP®7) only for Panel-HMI: W#16#7000 – Job is in process W#16#7001 – Invalid connection state, e.g not connected W#16#7002 – Job not accepted, because another job is proceeded actually W#16#7003 – Connection resource occupied (temporarily locked) W#16#8001 – Invalid connection ID number or connection is not configured
BUSY	OUTPUT	BOOL	Busy flag, TRUE Job is in processing
SCREEN	OUTPUT	INT	Currently shown screen ID number, (from VisuStage configured @ resources)
LANG	OUTPUT	INT	Currently selected language ID number (referring to int´l. codes - you can find it in the csv-file, when using the text export)

S7-program sample for using the SFC200

Purpose: Query the actual screen

```
UN    M   1500.0                // if read request is not set, then
BEB                             // end the function

CALL  SFC  200
 LADDR  :=W#16#0                // VisuStage connection ID number.
                                // In Panel-PLC (e.g PC700P) must be W#16#0.
 RET_VAL:=MW1000                // Result / return code
 BUSY   :=M1700.0               // TRUE = Reading is in process
 SCREEN :=MW2002                // Current screen ID number
 LANG   :=MW2004                // Current language ID number

U     M   1700.0                // Reading is in process
BEB
R     M   1500.0                // reset request signal

L     MW  1000                  // return / result code
L     0                         // no error
==I                             // If no error, then
BEB                             // end the function

L     MW  1000                  // error occurred
                                // error evaluation
                                // ...

BEA                             // end of function
```

Changing the screen with SFC 201 "SCR_SET"

Screen can be changed by using SFC 201 “SCR_SET“.

Parameter	Declaration	Data type	Description
LADDR	INPUT	WORD	Logical base address = 0 (for all Panel-PLCs) Logical base address = 1...16 (connection-ID-No. to the Panel-HMI)
SCREEN	INPUT	INT	Screen ID number, (from VisuStage configured @ resources)
RET_VAL	OUTPUT	WORD	Error code W#16#0000 – No error W#16#8002 – VisuStage is not running/configured W#16#8003 – Invalid Screen ID number W#16#8xyy – General error codes (compatible to STEP®7) only for Panel-HMI: W#16#7000 – Job is in process W#16#7001 – Invalid connection state, e.g not connected W#16#7002 – Job not accepted, because another job is proceeded actually W#16#7003 – Connection resource occupied (temporarily locked) W#16#8001 – Invalid connection ID number or connection is not configured
BUSY	OUTPUT	BOOL	Busy flag, TRUE Job is in processing

S7-program sample for using the SFC201

Purpose: Change to screen with ID number 16917

```
      UN    M   1500.1                  // if request is not set, then
      BEB                              // end the function

      CALL  SFC  201
       LADDR  :=W#16#0                 // VisuStage connection ID number.
                                       // In Panel-PLC (e.g PC700P) must be W#16#0.
       SCREEN :=16917                  // Screen ID number to change
       RET_VAL:=MW1000                 // Return / result code
       BUSY   :=M1700.1                // TRUE = Request is in process

      U     M   1700.1                 // request is in process
      BEB
      R     M   1500.1                 // reset request signal

      L     MW  1000                   // return / result code
      L     0                          // no error
      ==I                              // if no error, then
      BEB                              // end the function

      L     MW  1000                   // error occurred
                                       // error evaluation
                                       // ...

      BEA                              // end of function
```

Creating a visualization screen

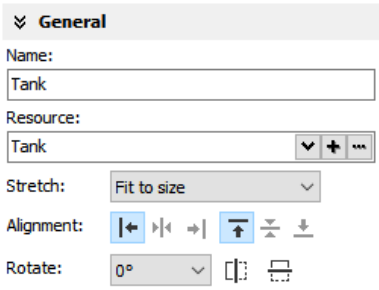
Static objects

Lines, rectangles, texts, images

Images

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Parameterize the object: (register “General”)

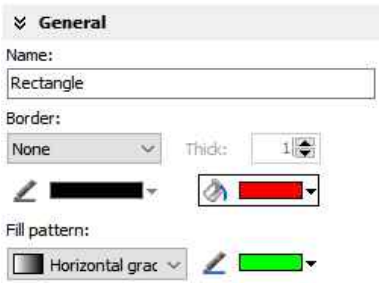
- use an existing **resource** or create a new one directly here
- in the **„Stretch“**-box choose **„Fit to size“** to see your image in the objects rectangle you did draw
- assign horizontal/vertical **orientation** if object is not stretched
- **rotate** and **mirror** object as you want to



Rectangles

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Parameterize the object: (register “General”)

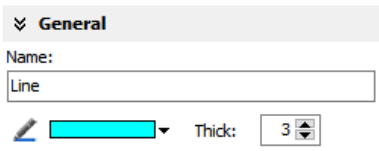
- this sample shows a rectangle without border, with a horizontal color gradient from red to green
- all other properties are self explaining



Lines

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Parameterize the object: (register “General”)

- this sample shows a 3px wide line.
- When changing target screens a miss calculation of width can happen what causes overlapping failure (reported in message window)



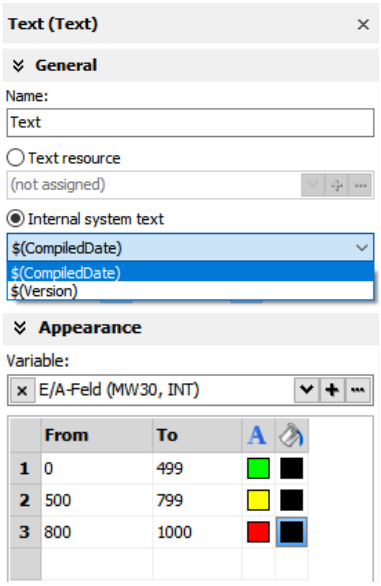
Texts

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign text fonts: (see basic funtions)
Parameterize the object: (register “General”)

- Use an existing **text resource** or create a new one directly here **OR** use the **Internal system text** to display compile-no and -date
- Assign font, bride and italic style
- Assign horizontal/vertical alignment
- Check “Wrap words” if this is a multiline text

Color the object: (register „Appearance“):

- Configure color changes by variables
  - First field is the color of the text font
  - Second field is the background

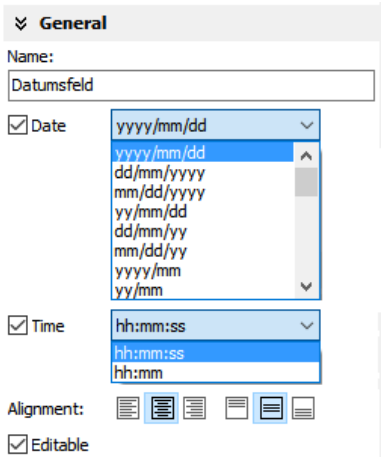


Hint:
To change the background color, assign a FLAT BORDER for the text object.. If you assign „NONE“, the background will be transparent and this can not be colored

Dynamic objects

Date/Time fields

Date/Time fields are used to **display** (and, when „Editable“ is checked) to **edit** time and date by an automatic displayed virtual keyboard to type in the values.



Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign border: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

Parameterize the object: (register “General”)

- Assign the **format of Date/Time field:**
  - Time format
  - Date format
- Assign horizontal and vertical alignment
- By checking **„Editable“** the object´s value is changeable by the operator on the touch panel

Hint:

- If a DateTime field is to narrow, than characters, what can not be displayed completely will not displayed at all
- At **TOD** (TimeOfDay) the time will be displayed in hh:mm:ss format.
  Use TOD for longer times.
- At **TIME**, **S5TIME** and **TIMER** time is displayed in ms Milliseconds).
- At **DATE** the date will be displayed in days (since 01.01.1990).

Attention / objects in general:

- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „ ► “ creates an error report, click on error and come directly to the failed object.

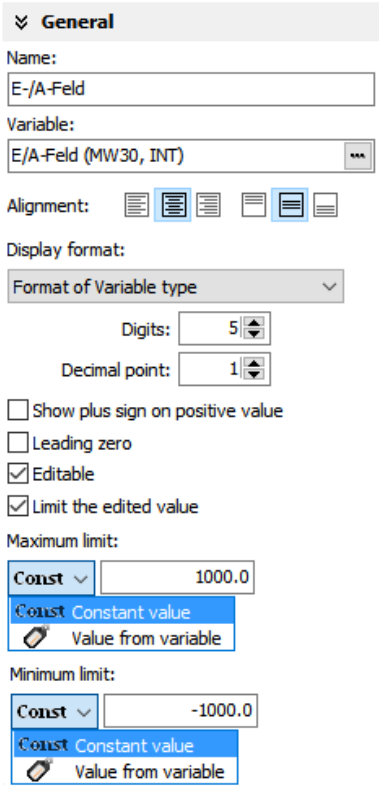
I/O fields

I/O fields are used to **display** (and, when „Editable“ is checked) to **edit** values with an automatic displayed virtual keyboard to type in the values.

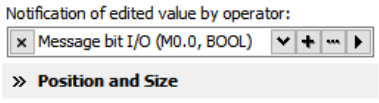
Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign border: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

Parameterize the object: (register “General”)

- Assign the vertical and horizontal **alignment**
- Assign a (or create a new one) **variable** to be displayed in this field
- Assign the **format of I/O-field**
  - leading zero, „+“-sign, digits, decimal point
  - display format (if comma-key shall be used in keyboard dialog)
  - or use the format of the assigned variable (shown here)
- By checking **„Editable“** the object´s value is changeable by the operator on the touch panel
- **Limit** the max/min values (always depending on the variables type)

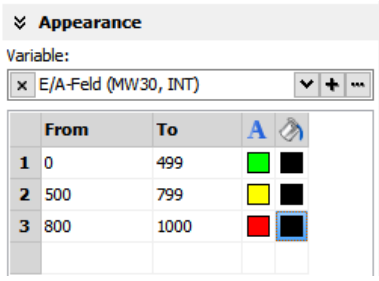


Notification of modification
Assign a bit to get informed, when the operator changes the value of the I/O-field at runtime.



Color the object: (register „Appearance“):

Assign a variable-based color change by entering
- the required colors for foreground (text color) and background (button color)
- the variable, what controls these color changes



Hint:
- At **STRNG** notice the S7-definitions (length-values in the first 2 bytes)!
  At INSEVIS the maximal length of the STRNG is 60 bytes
  BUT the referring DB MUST BE at least 60+2 bytes large!
- **Scaling:** by S7-program with the Siemens-FC105 SCALE
  (Result: REAL-value, what is not allowed in VisuStage to color the appearance of this fields),
- If this coloring/ appearance is needed, than us S7-commands Rounding (RND) or Cutting (TRUNC) to reach a valid value for this function
- If a DateTime field is to narrow, than characters, what can not be displayed completely will not displayed at all

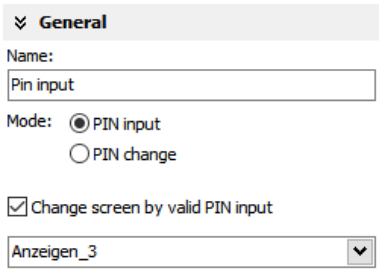
Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „►“ creates an error report, click on error and come directly to the failed object.

PIN input fields

In the user administration can be assigned up to 9 levels with an up to 8-digit PIN- number to administrate the access rights.

A login-keyboard appears automatically after touching the PIN input field by the operator.
„INPUT“ is to enter your PIN to get into your access rights.
„CHANGE“ means, that PIN can be changed by authorized personally. After changing the new PIN is valid.

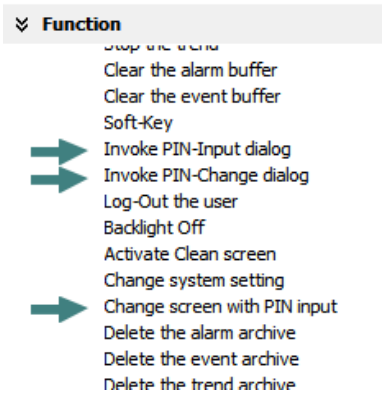
There are 3 ways to call this dialog:



1.) PIN-INPUT / CHANGE field (object)
The benefit of this way is, that the target screens, whereto it will be changed after successfully login/ logout are defined in the resource „User“

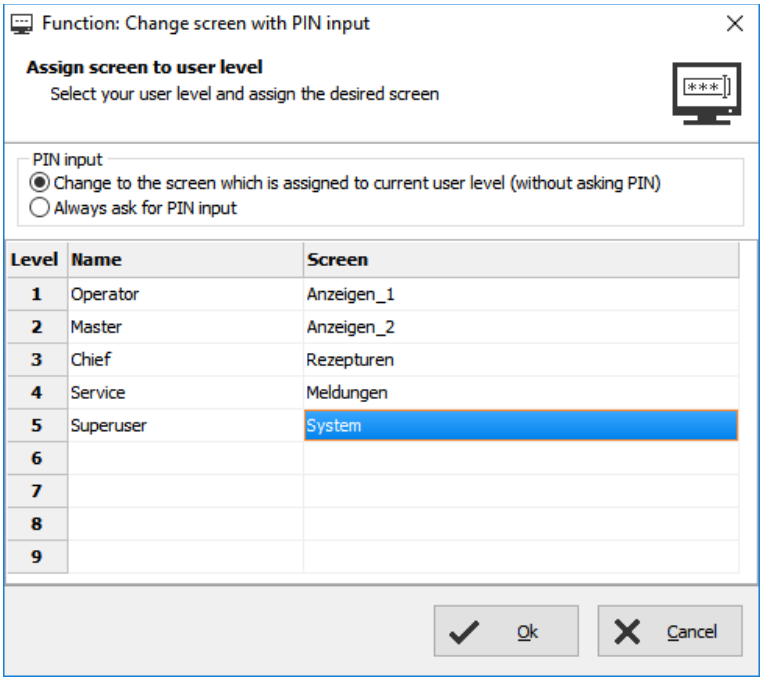
And here can be assigned a special screen change too.

2) Invoke PIN-INPUT / CHANGE dialog (function)
The benefit of this way is, that the login dialog can be assigned to any button or touch field as well. (See first 2 functions right)
The disadvantage is, that the screen is not automatically changeable with this function.



2) Change screen with PIN-input (function)
This is the right way to assign a different screen to change for every single user level.
(See 3rd function right)

With assigning this function you need to design the target screens for every user level.



Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

Diverse kinds of buttons

VisuStage contains standard, dynamic and text buttons.

- **Standard buttons** are available as templates and contain 65000 colors.
- **Dynamic buttons** will be created in the VisuStage, contain 256 colors only but offer symbol change (by image list), multi lingual text change (by text list) and color change functions.
- **Text buttons** can proceed text changes with very large text lists

All buttons contain the dead-man´s function (executing the function too, when leave the button sidewards).

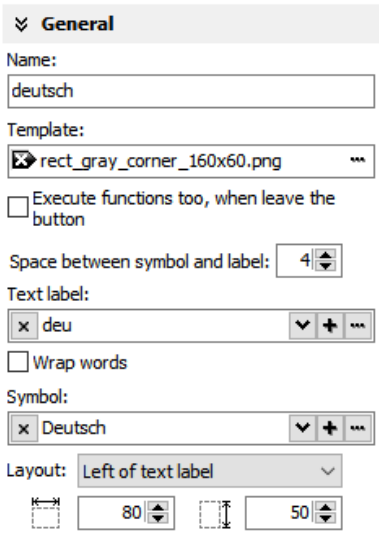
Attention
If you execute a function wen PRESSING and LEAVING the button, it is hardly recommended to check this box! Otherwise it may happen, that the operator leaves the button sideways without executing the assigned function for leaving the button and e.g. an drive does go on instead of stopping.

Standard buttons

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

Parameterize the object: (register “General”)

- Check / uncheck the execution when leaving the button sideways
- Select a **Label (Text)** from your resources or import it directly here to place it on the button
- Select a **Symbol** from your resources or import it directly here to place it on the button
- Assign the place, where the image/symbol is displayed referring to the text
- Assign the size of the symbols image



Use of selfmade buttons

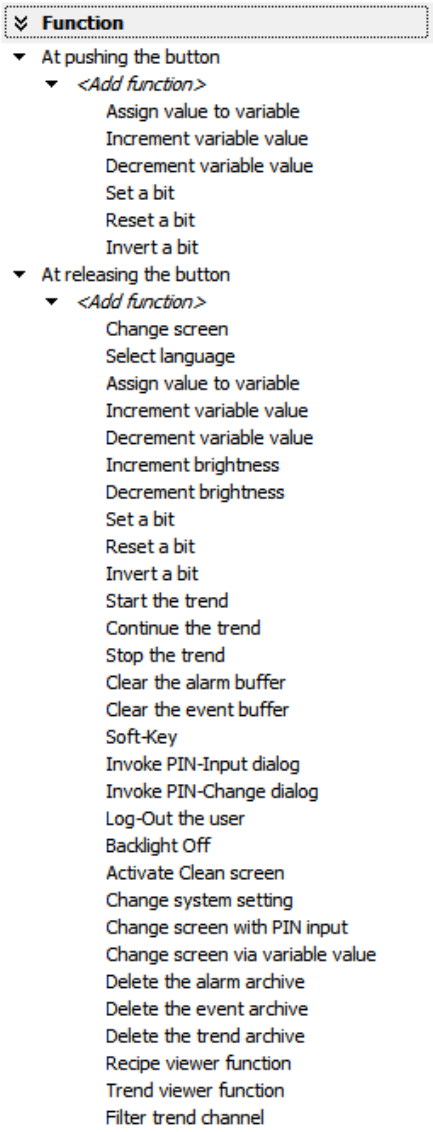
- Copy your 3 buttons (all with the same name) each in one of those 3 directories
  -\inactiv (displayed when no access is allowed),
  -\pressed (displayed wen pressed)
  -\unpressed (displayed when access is allowed, but unpressed),
  of the main directory C:\Programs (x86)\INSEVIS\ VisuStage\Buttons.
- Choose the same color for the are in the middle, where your text and/or symbol will appear.

