









Software Manual

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

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Changes to older versions of the manual

Rev. 02 / 2012:

new: chapter Recipe administration and recipe viewer in VisuStage
chapter Remote access 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:explanation 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 available, 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 ressources, 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

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 exclamation 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 starlike 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

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- STEP®, SIMATIC® and other as reserved trade mark of Siemens AG.

- CANopen® and other as reserved trade mark of CAN in Automation eG

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-CPU- 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 Panel-HMI of the **Generation II** with Profinet IO Controller will be available with Q3/2015.

Step®7-Programability

INSEVIS-S7-CPU- s are programmable by STEP 7® - AWL, KOP, FUP, S7-SCL, S7-Graph from Siemens and in general command-compatible to Siemens-CPU S7-315-2PN DP. 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.



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 to PLC / HMI

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

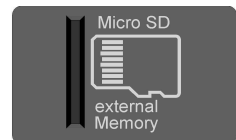


Ethernet
- TCP/IP

TCP / IP
(Remote-) access INSEVIS-CPU's,
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 levels 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-CPU's 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, retentive memory, etc.).

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. Exact 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.

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,
- Assign the know-how-protection levels