Attention
If you forward the source code of this VisuStage project (vsproj + vsbin) you need to add the 3 self made buttons and copy it in the same path like VisuStage Is installed there. Otherwise these buttons will not be displayed (and compiled to the binary).

Visualization with the software „VisuStage“

Assign a function (register “Function”)

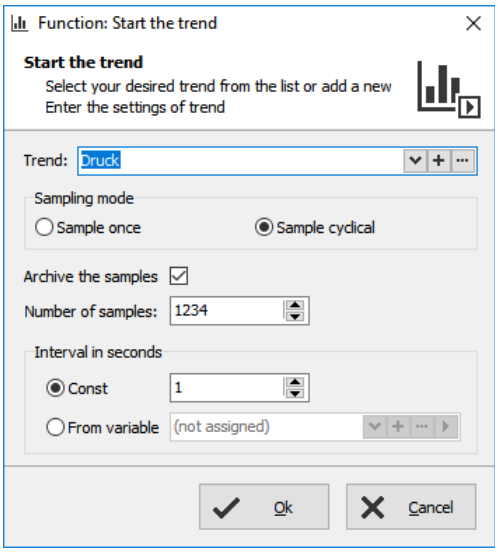
It is possible to assign multiple functions to one action (press or release).



- Decide, WHEN the function will be proceeded:
  - at PUSHING or
  - at RELEASING

  the button

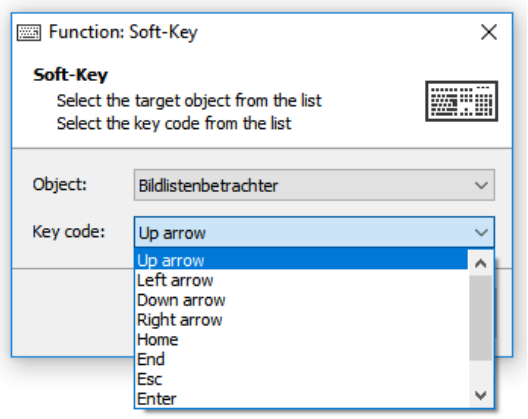
- After choosing a function (by double click) opens up another window to enter the required data for the selected function (like shown in sample below at “start Trend” function:)



- There can be assigned multiple functions to one object as well
- There can be assigned functions for pushing and releasing the button as well

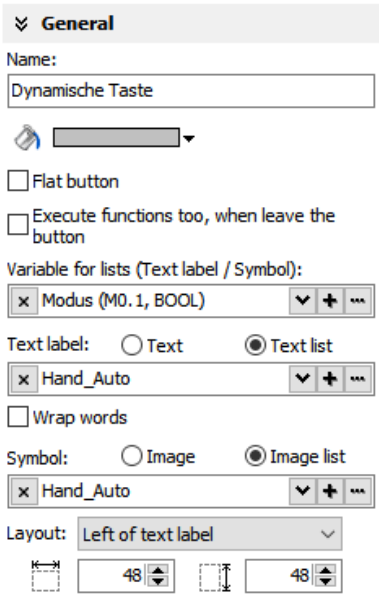
Use of Soft-Key function

- It is used to create own navigation buttons for viewer object and works in the same screen as the viewer object is.
- If there are more than one object with soft-key opportunities you have to select it first in the upper line.



Dynamic buttons

This buttons were used mostly for a mixture as state area, text- and image lists with a function to execute.)e.g. is in run / switch to stop, etc.). For this kind of button it is not possible to create own ones, because they were calculated at runtime.



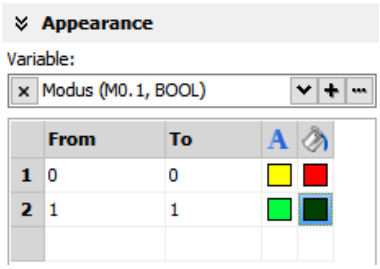
Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

Parameterize the object: (register “General”)

- **Assign a variable**, to control symbol- and text changes
- **Text changes:** (in the sample description / state of the buttons) choose (or create a new) a **text list**, what shell be shown on the dynamic button
- **Symbol changes:** (in the sample manually/automatic mode sign) choose (or create a new) an **image list**, what shell be shown on the dynamic button

Color the object: (register „Appearance“):

- **Color changes** for foreground (text color) and background (for button color)
- **Assign a variable** to control color changes



Attention
If there is active another value as these what are assigned in line 1...n, than ALWAYS this appearance will be displayed, what is assigned FIRST (in first line / line 1).

Use of self-made buttons
- Dynamic buttons are to be created in the VisuStage software.
- There is not possible to add additional (own) button designs.

Text buttons

These objects are used like a dynamic button without symbol change, but can be used to proceed very large text lists. For this kind of button it is not possible to create own ones, because they were calculated at runtime.

Touch areas – invisible buttons

These objects will be placed above an other object (mostly an image) to add a special function by pressing it (like an invisible button over a special part of a machine).

Place an object: (see basic funtions)
Assign access right: (see basic funtions)
Assign a function: (register “Function”)
like at the simple buttons.

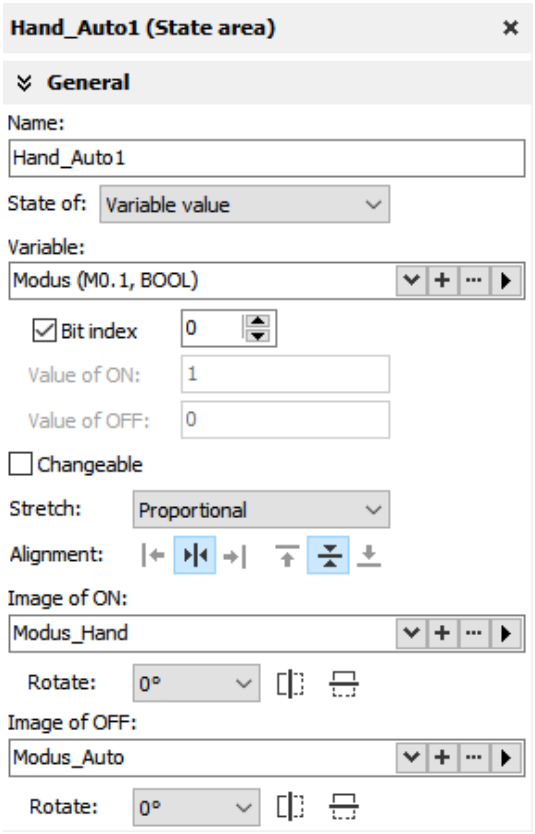
Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „►“ creates an error report, click on error and come directly to the failed object.

State areas

Place an object: (see basic funtions)
Assign access rights: (see basic funtions)
Assign visibility: (see basic funtions)

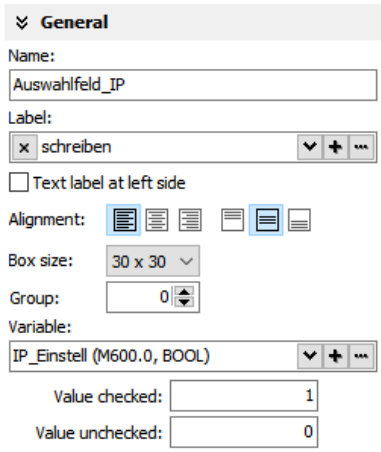
Parameterize the object: (register “General”)

- If you depend the state area on variables
  → use an existing resource or create a new one directly here
- If you use a system setting
  → select one of the system settings of the drop down menue
- In the „Stretch“-box choose
  - „Fit to size“ to see your image in the objects rectangle you did draw
  - “Proportional” to keep the images proportion (rest of the object stays empty)
- Assign an image resource or create a new one to be shown in ON-state and in OFF-state



Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- use PNG graphic format with a transparent Alpha-channel to let the background shine through the transparent areas of the image (e.g. on rounded corners).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

Radio boxes and Check boxes

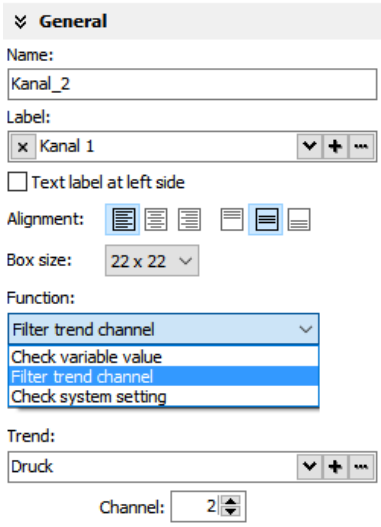


Radio boxes are used to visualize an **either-or-selection**
(e.g. at alarms coming and leaving)

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

Parameterize the object: (register “General”)

- Assign (or create a new one) a text („Label“) to describe the check item in the box
- Assign the alignment of the text
- Assign the dimension of the box size to click into
- Assign the group information (to what other radio boxes it should belong)
- Assign a variable value for UNCHECKED and one for CHECKED state



Check boxes can be checked and unchecked individually and **multiple** of it
(e.g. to filter trend channel or to change a state area).
Also these boxes are used to assign buzzer system functions.

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

Parameterize the object: (register “General”)

- Check,. If the text shall be left of the check box
- Assign (or create a new one) a text („Label“) to describe the check item in the box
- Assign the alignment of the text to the objects border
- Assign the dimension of the box size to click into
- Assign a variable, where the value is set by activating CHECKED / UNCHECKED (e.g. a bit with 0 / 1)
- Assign (or create a new one) a filter for a trend channel to show or
- Assign the state of a system property like e.g. the internal buzzer

Attention / objects in general:

- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- transparent areas of the image (e.g. on rounded corners).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

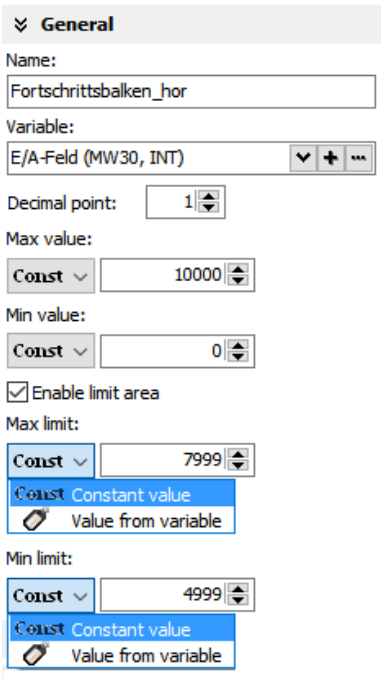
Progress bars

This item is uses to display analog values like dimensions, time, etc., where different colors depend on different limits assigned before.
The progress bar right was designed with these settings below:

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

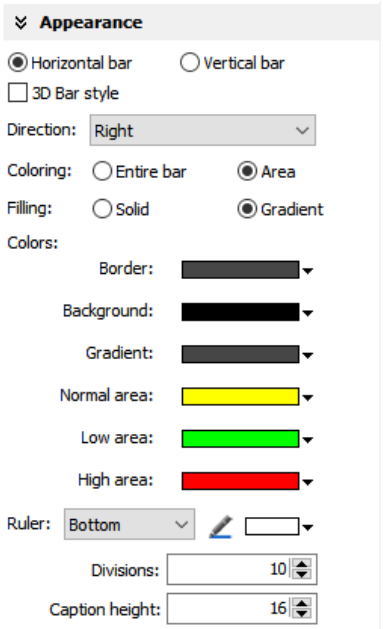
Parameterize the object: (register “General”)

- Assign a **variable** (or create a new one)
- Assign the **format** (minimal value, maximal value, decimal point)
  At INTEGER values type in the value w/o decimal point (here: 10000 = 1000.0)
- Assign a variable or a fixed value for Maxlimit and for Minlimit of the progress bar.
- If you want to color 3 parts of the progress bar, enable limit areas
  - by a fixed value or
  . By a variable



Color the object: (register „Appearance“)

- Choose a **bar style** (horizontal, vertical, 2D, 3D, color of background and fill color
- Decide, if the bar is always having ONE actual color (“Solid”)
  or 3 segments with a single color each (“Area”)
- If “Area” was selected: Assign direction of the colors in the bar
- Assign colors and of the 3 segments defined by the limits in “General”
- Design the **ruler** (position, color, divisions, capture height)
  → at unfavourable divisions rounding errors are possible!

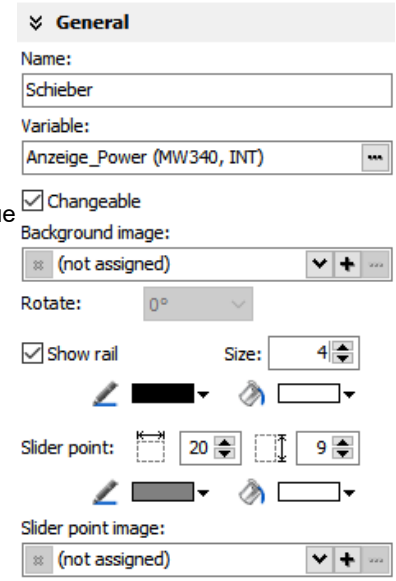


Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

Sliders

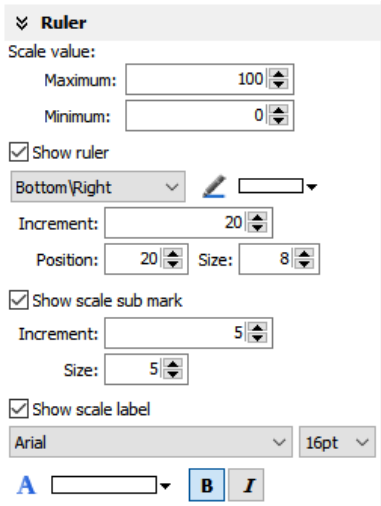
This object is a good solution to display a variables value along a staight line or (if editable is activated) to set up a value roughly by hand.

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign access rights: (see basic funtions)



Parameterize the object: (register “General”)

- Assign a **Variable** vor the value you want to display/edit
- If “**Changeable**” is activated the slider point is movable and changes the variables value
- It is possible to assign the sliding rail by VisuStage or to import an existing image as **Background image**
- It is possible to assign the sliding point by VisuStage or to import an existing image as **Slider point image**



Parameterize the scale: (register “Ruler”)

- Insert fixed values for the **Minimum / Maximum** of the rulers range
- Activate the display of the **Ruler**
- Select the rulers position referring the slider
- Assign the increments (values between the visible values on the ruler)
- **Position** = The rulers distance between the ruler and the sliding rail.
- **Size** = Width (at vertical) e.g. height (at horizontal) of the ruler
- Activate **Scale sub marks** (between the main marks = rulers increments)
  (it is better if these sub marks are a devisor of the main mark, e.g. 5 or 10, when the rulers increment is 20)
- Activate **Scale label** (self explaining)

Hint:
By the dimension of the objects when putting into the menue by mouse it will be set automatically, if it is a
- vertical (height > width) or an
- horizontal (height > width) slider.

Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

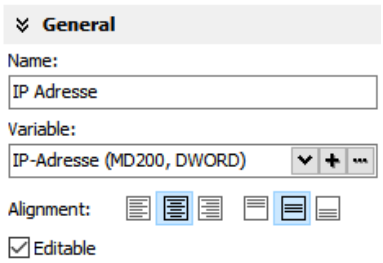
System data (IP-address field, languages, etc.)

While languages, brightness or screen savers are functions what can be assigned to buttons or touch areas, the IP-address-field is an own object.

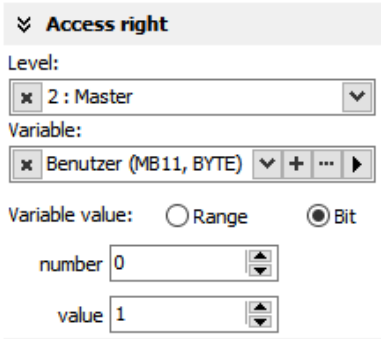
Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Assign margins: (see basic funtions)
Assign font: (see basic funtions)
Assign access rights: (see basic funtions)

Parameterize the object: (register “General”)

- Assign a (or create a new one) **variable** to control the system property
- By checking **„Editable“** the object´s value is changable by the operator on the touch panel
- Assign the alignment of the box

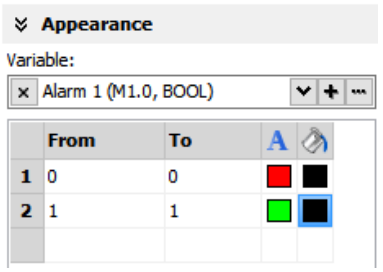


- Assign access rights



Color the object: (register „Appearance“)

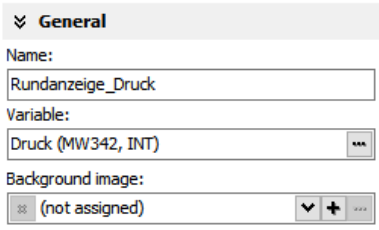
- If the field and text colors should change by variables value (e.g. „Disabled-Look“ and „Enabled-Look“)



Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

Gauges

With this object a value can displayed in a gauge form with a pointer like in older meters.



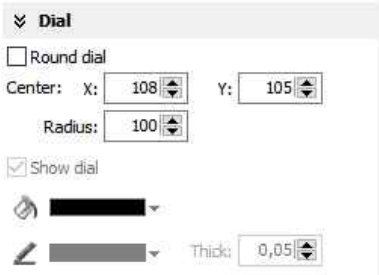
Place an object: (see basic funtions)
Assign visibility: (see basic funtions)

Parameterize the object: (register “General”)

- Assign a variable to display their value
- Activate a background image
  (If you do not want do create your gauge by VisuStage)

Parameterize the dial: (register “Dial”)
When round dial is activated, a circle is created by the smaller value ox X and Y

- When “Show dial” is activated this can be colored
  - Assign the background color of the dial
  - Assign the border color and thickness of the dial
- When “Round dial” is dectivated, you can set:
  - **Radius** of the circle segment (angle below „Scale“)
  - **X-Position** of the pointer rotation points (from the left object border)
  - **Y-Position** of the pointer rotation points (from the upper object border)



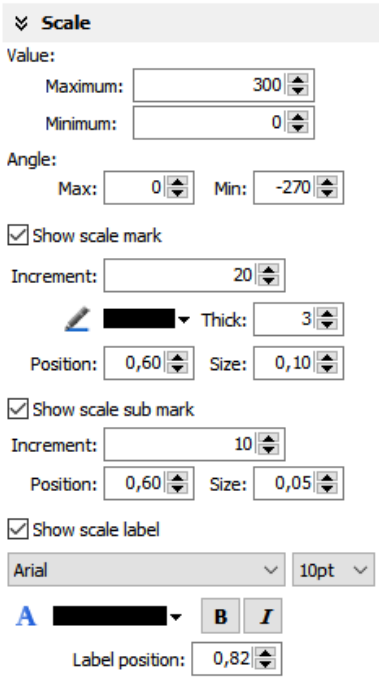
Scale configuration: (register “Scale”)

- Insert **Minimum / Maximum** of the scale value to be dislayed

- Insert the **Angle** of the circle segment for the scale area
  - Start at **Min**, end at **Max,**
  - **Pointer always runs clockwise**
  - Information angle position: -270° = „6 o´clock“ / -180° = „9 o´clock“
    -90° = „12 o´clock“ / 0° = „3 o´clock“ / 90° = „6 o´clock“
    180° = „9 o´clock“ / 270° = „12 o´clock“

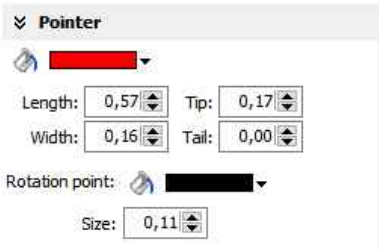
- Activate **Scale marks** (marks and sub marks)
  - Increments between main marks
  - Color, thickness, position (~Radius form pointer rotation point), size (~length)
- Activate **Scal sub marks**
  - Increments between sub marks
  - Color, thickness, position (~Radius of the pointer rotation point), size (~length)

- Activate **Scale label**
  - Font, size, color, style (bride/italian)
  - Position (~ assign radius of the pointer rotation point



Pointer configuration: (register “Pointer”)

- Assign a **color** for the pointer
- Assign the **length** of the pointer (distance between pointer root to top))
- Assign the **width** of the pointer
- Design the shape of the **pointers tip** (0,01~ flat, >0,01 more and more narrow)
- Assign the distance between pointer root to the rotation point **(tail)**
- Color the **circle at the pointers rotation point**
  (The rotation circle always does have a 1 pixel-frame outside in the pointers color))
- Adjust the **size (diameter)** of the rotations points circle



Visualization with the software „VisuStage“

Configure the color ring: (register „Range“)
Limits and areas can be colored by a ring inside/outside the scale.

- Activate **Scale range**
  - Assign the **position** (~ radius of this circle segment)
  - Assign the **thickness** of this ring
- **Coloring**
  - The color area do not have an upper limit.
  - The next color are starts at the lower limit of the next color.
  - the last color limit is the maximum limit of the scale

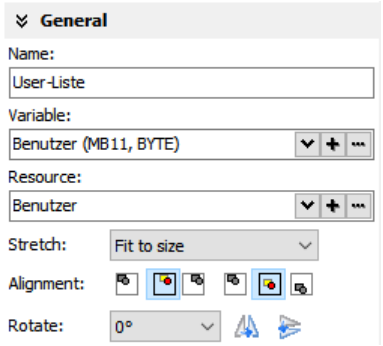
Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

Viewers

Image and text lists

Image list sample

with color change of the pipes. The pipes will be separated into segments. For these segments all colors are available as single images with the requested colors. In the resource „image list“ values will be assigned to these single images. In the object image list these values will be controlled by a variable (what itself is controlled by arrow buttons, what increase/decrease its value by „1“. This value is also shown in a I/O-field).



Place an object: (see basic funtions)
Assign visibility: (see basic funtions)

Parameterize the object: (register “General”)

- Ín the **„Stretch“**-box choose **„Fit to size“** to see your image in the objects rectangle you did draw
- Assign horizontal/vertical **orientation** if object is not stretched
- **Rotate** and **mirror** object as you want to assign an **image list** resource (must be existing - created at the image lists item)
- Assign a **variable**, what controls the image lists value

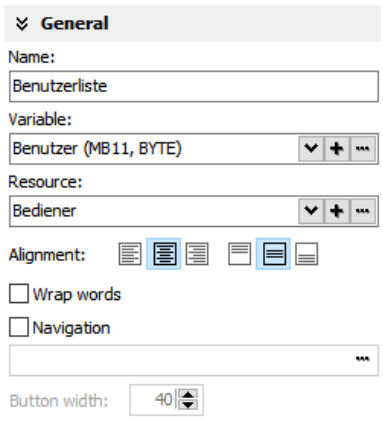
Text list sample

with displaying the actual logged-in user. There were assigned 3 user (user 1, .._2, .._3).

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)

Parameterize the object: (register “General”)

- In the **„Stretch“**-box choose **„Fit to size“** to see your image in the objects rectangle you did draw
- Assign horizontal/vertical **orientation** if object is not stretched
- **Rotate** and **mirror** object as you want to assign an **image list** resource (must be existing - created at the image lists item)
- Assign a **variable**, what controls the image lists value



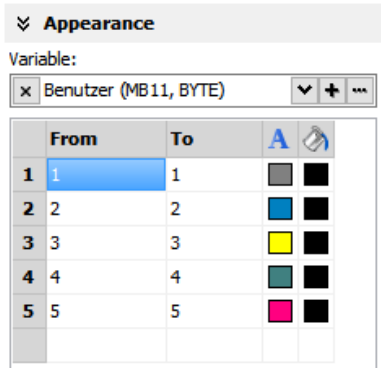
Color the object: (register „Appearance“):

Additional functions at text lists

- If there is a multiline text list, it is possible to assign **navigation buttons** for scrolling up-/down

Assign the color: (register “Appearance”)

- **Color changes** for foreground (text color) and background (for button color)
- **Assign a variable** to control color changes



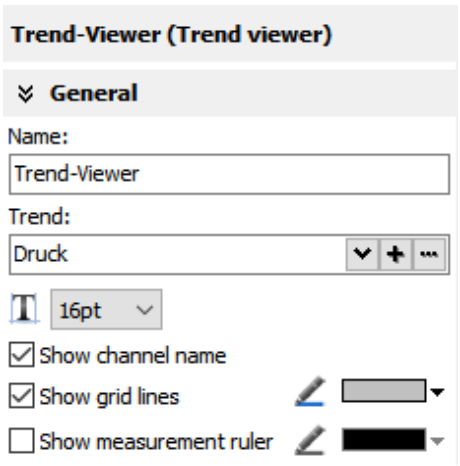
Attention / objects in general:

- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „►“ creates an error report, click on error and come directly to the failed object.

Trend viewer and trend archive viewer

This object shows the samples of up to 16 values (= 1 trend) by time in a graphic way.
At CPU-T-devices there are available grid lines for better orientation, a higher scaled X-axis (more time values) and a movable measurement ruler to show archived values at different times.

Per trend there is shown only ONE vertical scale with the referring trend name above. To see the other scales click on the name and the scale and name of the next trend appears, and so on until the first trend comes again.



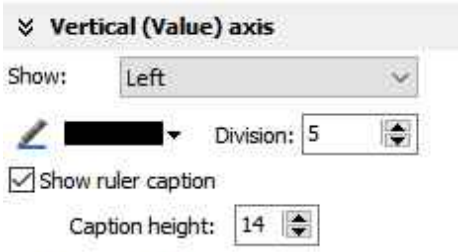
Place an object: (see basic funtions)
Assign border settings: (see basic funtions)

Parameterize the object: (register “General”)

- Assign a **trend resource**
  (use existing rersources)
- **Format the text** of the displayed channel name
- Check, if the **channel name** should be displayed
- Activate and color **grid lines**
- Activate and color the **measurement ruler**

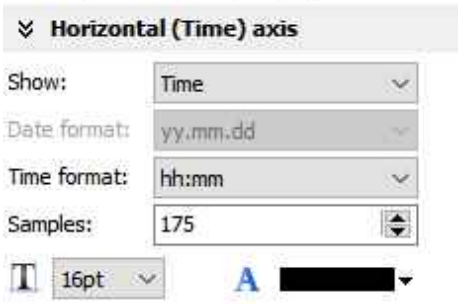
Parameterize the object: (register „X/Y-axis“)

- **Activate and color the Y-axis**
- Assign **scale divisions**
  (Rounding errors can appear!)
- Activate the rulers caption
- Assign caption height



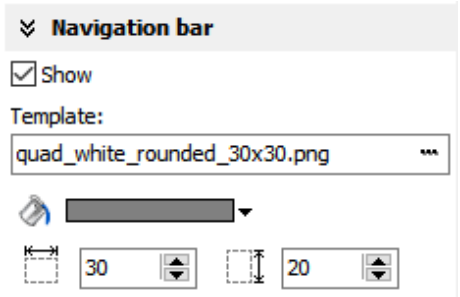
Activate and color the X(time)-axis

- **Assign time format**
  - Time + Date or
  - Time only or
  - Date only or
  - nothing
- Enter the **number of samples** to be displayed
  max. 200 in viewer, max. 65535 (expect longer displaying time)
  in archive viewer (values for CPU-T)
- Assign font, size and color of the X-axis



Navigation bar (for trend archive viewer only)
For CPU-V/-P-devices or for CPU-T-devices, when there shall not be an manual generated navigation, zoom bar

- Activate **navigation bar** for scrolling forward or backward
- Assign buttons and dimension it
- Assign background color for the bar



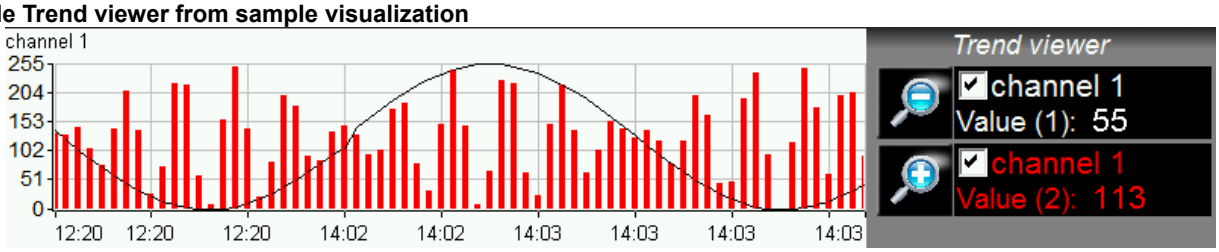
Information for time axis (X-axis) of CPU-V/-P-devices
Because the displayed time will be calculated in run-time, only 2 time stamps will be displayed:

- the time of the first shown sample (very left) and
- the time of the last shown sample (very right)

and nothing between it because it would overwrite each other.
100 samples will be displayed in the trend window. After the graph reaches the right border, the graph is moved 10 samples (10%) to the left (and the displayed times are changing).

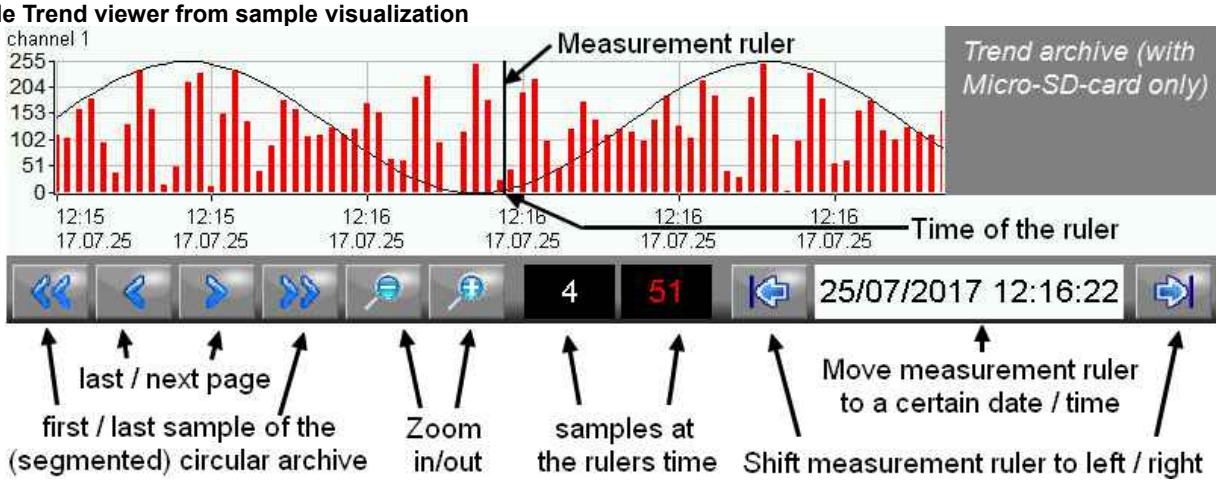
Visualization with the software „VisuStage“

Sample Trend viewer from sample visualization



Activating trend channel: by check box (function: Filter trend channel)
Display the actual sample value: by I/O-field (variables value)
Zoom in/out functions: as button function (Trend viewer function, zoom in/out)

Sample Trend viewer from sample visualization



Activating trend channel: by check box (function: filter trend channel)
Zoom in/out functions: as button function (trend archive viewer function, zoom in/out)

Manually designed navigation
First / last (actual) samples as button function (trend viewer function, zoom in/out)
Next sample page / sample page before as button function (trend viewer function, zoom in/out)
Values at the measurement ruler time as I/O-field (with values from trend archive viewer)
Move the m-ruler to a certain time as date/time-field (with source trend archive viewer)
(The measurement ruler can be moved by touching the touch display in the viewer)

Caution

Attention / objects in general:

- trends can be archived only, if there is a micro-SD-card inserted
- for CPU-V/-P-devices:
  trend viewer max. 100 samples will be displayed. When the samples reach the right border, they were shifted 10% to the left
  trend archive viewer: max. 800 samples can be displayed
- for the CPU-T-devices
- trend viewer: max 1000 samples can be displayed. When the last sample reaches the right border, the where shifted to left pixel by pixel.
- Trend archive viewer: max. 655.350 samples can be archived (=10 circular archives)
- there is shown only ONE vertical scale with the referring trend name above. To see the other scales click on the name and the scale and name of the next trend appears... until the first trend comes again.
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „►“ creates an error report, click on error and come directly to the failed object.

Message viewing and archiving

There are different objects to display messages:

- blinking symbols (Message indicator)
- blinking text lines (Message indicator - text)
- oldest/youngest message only (Message viewer - line)
- viewer box for all actual messages (Message viewer - multi line)
- viewer for all archived messages (Message archive viewer)

Message indicator symbol and text

This dynamic objects are used to inform the operator about an actual existing message (alarms/events) either with a blinking symbol or a blinking text line.

Indicator at alarms:

Blinking	if alarm has come and is not acknowledged
Display (without blinking)	if alarm is acknowledge but still there
Disappears	if alarm is acknowledged and no more there

Indicator at events:

Blinking	if event is there
Disappears	if event is no more there

Placing as like at all other objects too, **Parameterization** is self explaining only **Assign** an event type - alarm or message.

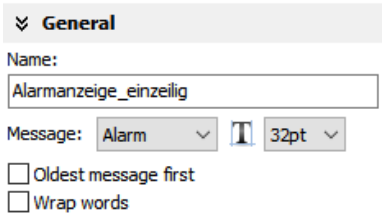
Message viewer - line

This message line is made to **show only** the most actual message to be implemented as an information line only, with no opportunity to acknowledge or scroll.

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)

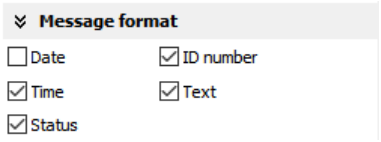
Parameterize the object: (register “General”)

- Select “events” or ”alarms” to display
- Adjust, if oldest or newest message will be displayed
- Activate word wrapping

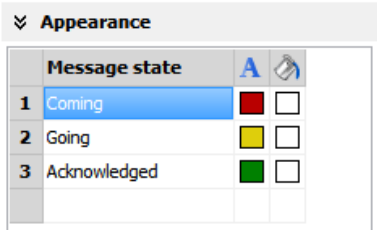


Formatting the object (register “Message format”)

- date
- time
- state
- ID-no. (Group)
- message text



Color the object (register „Appearance“)
All messages in the message viewers all single messages can be changed in color referring to their stat (Coming, Going, Acknowledged).



Attention / objects in general:

- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „▶“ creates an error report, click on error and come directly to the failed object.

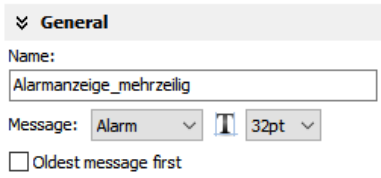
Message viewer multiline / Message archive viewer

This message viewer is made to show all **active messages**. It contains navigation functions (line **scroll**) and (for alarms) an **acknowledgment** function.
This message viewer is made to show all **archived messages** saved on the Micro-SD-card. It contains navigation functions (line and page scroll). To archive samples activate it by a hook as archivable.

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)
Formatting the object: (register “Message format” at the single line message viewer)
Color the object: (register „Appearance“ at the single line message viewer)

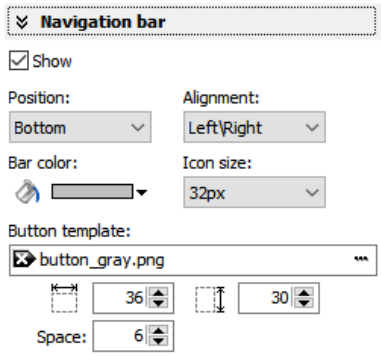
Parameterize the object: (register “General”)

- Select “events” or ”alarms” to display
- Adjust, if oldest or newest message will be displayed
- Activate word wrapping



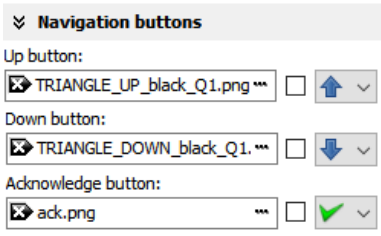
Formatting navigation bar: (register “Navigation bar”)

- **Activate** the bar
- **Color** the background
- Design the **placement** of the buttons
- Configure the **size of the icons** in the buttons
- Select a **button template**
- Design the **button size** width by height
- Adjust the **distance** between the buttons



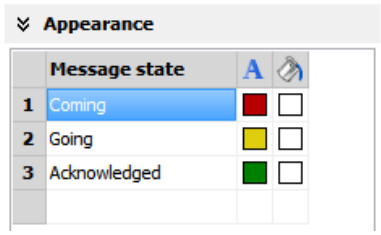
Designing navigation buttons: (register “Navigation buttons”)

- Select a **button template**
- Activate to insert a icon (Up/Down/Acknowledge)
- Select one of the icons from the list
- Scroll navigation (up & down):
  - Message viewer: line by line
  - Message archive viewer: line by line & page by page



Color lines and texts by status: (register “Appearance”)

- Depending on message status
  (such as Coming, Going, Acknowledged)
  different colors are possible for
  - Foreground (Text)
  - Background (field area)



Attention / objects in general:
- Dynamic objects shall **not overlap each other** (Exception: touch area may).
- Simulation with F9 or „►“ creates an error report, click on error and come directly to the failed object.

Recipe viewer

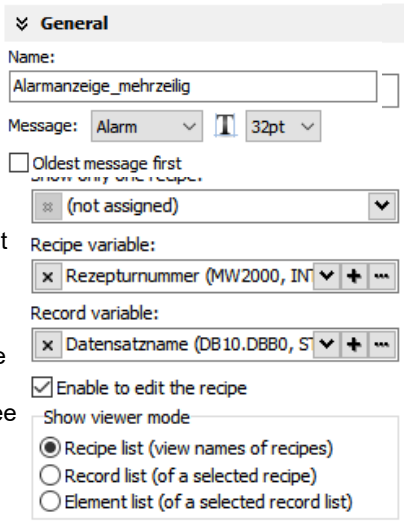
The resource “recipes” will displayed by this object in 3 different windows:

- Recipe viewer window
- Records viewer window (of each recipe)
- Element configuration window

Place an object: (see basic funtions)
Assign border settings: (see basic funtions)
Assign access right: (see basic funtions)

Parameterize the object: (register “General”)
Name:

- internal name of the recipe viewer (independent of project language)



Show only one recipe:

- reduces the list to only one (selected) recipe (e.g. if this machine is designed for only one recipe but the project contains more recipes for more machines)

Recipe variable: *(to display the actual used receipt name)*

- Assign it, if the internal number of the recipe shall be stored in a S7-variable, what will be linked with the receipt name
- (resource „View Name“ in a text list and can be displayed as active receipt name)

Record variable: *(to display the actual used receipt name)*

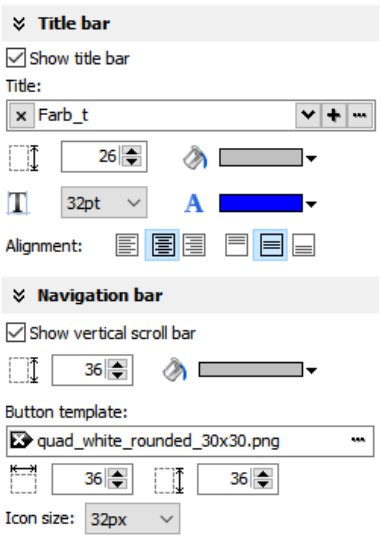
- Assign it, if the internal number of the record shall be stored in a S7-variable to be shown in a I/O-field to display the actual record name
- (At first simulation assign any value to this variable in the SimuStage, than you see the active record after press the button „Save to PLC“)

Enable to edit the recipe:

- Allows manipulation by the operator (changing the element values, storing as a new record, deleting records and so on)

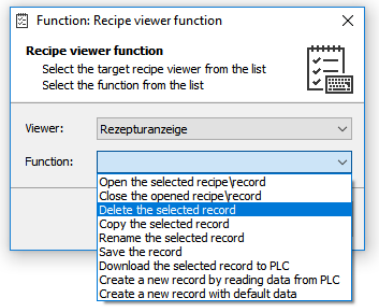
Parameterization of the title bar
(general for recipe lists, record lists, element lists)

- It is recommended to use a title bar and to assign a title to the recipe list.
- The titles of the other lists bellow (record list and element list) will be assigned automatically by the inserted data.
- (Title of the record list in the sample „red shades“, element list in the sample Rose“)
- All other settings are self explaining settings to design the title bar



Parameterization of the navigation bar
(general for recipe lists, record lists, element lists)

- This activation is recommended, when more recipes, records or elements are used than fit into the screen window and scrolling is necessary.
- All settings are self explaining settings to design the scroll bar



Hint:
Instead of a navigation bar you can assign own buttons by using “Receipe Viewer Function” at releasing the button.

Parameterization of the operators control elements
(general for recipe lists, record lists, element lists)

By the register „Navigation buttons“ can be selected all function keys you need.
Their button design can be substituted by a customized button.

Recipe list:

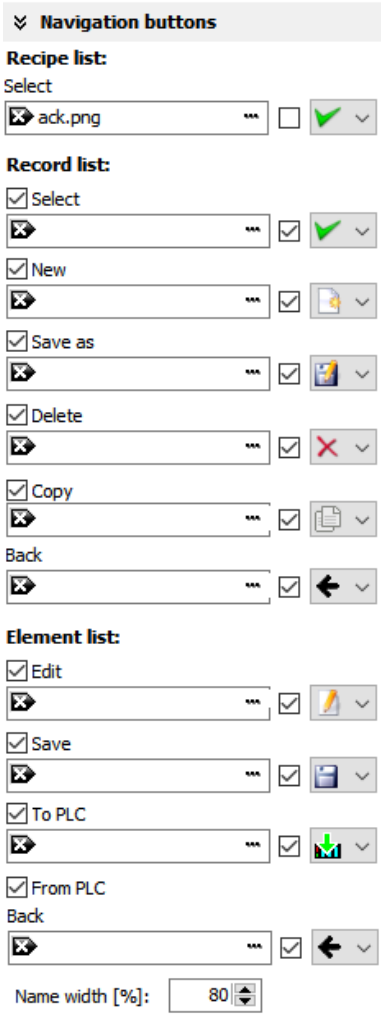
Select:	activates a recipe from the recipe list (will be highlighted), by touching directly too, this list can be hided, when you have 1 receipe only

Record list:

Select:	activates a record from the record list (will be highlighted), by touching directly too
New:	creates a new record with existing element structure
Save as:	saves the record with a new name in the Micro-SD-card (an string input field opens automatically)
Delete:	deletes an existing record
Copy:	copies an existing record
Back:	returns to recipe list

Element list:

Edit	opens up a virtual keyboard to edit the elements value
Save:	overwrites (in the Micro-SD-card) an existing value with actual element values
To PLC:	transfers the stored values and records into the PLC
From PLC:	reads variable for element values from the PLC
Back:	returns to record list



Assign a width of the recipe viewers window to the displayed elements name to have a efficient window design.

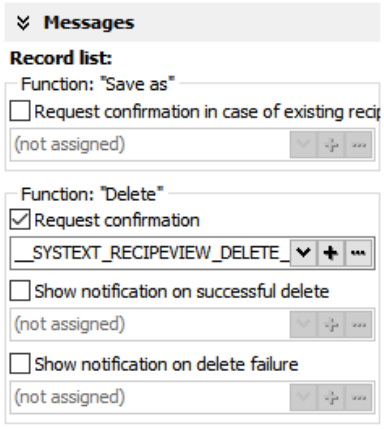
Different confirmation messages (register “Messages”)

In the 3 different viewing windows (recipe, record- and element-) it is useful to ask the usere “Do you really want to...?” BEFORE he is manipulating something wrong.
These message texts are system messages and can be activated here

At the text resources you will find these text phrases as system texts always on top of the texts and in the csv-file with the prefix „__SYSTEXT“.

These messages will be displayed BEFORE storing, deleting, data transfer to/from PLC

(These register is shown just for the record-list only, the others work similar to it.)



Visualization with the software „VisuStage“

Views of recipe lists, record lists, element lists at runtime

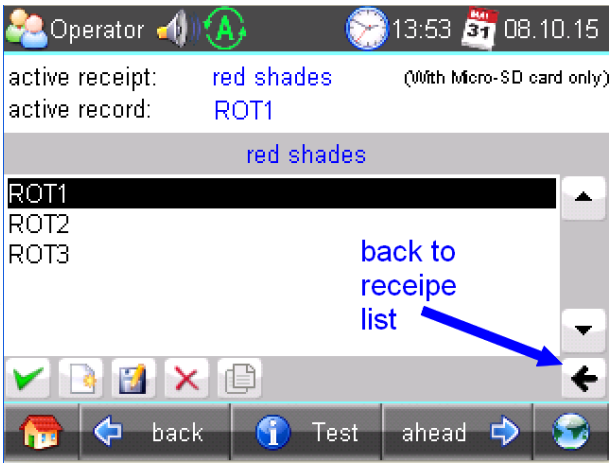
Recipe list

The recipe list contains all recipes, what are pre-assigned in the VisuStage before. It has an clear and an uniform element structure, what was pre-assigned in the software VisuStage before.

The assigned name for all recipes is displayed on the title list.

The choice of the a recipe is done by a touch on the name and a touch on the bottom left symbol to open it. Than the display changes into the next screen with the record list.

To exit the recipe administration, add a common button and assign the function „change screen“ whereto ever you want.



Record list

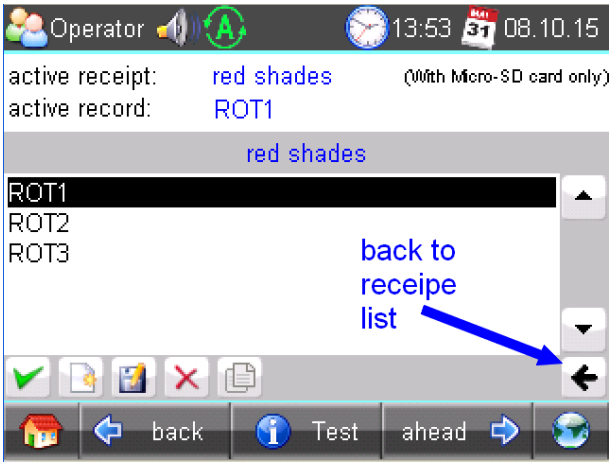
The record list contains all user-created records of a certain recipe (in this sample of the recipe „red colors“).

The regarding recipe name is displayed on the title list. Select it by touch on the name and press „Edit“ or create a new one. Than it switches directly into the element table to edit values and to store it in an automatically displayed string input field.

New from VS 2.0.1.5: The actual record will be displayed in the color of the recipes name in the title bar

The function buttons are displayed in the lower left bar:
Edit | New | Save | Delete
With the lower right „←“ this screen changes back to the recipe list.

Note: *Because recipe data are kept in the Micro-SD-card there is possible no simulation with these values (your PC has not such a memory extension).*



Element list

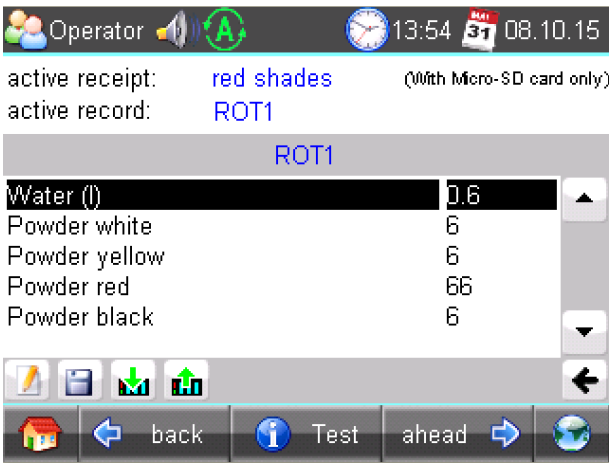
The element list contains all user-created values of a certain record (in this sample of the record „ROSE_1“)

The regarding record name is displayed on the title list.

By touching an elements value a numeric keyboard opens up automatically to type in the new value of the selected element.

The function buttons are displayed in the lower left bar:
Edit | Save | Read from PLC | Write to PLC
With the lower right „←“ this screen changes back to the record list.

Note: *Because recipe data are kept in the Micro-SD-card there is possible no simulation with these values (your PC has not such a memory extension).*



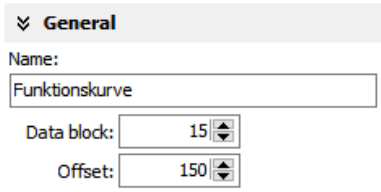
Function graph

This viewer is able to display a number of x;y-values from a data block. There could displayed up to 2000 couples of x;y-values each as one pixel.

Place an object: (see basic funtions)
Assign visibility: (see basic funtions)

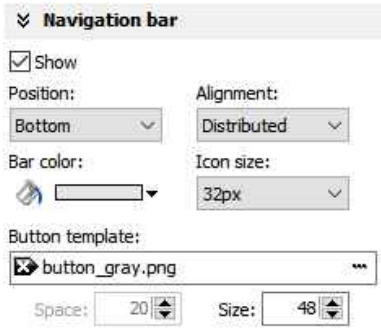
Parameterize the object: (register “General”)

- **Assign a data block and offset**
  This data block contains the values to be displayed



Adapt the navigation bar: (register “Navigation bar”)

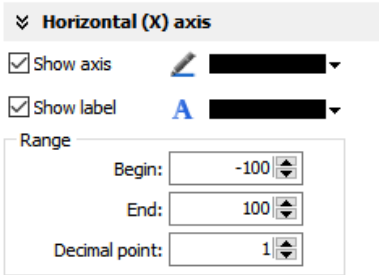
- **Activate** the bar
- **Color** the background
- Design the **placement/alignment** of the buttons
- Configure the **size of the icons** in the buttons
- Select a **button template**
- Design the **button size** width by height
- Adjust the **distance** between the buttons



Designing navigation buttons: (register “Navigation buttons” / see right)

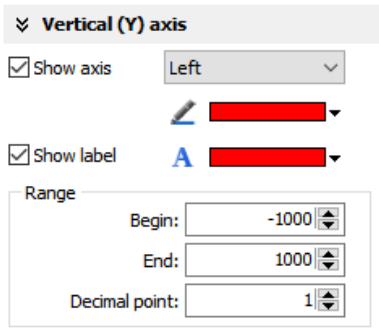
- Select a **button template**
- Activate to insert a icon into your buttom
- Select one of the icons from the list

Parameterize the object: (register „X/Y-axis“ / see below)



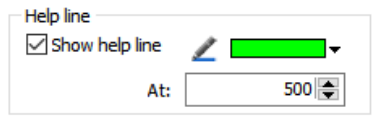
Activate and color X-axis
Activate and color the label of the X-axis
Assign scale values

- Start value
- End value
- Decimal point



Activate and color Y-axis
Activate and color the label of the Y-axis
Assign scale values

- Start value
- End value
- Decimal point



Activate and assign help line

- Y-Value
- Color (one help line possible for an Y-value)

Visualization with the software „VisuStage“

The data block with the x;y-values to display must be devided into two parts:

- Header — Information about trend coordinate structure.
- Data — Array of [X,Y] pairs. Data type must be defined in Header

Header structure

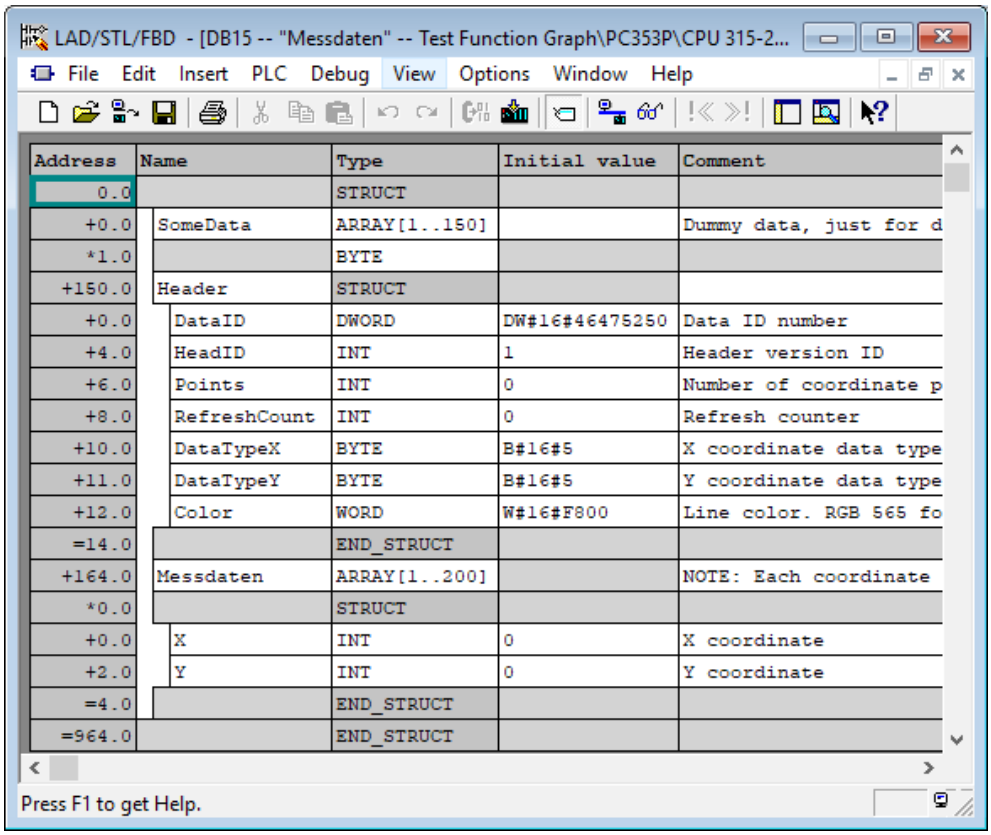
Offset	Name	Data type	Value	Notes
0	DataID	DWORD	DW#16#46475250	Constant value
4	HeadID	INT	1	Constant value
6	Points	INT		Number of [X,Y] pairs [0 .. 200]
8	RefreshCount	INT		Refresh request counter. S7-User program should increment the value, in order to request refreshment in VisuStage.
10	DataTypeX	BYTE		Data type of X coordinate value 2 = BYTE 3 = CHAR 4 = WORD 5 = INT 6 = DWORD 7 = DINT 8 = REAL
11	DataTypeY	BYTE		Data type of Y coordinate value (see DataTypeX notes)
12	Color	WORD		RGB color value, format 565 Bit0..Bit4 Blue component Bit5..Bit10: Green component Bit11..Bit15: Read component

Data structure

Array of [X,Y] pairs (structure). It's structure completely depending on user demands and must be correctly defined in Header structure.

For example:
The following data block contains trend coordinates with following property

- each coordinate value (16 bit integer, value range -32768 .. 32767)
- 200 coordinate pairs
- Line color is blue



Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	SomeData	ARRAY[1..150]		Dummy data, just for d
*1.0		BYTE		
+150.0	Header	STRUCT		
+0.0	DataID	DWORD	DW#16#46475250	Data ID number
+4.0	HeadID	INT	1	Header version ID
+6.0	Points	INT	0	Number of coordinate p
+8.0	RefreshCount	INT	0	Refresh counter
+10.0	DataTypeX	BYTE	B#16#5	X coordinate data type
+11.0	DataTypeY	BYTE	B#16#5	Y coordinate data type
+12.0	Color	WORD	W#16#F800	Line color. RGB 565 fo
=14.0		END_STRUCT		
+164.0	Messdaten	ARRAY[1..200]		NOTE: Each coordinate
*0.0		STRUCT		
+0.0	X	INT	0	X coordinate
+2.0	Y	INT	0	Y coordinate
=4.0		END_STRUCT		
=964.0		END_STRUCT		

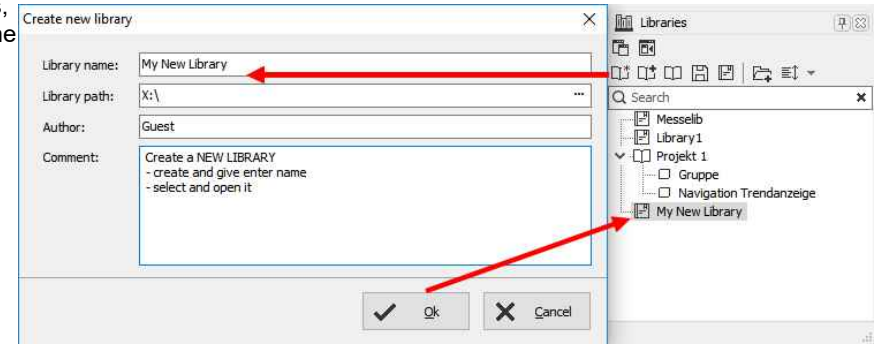
Working with library elements

Library elements were used to have available pre assigned elements for different projects. This is very useful as base for multiple visualizations and show a corporate design e.g. at navigation bars, state bars and login pages.

Creating libraries and ~ elements

Single or multiple (grouped or ungrouped) objects can be added to a library, consisting of at least one element.

If a library element consists of multiple objects, it is better to group these objects before. So the positions between these objects are fixed.



To create a new library

- 1. select the "new library" button
- 2. assign name, path and comments
- 3. select the new created library and
- 4. open this new library

To add new library elements

- 1. open your library
- 2. move objects or groups directly on the library sign

Using library elements

The Library function is self explaining:

- either **CREATE** a new one,
- or **ADD** another library from any PC-directory (*.vsl) into this library list
- or **OPEN** a library from this list

- Group some objects and name the group.
  Copy this group by drag´n drop into your open library
  or
- Click at a group in your open library and copy it by drag´n drop into your screen.

Variables, texts and images will be taken over 1:1 from the library element into the new screen/project. All other resources must be assigned new.

Library elements will be integrated in the visualization project (*.vsproj).

To send your libraries to others, always zip and send complete libraries (folders on the VisuStage-PC) including your library elements (*.vsl) .

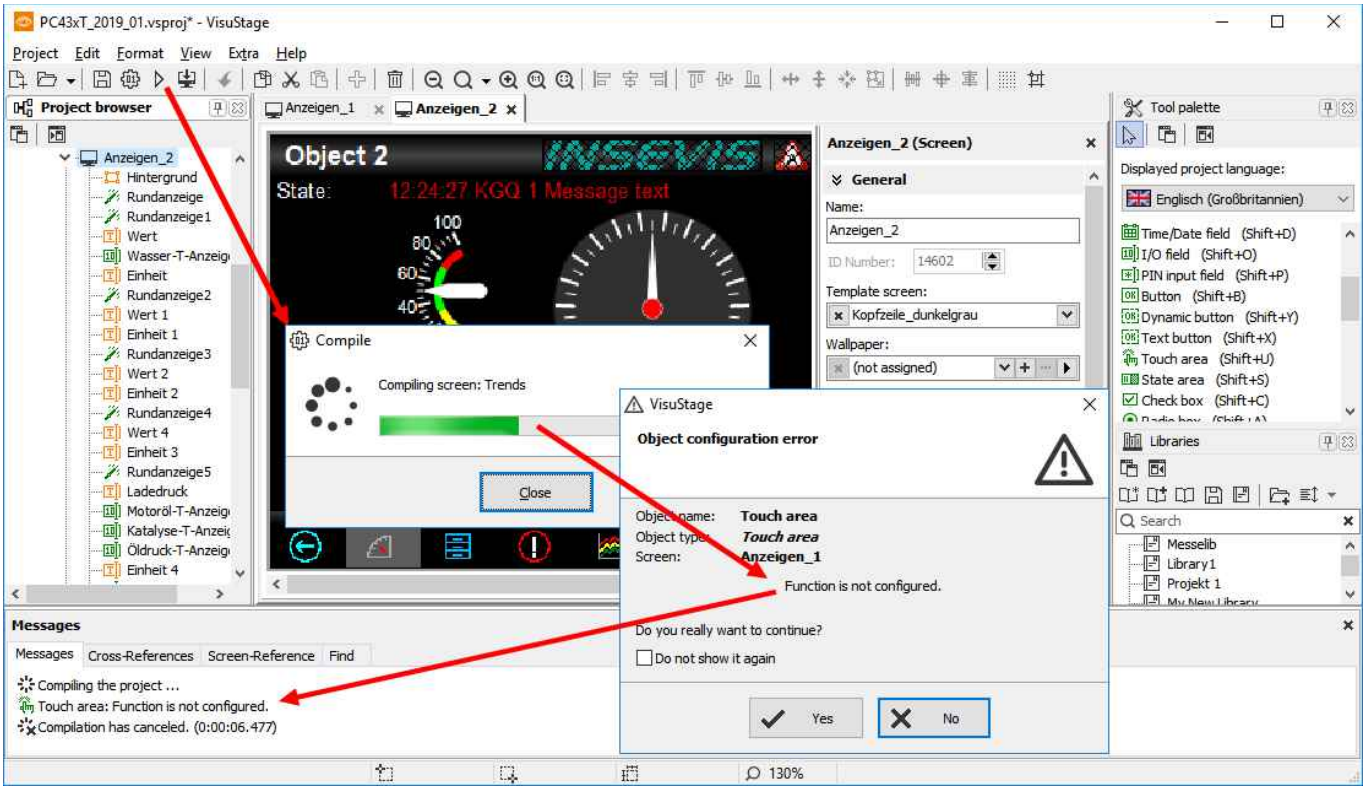
The library offers images, button shapes and state areas in a SVG-format, who will be stored at the image-resorce of the project. To get a preview right in the library window, select the icon as shown in the figure to the right.

Hints:
The library objects in SVG-format allow a very simple color-change (at the rider „Appearance“), much easier then with image lists, what will simplify your visualization project by far.

Also when scaling the size of the objects the quality loss is less than at bmp-, jpg- oder png-files.

Simulation and download

Error treatment



- After finishing the visualization start the simulation by F9 or „►“
- If there are errors, the compiler stops and creates a error message (object and error type).
- Double click this message and you will see the failed object.
- Correct the error and restart the simulation by „F9“ or „►“

If all errors are cleared, the compiler creates a *.bin-file and the simulation tool „SimuStage“ starts automatically.

Simulation and download

There are 2 ways to simulate your visualization:

Manual simulation
Starts the integrated simulation tool SimuStage in a new window.
The operation by the user is by mouse pointer simulated like at the real touch panel.

Automatical simulation
Starts the SimuStage together with the Siemens-software S7-PLCSIM (what must be installed at the same PC).
The process data come from S7-PLCSIM (not from PLCSIM Advanced – this is for 1200/1500CPUs).
Of course, S7-PLCSIM does not simulate INSEVIS-SFCs/SFBs.

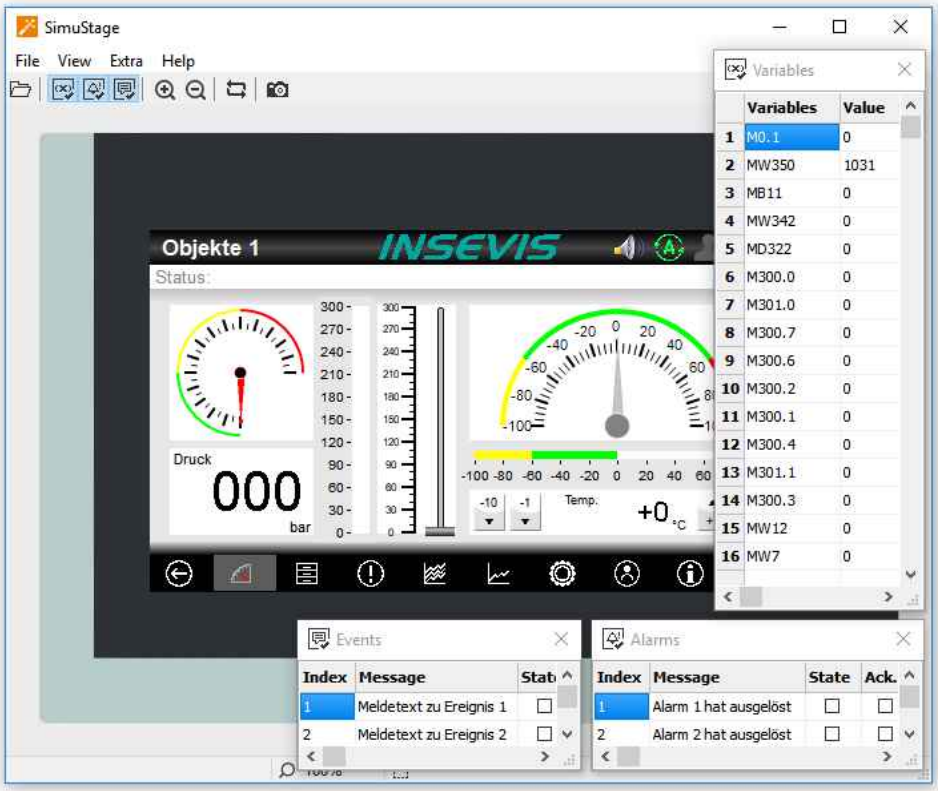
Visualization with the software „VisuStage“

Manual simulation

By manipulating variable values in the variable table you can cause changes manually.

Events can be simulated (Coming - Leaving - Acknowledge) by checking/unchecking boxes in the SimuStage.

It is also possible to generate screen shots of the simulated screen for creating any kind of documentation.



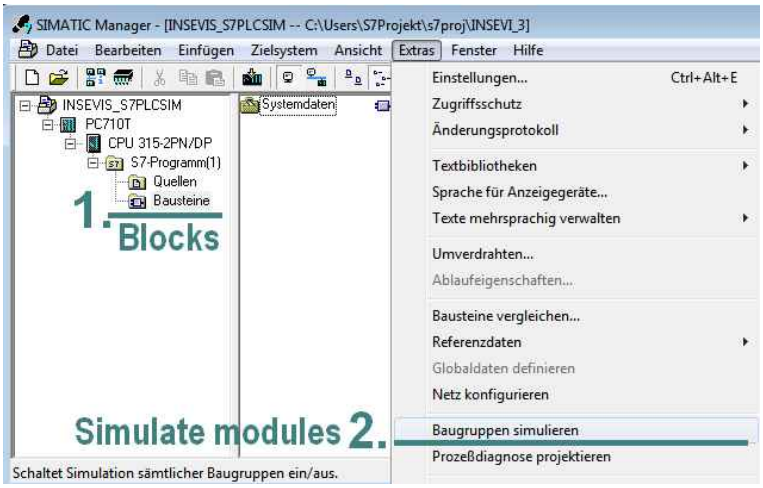
Automatical simulation

Start in the VisuStage by
“Project” → “Simulate with S7-PLCSIM”

The (already installed) S7-PLCSIM must be opened from the S7-programming tool.

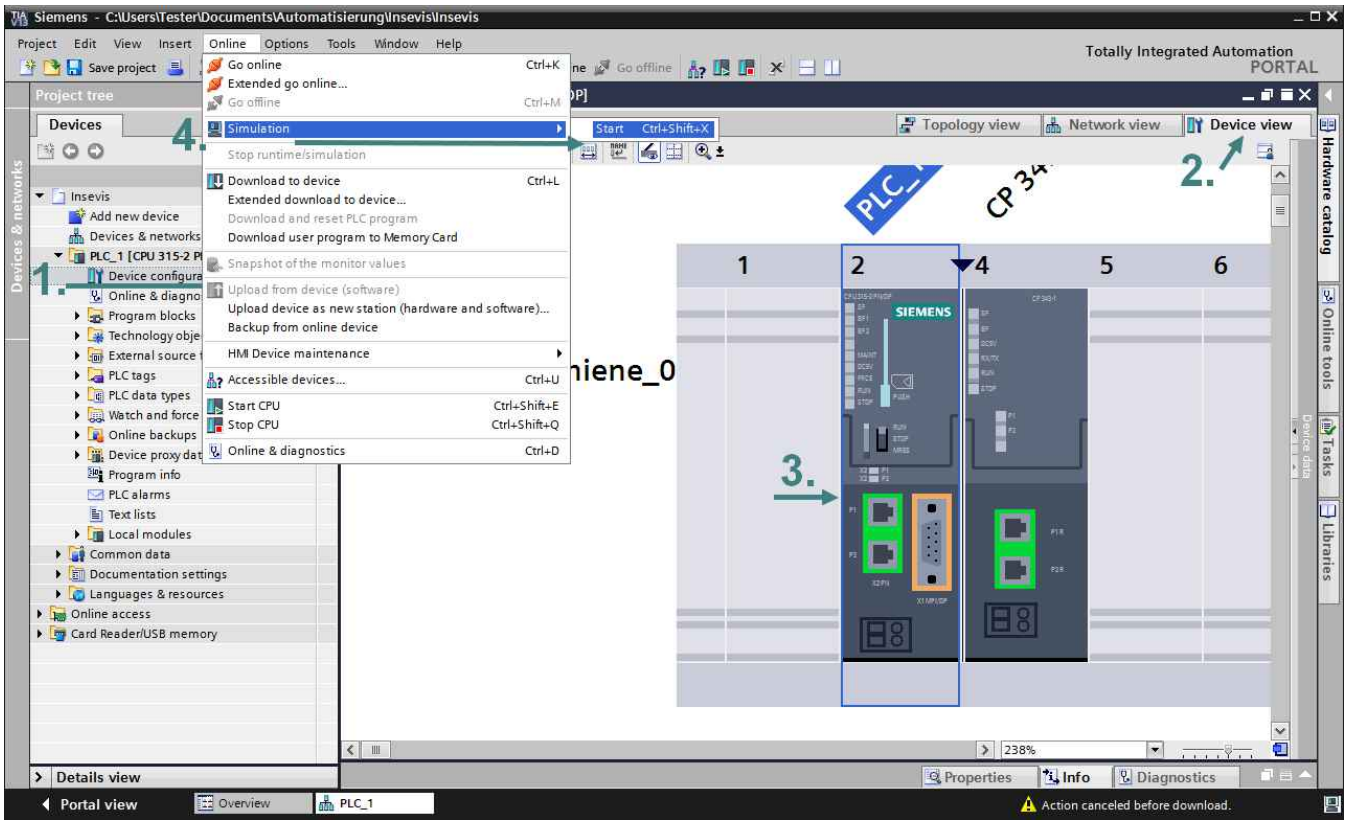
Here you find the call from Simatic®-Manager

1. select “Blocks”
2. click on “Simulate modules”



Visualization with the software „VisuStage“

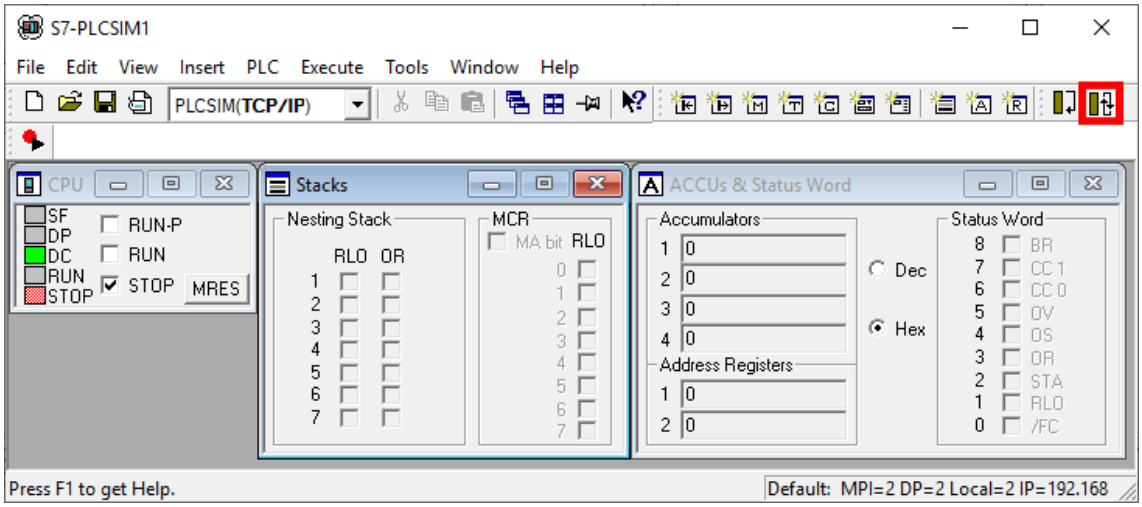
Here you find the call from Simatic®-Manager



1. Goto “Device configuration”
2. Select “Device view”
3. Select the CPU
4. select “Simulation” and “Start”

If the S7-PLCSIM was called, the S7 program is simulated **ONCE** only.

For a **CYCLIC** simulation use the right button (green frame)

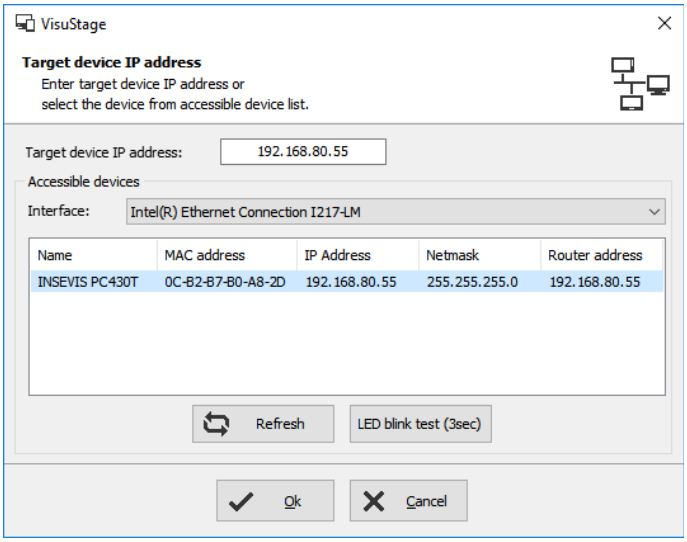


Download

Transfer the visualization binary file to the target device

To transfer the project (start by key F12 or icon) use

- the IP-target-address from the project data
  or
- the IP-addresses in the network area you are connected to by using the magnifier icon (identification in networks with switches only, not with routers, because they filter the Ethernet-Layer 2, what is necessary for identification)



Alternatively download the compiled project as vsbin-file

- via ServiceStage or
- by a Micro-SD-card
  (with hard reset and clear all)

Attention
If some devices with **the same IP-address** should be connected, this will be stopped from Windows-OS. To switch off this function, please insert in the **cmd** this command: **arp -d** (this deletes in your PC the old MAC-address from the foregoing device, what was stored in your PC).

Remote access with the software „RemoteStage“

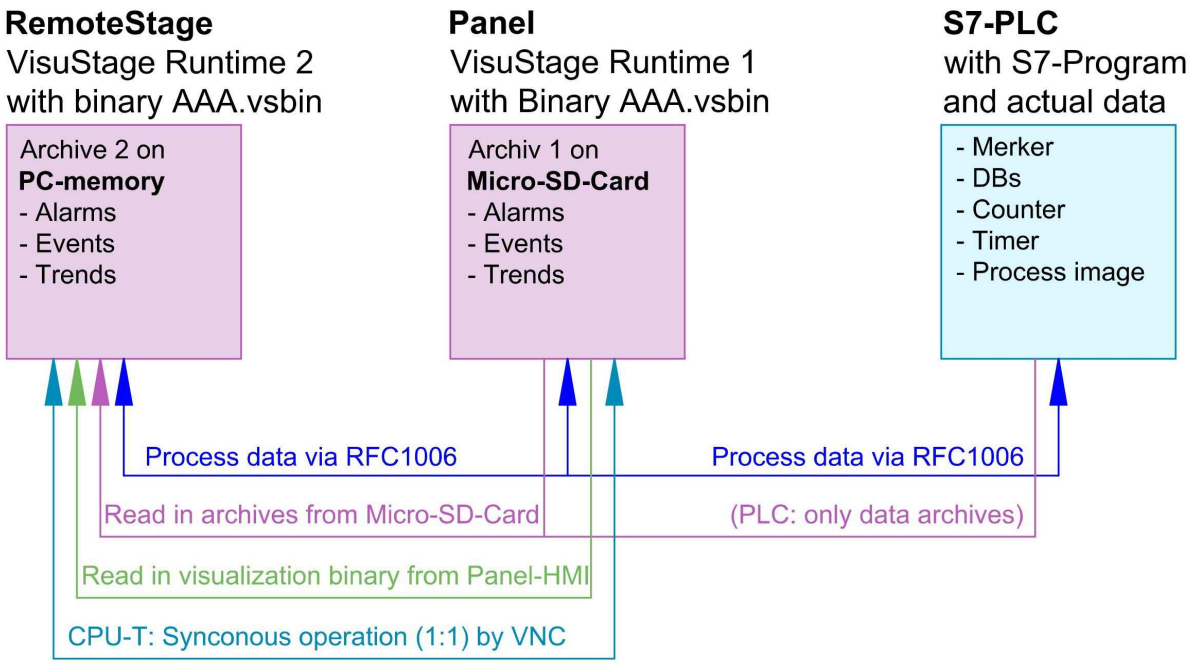
General

The RemoteStage is a multiple instanciable command line software tool, what is not to install. It can be kept in a folder on the remote-PC or on a mobile data carrier as **remotestage.exe** (and if you use German program language with the file **remotestage.deu** as well). As command line tool it can proceed diverse functions in a batch file.

The software RemoteStage uses the binary files (binaries / ***.vsbin**) of visualization projects, made with „VisuStage“. These binaries are not backreadable, what offers an effective protection of the users know-how and allows to forward these files towards the final user or operator. It is possible to download the visualization binary directly by Ethernet from the Panel-PLC / Panel-HMI to reduce the organization efforts. A a PIN-code protects the visualization against unauthorized uploads.

The RemoteStage works **like an additional Panel-HMI** on the remote-PC, what gets the process (actual) data by a TCP/IP-connection straight from the PLC. System data like time and buzzer are related to even this PC of course. This allows a free remote visualization and account to external S7-PLCs by S7-Ethernet (Put/Get).

In a 2nd program instance (Archive mode) the RemoteStage reads in (direct form Micro-SD-card or by Ethernet) from the Micro-SD-card, displays the values, converts into csv-format and saves it to the remote PC.



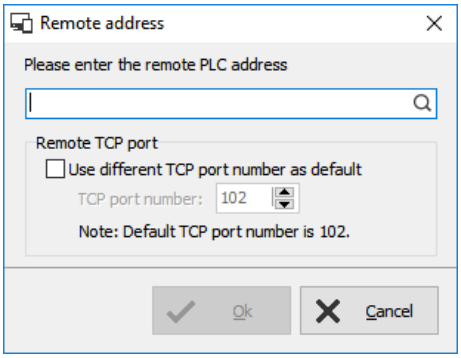
If the RemoteStage should be installed as an batch call on the end user´s PC this is all you need to write:

[path of RemoteStage]\remotestage.exe ***/r=[IP-address of the remote-PLC in the same sub net]***
/V=[path of visualization binary]\complete file name]
/start

Selection of the remote-device

With opening of the visualization binary („visualization“.vsbin) the IP-address of the remote PLC will be required *(Fig.)*.(By using the function „accessible devices“ - loupe- you can select one of these directly or type in the IP-address manually.)

This address will be linked with this binary.
So it is not necessary to re-type it again.



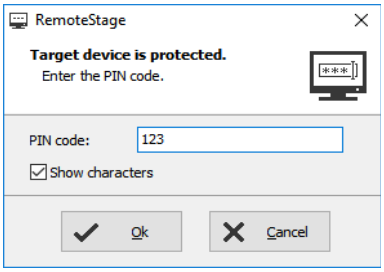
Remote access with the software „RemoteStage“

Insert PIN code

In the VisuStage-project it is possible to allow an upload of the compiled binary to the remote PC. This upload can be protected by a PIN code, what is to be inserted in a new window (right)

This PIN must be inserted at every new upload (also when you use this upload for backup function in ServiceStage). At INSEVIS sample projects this PIN is 123.

After successful upload a black window appears, what changes to the first menue in the VisuStage project after clicking the “connect” button. (Not 1:1 of the original panel, this will be done by VNC)

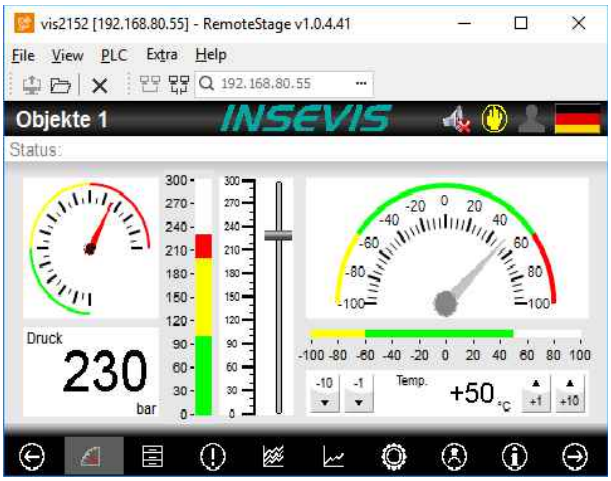


Using and setting up the remote screen

The PopUp-menues are self explaining.
The actual remote state is shown on the bottom of the screen.

The switching between online/offline can be done by the green button beside the IP-address line or by the menu „PLC“.

Hint: Referring the system data (like buzzer, archives and time) always the PC-system data will be used, not these of the remote device.

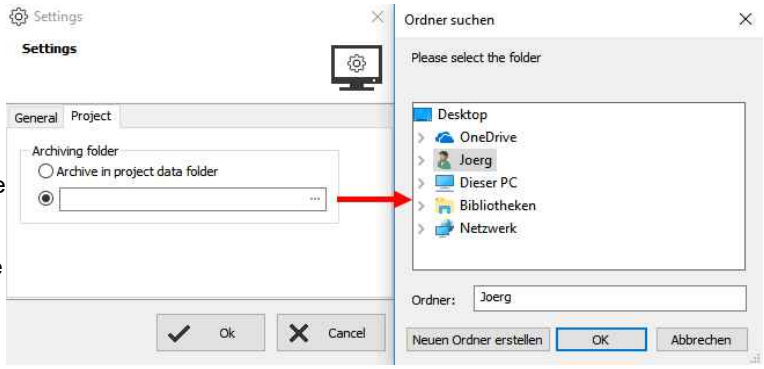


Storing the remote (on the PC) archived data

The archive data, logged during the remote session on the PC, will be stored on the working place in the remote-PC **only**. (not depending from the archive in the PLC in the Micro-SD-card during the same time).

Note: there are 2 archives of each item. If you want to archive a remote-trend, you need to start this trend in the remote visualization.

At the menu „Settings“ will be set up, if these date will be stored
- in the project folder (where the visu binary is kept) or
- at another path.

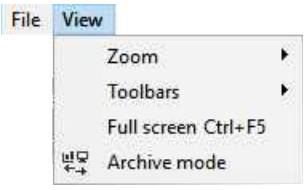


INFO

Hint: If you upload the visualization binary from the remote device (this function will be activated in the VisuStage-project), this file will be kept in the local TEMP-directory of your PC as long you are remote online. There will be stored the archive files as binary too as long the remote session is active.
To save and convert these archives into CSV-format please go to archive mode and select “File Open” and select the TEMP-directory.

Most of the archive data are kept on the Micro-SD-card as binaries and con be converted to csv-format by RemoteStage “Archive mode” (a 2nd instance of RemoteStage) only.

Open this 2nd instance in the “View”.menue (see right).



Attention

ATTENTION:
Use only the binary file what fits to the archives (where these archives were projeted)

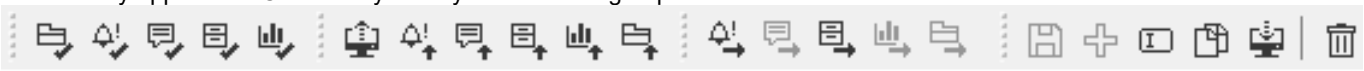
Remote access with the software „RemoteStage“

Uploading, converting and storing archive data as csv-files

These data can be archived by these products on the Micro-SD-card:

Messages (alarms, events)	by all Panel-PLCs and Panel-HMIs → by activating the archive funtion „archiving“ in the VisuStage-project
Trends (with all channels)	by all Panel-PLCs and Panel-HMIs → by activating the archive funtion „archiving“ in the VisuStage-project
Recipes (with all records and elements)	by all Panel-PLCs and Panel-HMIs → will always be stored / archived on the Micro-SD-card
Archiv-(data blocks) (as bin or csv)	by all Panel-PLCs and Panel-HMIs → will be configured by SFCs in the S7-program

In the newly appeared PC-window you may find different groups of icons with different functions:



Reads archive by inserting Micro-SD-card in PC slot from left → right:
- Data(DB-)archive
- Alarm archive
- Event archive
- Trend archive

Read in archives by Ethernet directly into PC from left → right:
- All archives
- Alarm archive
- Event archive
- Recipe archive
- Trend archive
- Data(DB-)archive

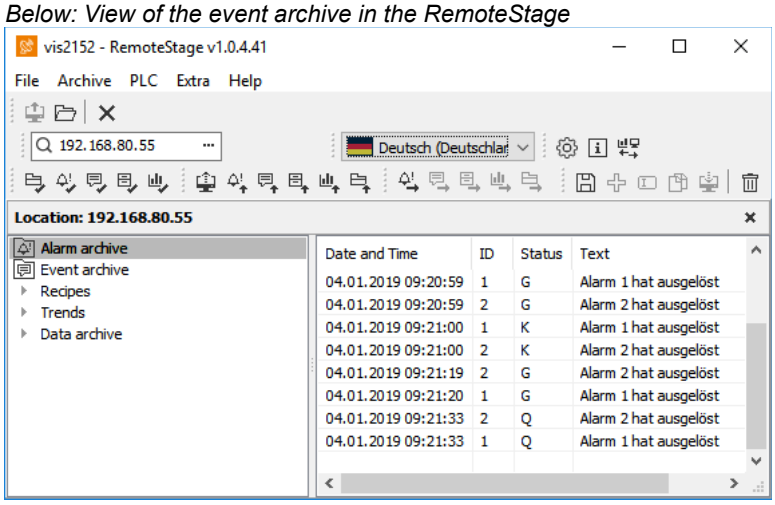
Exports archive data to PC nto the PC-network from left → right:
- Alarm archive
- Event archive
- Recipe archive
- Trend archive
- Data(DB-)archive

Editing and downloading of modified archives from left → right:
- Save archive
- Add new archive
- Rename archive
- Copy archive
- Download archive

Display and export event and alarm archives

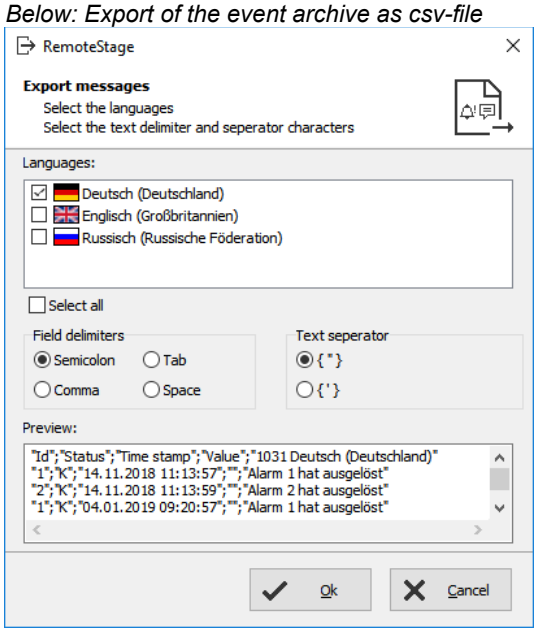
Archive data will be read in from Micro-SD-card, can be displayed and e.g manually saved as csv-file.

Below: View of the event archive in the RemoteStage



(Displays all archived alarm messages of the Panel-PLC with the IP-address 192.168.80.55)

Below: Export of the event archive as csv-file



ATTENTION:
Do not confuse the uploaded (from Micro-SD-card) archive file with the other archive file created during the remote-session in the remote-PC itself. Pay attention to format the csv-file according to your own needs.

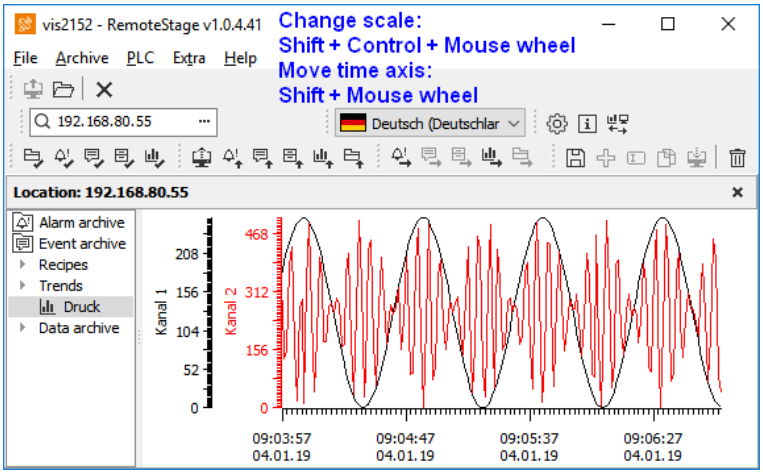
Remote access with the software „RemoteStage“

Display and export trend archives

Archive data will be read in from Micro-SD-card, can be displayed and e.g manually saved as csv-file.

Figure right displays all archived trend with name „Druck“of the Panel-PLC with the IP-address 192.168.80.55.

The time will be displayed in the language format you assigned on your PC (here in German = DE)



ATTENTION:
Do not confuse the uploaded (from Micro-SD-card) archive file with the other archive file created during the remote-session in the remote-PC itself. Pay attention to format the csv-file according to your own needs.

Remote access with the software „RemoteStage“

Recipe handling

Recipe archive data from Micro-SD-card can be

- read in / uploaded (→ You have to select the whole root-folder “recipes” of the Micro-SD-card !),

- displayed and maybe edited in RemoteStage directly what is self explaining and

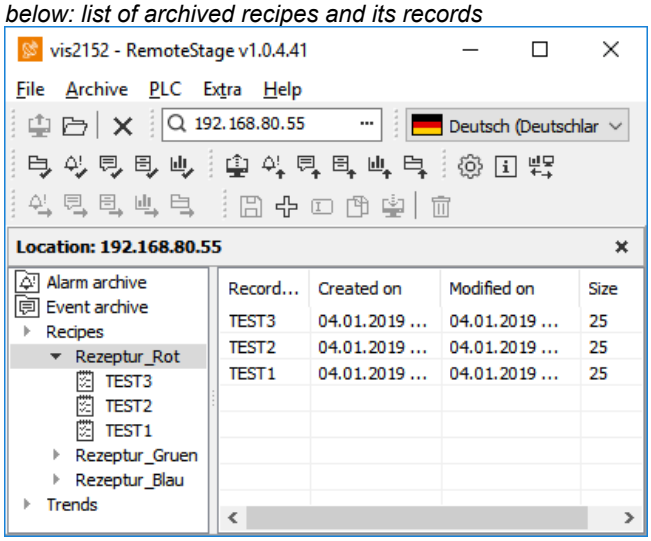
for FURTHER EDITING stored as csv-file at the PC

- converted into csv and stored, edited and written back / downloaded into the remote PLC or

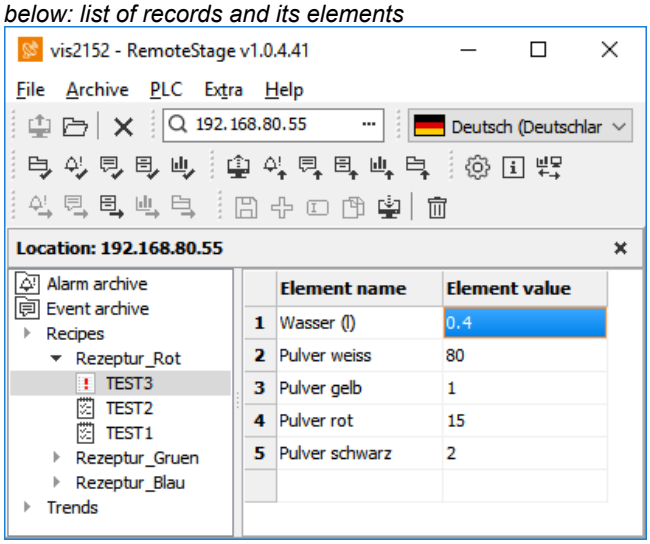
for COPYING THE WHOLE RECIPE SYSTEM saved as binary at the PC

- stores the whole recipe tree uneditable as binary, to be opened again and downloaded to another remote device (You have to select the whole root-folder “recipes” in the PC!)

below: list of archived recipes and its records



below: list of records and its elements



The record „TEST3“ was modifyed in the RemoteStage and this is shown by an „!“ .
After downloading into the remote device this sign disappears.

The storing of all records (as binary files in an own folder into the network drive for modifying) is done, when “recipes” are marked in the tree view (left).

When recipes are edited in a network drive you can see their path in the address line.
When recipes will be uploaded from the remote device you see its IP-address.

The creating of a record can be done when in the tree view (left) a single recipe is marked.

ATTENTION:
The structure of the recipes MUST be kept the same.
Records of a recipe can be added or deleted within this recipe.

Remote access with the software „RemoteStage“

Data (DB) archive upload, display, storing and download

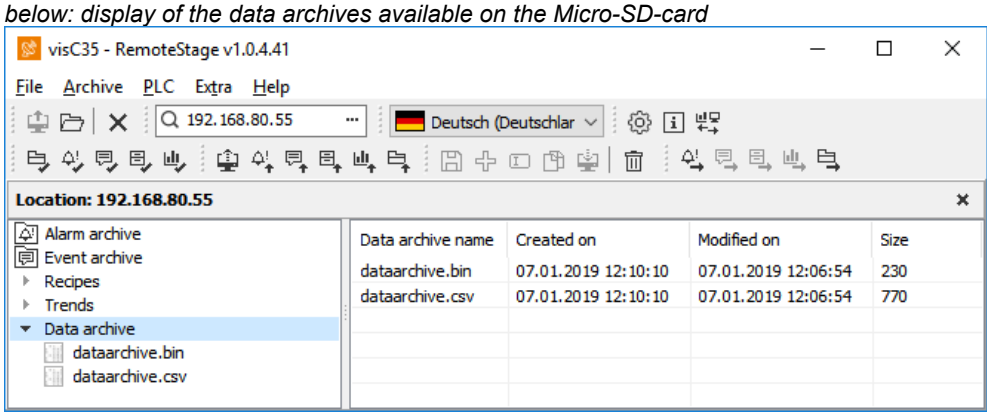
Any data can be archived with the **SFC 207** ARCHIVE onto the Micro-SD-card (binary or csv-data)and read back with the **SFC 209** READFILE (see system functions).

Data archive display and storing

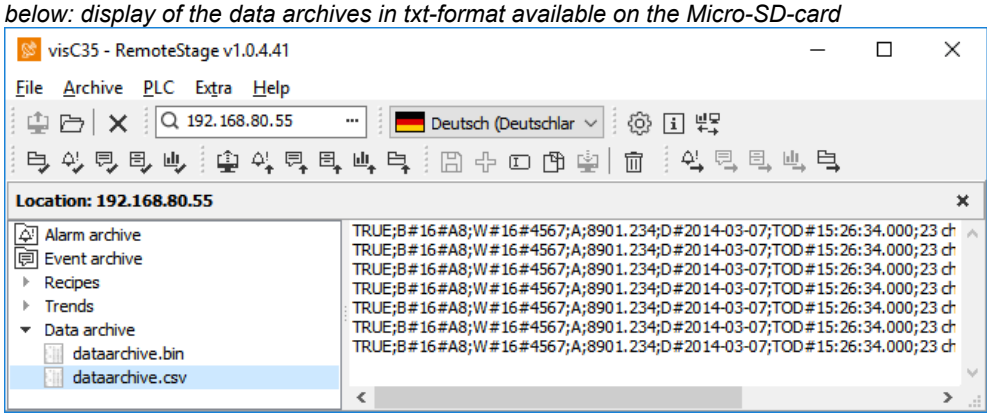
These data (DB) archived over S7-program to Micro-SD-card, can be read in and displayed and stored to the PC in the assigned format.

The format of the csv-file will be assigned by the S7-program (SFC207) and is not configurable by the RemoteStage. This can be done later on with any table calculation program by customer (because only he knows the format).

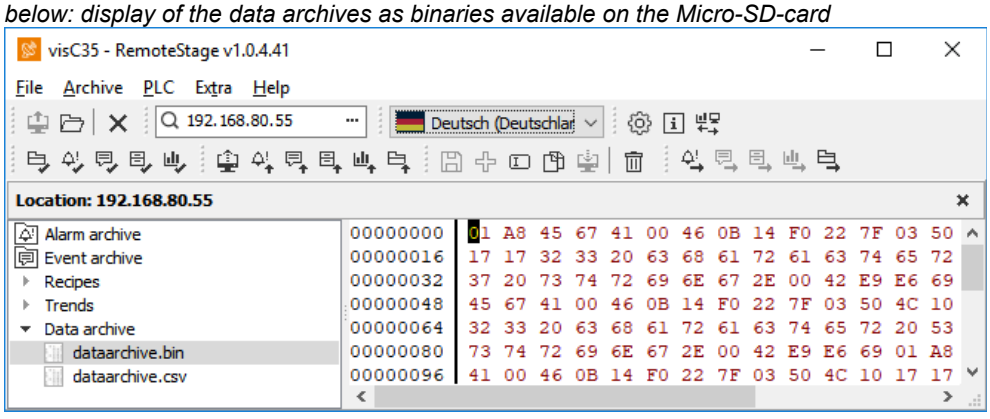
below: display of the data archives available on the Micro-SD-card



below: display of the data archives in txt-format available on the Micro-SD-card



below: display of the data archives as binaries available on the Micro-SD-card



Remote access with the software „RemoteStage“

Command line of RemoteStage (Viewing mode)

RemoteStage can be inserted in „planned tasks“ of the remote PC. A combination of multiple parameters is possible.

Here are available these special functions.

Automatic connecting to remote panel after starting PC

With his function a binary of the visualization is called and linked with the predefined IP-address of the remote panel (if this is available online only)

Command line

remotestage.exe /start /r=<*remote*> /v=<*project binary*>

Hint: If the binary name contains space-signs it is necessary to write it in “ like „C:\Test 1 2 3.vsbin“)

Automatic full screen after starting PC

With his function a binary of the visualization is called and the RemoteStage changes into full screen at the remote PC after automatic starting (Screen stays dark, because no IP-address was assigned here...)

Command line

remotestage.exe /start /full /r=<*remote*> /v=<*project binary*>

Hint: Use STRG+F5 to switch between full-/ part screen

Set up TCP port number for S7-communication

If there are multiple PLCs to connect by a web enabled router/ gateway with port forwarding service

In this case the RemoteStage starts a communication with a remote device with the IP address 192.168.80.50 via the TCP port with the number 4500.

Command line

remotestage.exe */v=d:\visu\process.vsbin /r=192.168.80.50 /p=4500*

Hint:
The default port number for TCP is port 102 at the PLCs.

Command line of RemoteStage (Archive mode)

RemoteStage can be used in batch process from command line with command line parameters, to save archives somewhere with a self defined name.

In the PC-OS Windows® batch files can be done **time controlled** in the task manager
Start menue →All Programs →Accessories →System programs →Planned tasks → add a task
In the wizard dialog can be assigned date and time for that job.

Read in (upload) message- and trend archives from remote device

The binaries of the messages and trends (assigned in the VisuStage before and created at runtime) will be read in, converted and stored in a path on the PC.

Command line

remotestage.exe /mode=<*mode*> /r=<*remote*> /o=<*output file*> /v=<*project binary*> /t=<*trend number*>

Parameters

mode: Archive file read in
alarm_archive - read in alarm archive from remote device (alarm.bin)
event_archive - read in event archive from remote device (event.bin)
trend_archive - read in trend archive from remote device (trend_<trend number>.bin)
(trend ID is assigned automatically by VisuStage at ressources / grayed out you can not change it)

remote: Remote device IP address

output file: File name of archive file to be stored in PC.
This is optional parameter. If this parameter is not assigned, default archive name is used (e.g alarm.bin) and stored in same folder where remotestage.exe located.
If file name includes space character, it should be quoted with **"** (quotation mark).
Archive converted to CSV format if file name has **.csv** or **.txt** extention, otherwise it writes as binary format.

project binary: Visualization project binary file name

trend number: Trend ID-number which is automatically assigned in VisuStage.
It is only used at "trend_archive" mode.

Samples

For example to read in alarm archive from INSEVIS PLC with IP address 192.168.80.50 and write to „d:\archive\alarm.csv“ file with CSV format you need this command

Command line

C:\>remotestage.exe /mode=alarm_archvie /r=192.168.80.50
/o=d:\archive\alarm.csv /v=d:\visu\myvisu.vsbin

For example to read in the sample-trend with ID6163 (from sample visualization of PC1560T) from Panel-PLC with IP-address 192.168.80.50 and to save it as csv-file to D:\archive\trend6163.csv you need this command

Command line

C:\>remotestage.exe /mode=trend_archive /r=192.168.80.50
/o=D:\archive\trend6163.csv /t=6163 /v=D:\PC156xT_2017_03.vsbin

Remote access with the software „RemoteStage“

Read in (upload) recipe archive from remote device

The binaries of the (in VisuStage predefined) recipes and the of the records (created in runtime by the operator or by SFC206 from the S7-program) will be read in, converted and stored in a path on the PC.

Command line

remotestage.exe /mode=recipe /r=<remote> /v=<project binary> /recipe=<recipe name> /record=<record name> /o=<output file> /format=csv

Parameters

mode Recipe = read in the recipe data from remote-device

remote Remote device IP address

project binary Visualization binary name

recipe name Recipe name assigned in visualization project (NOT: View name)

record name Name of the record for saving of SPECIAL (single) records.
If this parameter is not assigned, RemoteStage reads in ALL records, what belong to the recipe *<recipe name>* and stores it in a folder assigned by the parameter "/o=" before.
→ To configure the format of the output file as csv, the parameter "/format=csv" must be set, otherwise all data will be stored a a binary.
In the csv-files this format is predefined: **;** (Semicolon) as field limiter and “ (quotation mark) as text separator.
If this parameter is assigned, the format of the output file MUST BE predefined by the extension of the record name.
→ If the file has an extension .csv or .txt, than it is a csv-format, otherwise the output file format is binary.

output file: Path and file name of the recipe record for the storing in the PC (optional parameter)
If the parameter "/o=" is not assigned, a folder "Recipes\<recipe name>“ will be created in the project folder (where the visualization binary is kept) automatically and the recipe record stored as <record name>.rec.
If file name includes space character, it should be quoted with **"** (quotation mark).

Samples

To read in e.g. a single recipe record „Orange“ from the recipe „Rezeptur_Rot“ from the INSEVIS Panel-PLC with the IP-address 192.168.80.50 and to store it as csv-file to „D:\archive\“ this command line is required:

Command line

C:\>remotestage.exe /mode=recipe /r=192.168.80.50 /v=d:\visu\myvisu.vsbin /recipe=Rezeptur_Rot /record=Orange /o=D:\archive\Orange.csv

To read in e.g. ALL recipe records from the recipe „Rezeptur_Rot“ from the INSEVIS Panel-PLC with the IP-address 192.168.80.50 and to store it as csv-file to „D:\archive\“ this command line is required:

Command line

C:\>remotestage.exe /mode=recipe /r=192.168.80.50 /v=d:\visu\myvisu.vsbin /recipe=Rezeptur_Rot /o=D:\archive /format=csv

Write back (download) recipe archive into remote device

With this function the uploaded (and maybe modified) recipe data will be written back (downloaded) into the remote device.
(from rev. 1.0.4.17 and PLC firmware 2.3.9 (all CPUs) or HMI firmware 1.2.7 CPU-V/-P and 1.2.6 CPU-T)

Attention: The structure of the receipes in the remote device may not be modified between upload and download.
(No adding, deleting elements or changing the row of order)

Command line

**remotestage.exe /mode=recipe_download /v=<project binary>
/recipe=<recipe name> /record=<record file(s)>**

Parameters

project binary	Binary fle of visualization project
recipe name	In VisuStage projected recipe name (ATTENTION: not view name!)
record file(s)	Recipe data to download into remote device

Samples

Following command line downloads ONE recipe record „Rot_123.rec“ of the recipe „Recipe_Rot“ from the folder D:\recipes into the remote device with the IP address 192.168.80.50

Command line

**remotestage.exe /mode=recipe_download /v=d:\visu\process.vsbin
/recipe=Recipe_Rot /record=d:\recipes\Rot_123.rec /r=192.168.80.50**

Following command line downloads ALL recipe record of the recipe „Recipe_Rot“ from the folder D:\recipes into the remote device with the IP address 192.168.80.50

Command line

**remotestage.exe /mode=recipe_download /v=d:\visu\process.vsbin
/recipe=Recipe_Rot /record=d:\recipes*.rec /r=192.168.80.50**

Remote access with the software „RemoteStage“

Read in (upload) data (DB-) archive from remote device

This function copies the data(DB-) archives created by S7-program with SFC207to the requested target path into the PC. A modification of the csv-format is not possible.

Command line

remotestage.exe /mode=data_archive /r=<remote> /archive=<archive file> /o=<output file>

Parameters

mode data_archive = read in the date (DB-) archive from remote-device

remote Remote device IP address

archive file: File name of the data (DB-) archive
If there is no archive file assigned to this parameter, the RemoteStage stores all data (DB-) archives in a folder assigned by the parameter "/o=" before.

output file: Path and file name of the data (DB-) archive for the storing in the PC (optional parameter)
If nothing is assigned for the parameter "/o=", a folder "UserData“ is created in the program folder (where the remotestage.exe is kept.
If file name includes space character, it should be quoted with **"** (quotation mark).

To read in e.g. a data (DB-) archive „Test-DB“ from the INSEVIS Panel-PLC with the IP-address 192.168.80.50 and to store it as csv-file to „D:\archive\Testdaten.csv“ this command line is required:

Command line

C:\>remotestage.exe /mode=data_archive /r=192.168.80.50
/archive=Test-DB /o=D:\archive\Testdaten.csv

Write back (download) data (DB-) archive into remote device

With this function the uploaded (and maybe modified) data (DB-) archives will be written back (downloaded) into the remote device. (from rev. 1.0.4.17 and PLC firmware 2.3.9 (all CPUs))

Attention: The programmer itself is responsible to keep the structure of the data (DB-) archives. If they will be modified, all referring reports must be adapted too!

Command line

remotestage.exe /mode=data_download /archive:=<archive file(s)>

Parameters

archive file(s) S7 User data archive file(s) to download to remote PLC

Samples

Following command line downloads ONE archive file "default_cfg.csv" from the folder D:\configs into the remote device with the IP address 192.168.80.50

remotestage.exe /mode=data_download /archive=d:\configs\default_cfg.csv /r=192.168.80.50

Following command line downloads ALL archive files from the folder D:\configs into the remote device with the IP address 192.168.80.50

remotestage.exe /mode=data_download /archive=d:\configs*.* /r=192.168.80.50

Return codes

Return codes of remotestage.exe indicate the result of operation.

Return code	Meaning
0	Successfully read out and saved.
1	Invalid parameter or mandatory parameters are missing
2	Project binary file is invalid or not found
3	Remote IP address is invalid
4	Could not connect to remote device
5	SD card not inserted on remote device
6	Archive file not found on remote device
7	Remote device does not support archive file read service
8	Invalid archive data
9	Not enough system resource
11	Not enough system resource on remote device
14	Could not write to in give <output file>
15	Connection is broken

Sample of RemoteStage usage in batch process:

```
@remotestage /mode=alarm_archive /r=192.168.80.50 /o=d:\archive\alarm.csv /v=d:\visu\myvisu.vsbin
@echo.
@goto res%ERRORLEVEL%

:res4
@echo Could not connect to remote device
@goto :EOF

:res0
@echo Successful read out and saved
@goto :EOF
```

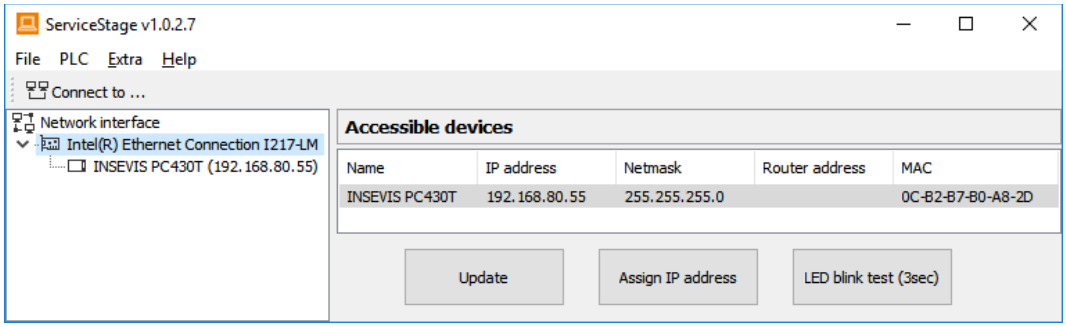
Working with the software „ServiceStage“

With the free-of-cost software „ServiceStage“ it is possible to recognize INSEVIS-CPUs online to check their state, backup/update programs, set a know-how protection, etc.

VIDEO-tutorials available
More information are provided in different video tutorials in the ServiceStage play list at INSEVIS YouTube®-channel “INSEVIS EN”.

With this program a member of the service-team can do all the main functions for diagnostics and update by his PC/Laptop without other expensive tools.

Therefore you choose the network adapter of your PC (This one, who makes the network access to the CPUs).
Select one of the CPUs displayed in the left window and press **„Update“**.
The **„LED blink test“** helps to identify the selected CPU. (yellow battery-LED blinks for 3 seconds).



In this view you can assign a new IP-address of the connected device (Assign IP address).

Function overview

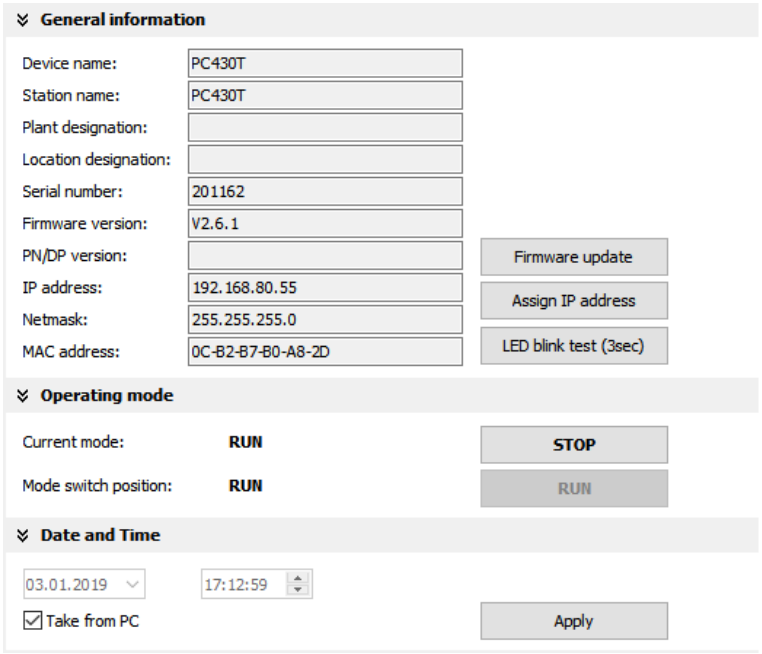
General information

Displays the system data to inform only (like serial number, firmware version, MAC-address).
Shows editable data like

- IP-address,
- Net mask and
- Router-IP-address

as well as a blink test button to identify your CPU again.

Only for CPU-T:
Firmwareupdate possible by Ethernet



Operating mode

Here you can change the operating mode of you CPU between RUN and STOP (not for Panel-HMI). This change must be confirmed in an extra window.

Date and time

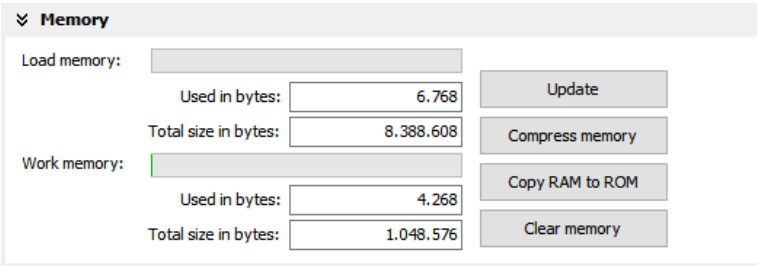
For manual adustment of system date and time.
By checking the box **„Take from PC“** these data will be taken over from your PC after pressing **„Apply“**.

Working with the software „ServiceStage“

Memory

Shows the workload of the load- and work- memory (not for Panels-HMI).

The function **„Compress memory“** should be used manually after multiple download of S7-programs to clear the memory.
The function **„Copy RAM to ROM“** copies the battery buffered load memory content (like process data) to the onboard flash, to prevent a loss of data.
The function **“Clear Memory“** deletes all user and process data in the CPU, only the firmware (operating system) remains.



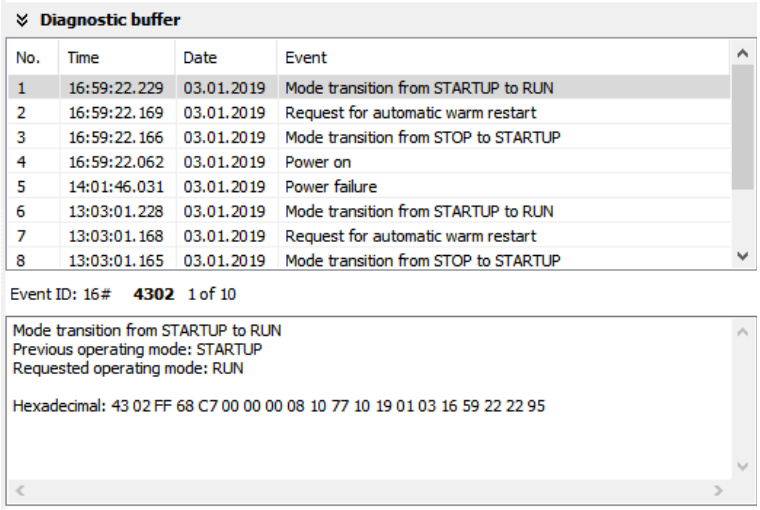
Diagnostic buffer

It displays the last 100 entries of the diagnostic buffer listed by date and time (not at Panels-HMI).

By checking the function **„Information in hexadecimal format“** it is shown in an hexadecimal system.

By pressing **„Update“** new events will be displayed, what happened meanwhile.

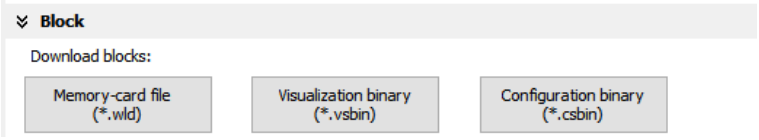
With **„Save as“** the displayed entries will be saved into a text file (*.txt).



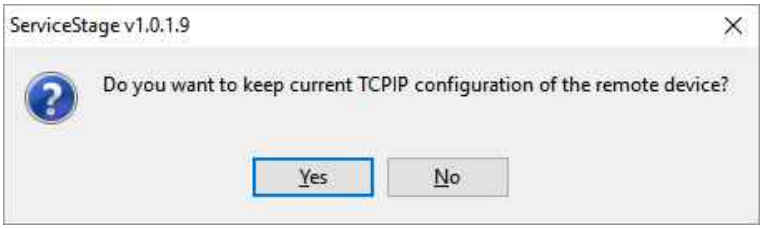
Block Update

This function makes it possible to download
- the S7-user program as MemoryCard-file
  ***.wld** * (not for Panel-HMIs)
- the INSEVIS-binary for visualization file as
  ***.vsbin** and
- the INSEVIS-configuration file as
  ***.csbin** (not for Panel-HMIs)

separately via the network into the CPU.



If the Hardware configuration block of the target device contains another IP-address than it is assigned to the configuration blocks of the blocks you do download into the device (WLD / VSBIN / CSBIN), it can happen, that you loose the connection after transfer. To avoid this, the ServiceStage from Rev. 1.0.1.9 asks, if the target-IP-configuration shall be replaced or not.



* The **WLD-file** is a binary file with S7-system data (SDBs) and S7-program blocks (OBs, FBs, FCs, DBs). After creating a WLD file in SimaticManager/TIA-Portal (at the menue: „File → Memory Card File → New“) you can copy DIFFERENT DBs with or without their system dats into the window of the new S7-Memory-Card-File by drag´n drop.
So it is possible to download WHOLE S7-projects **OR** SINGLE DBs with/without their system data.

ATTENTION: When inserting system data by SimaticManagers/ TIA-Portal,
- they shall be uploaded from a PLC with included ConfigStage-configuration (Menue: „PLC → Upload Station to PG“), because the are “ConfigStage-configured” already or
- the system data of the Simatic-Manager/TIA-Portal overwrite the ConfigStage-system system configuration. In that case the *.csbin-file of the project must be downloaded again after the WLD-file was downloaded.

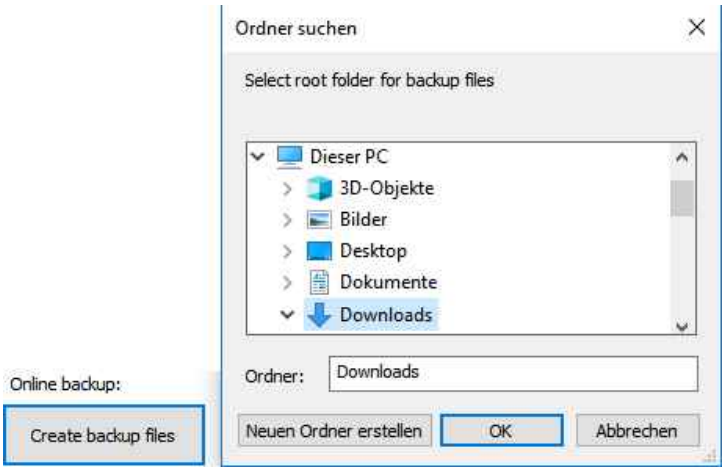
Creating backup files (Online Backup)

This function creates

- an WLD-file „S7programs.wld“ with all the S7-system data and all OB, DB, FB, SFB and SFC and
- a visualization binary file „Visudata.vsbin“ and copies this files into a folder „backups“.

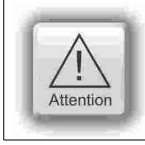
With these function S7-programs and visualizations can be backed up from connected devices and by Block update these devices can be updated either by ServiceStage or by a Micro-SD-card only – complete without any PC.

(more at „System functions“, chapter „Data backup and restore“)



ATTENTION:

- To make a visualization backup, it must be allowed to RemoteStage BEFORE, when doing the visualization in VisuStage (check the upload-function in VisuStage-project-header), if necessary a PIN-input is required. Additional a password for communication must be typed in, when assigned in SimaticManager/ TIA/ ConfigStage.
- If “Read Protection” is assigned to the device an “Online Backup” is not possible any more.



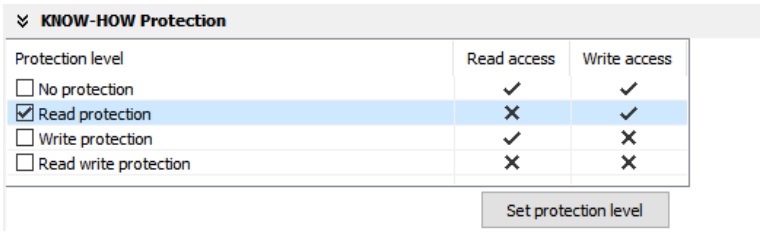
ATTENTION: When using Block Upload for backup / restore

- With firmware 2.3.6 a Restore can only be done by WLD- and VSBIN-file. The CSBIN-file will be ignored. So the WLD-file MUST CONTAIN these system data, who where downloaded with CSBIN before.
- If the WLD-file does not contain system data, program stops after restore because of missing data.

Know-how-protection

There are different levels of to protection of the S7-program against unauthorized reading or writing.

Therefore the PLC will be switched to STOP-mode.



No protection: The S7-program blocks (DBs) can be read and overwritten from everyone. The protection level can be increased by assigning another level in the „ServiceStage“. There will be asked for an authentification by password, if it was configured so in the Simatic-Manager or TiA-Portal. So only authorized personnel can activate higher protection levels.

Read protection: The S7-program blocks (DBs) can still be manipulated from everyone, but not read any more. Only the Panel-HMIs can still read out the process data (DBs) to visualize it. This protection level can be reset by the PG-function „Clear All“ or by ServiceStage. Than the S7-program is deleted in the PLC and the unprotected original program may be downloaded into the PLC again.

Write protection: The S7-program blocks (DBs) can be read from every one, but no more manipulated. This protection level can only be reset by general reset by hardware directly on the device. Than the S7-program is deleted in the PLC and the unprotected original program may be downloaded into the PLC again.

Read/Write protection: The S7-program blocks (DBs) can no more be read or manipulated. Only the Panel-HMIs can still read out the process data to visualize it. This protection level can only be reset by general reset by hardware directly on the device. Than the S7-program is deleted in the PLC and the unprotected original program may be downloaded into the PLC again.

INSEVIS

INSEVIS - Gesellschaft für industrielle
Systemelektronik und Visualisierung mbH

Am Weichselgarten 7
D - 91058 Erlangen

Fon: +49(0)9131-691-440
Fax: +49(0)9131-691-444
Web: www.insevis.de
E-Mail: info@insevis.de

Zertifiziert nach DIN EN ISO 9001:2008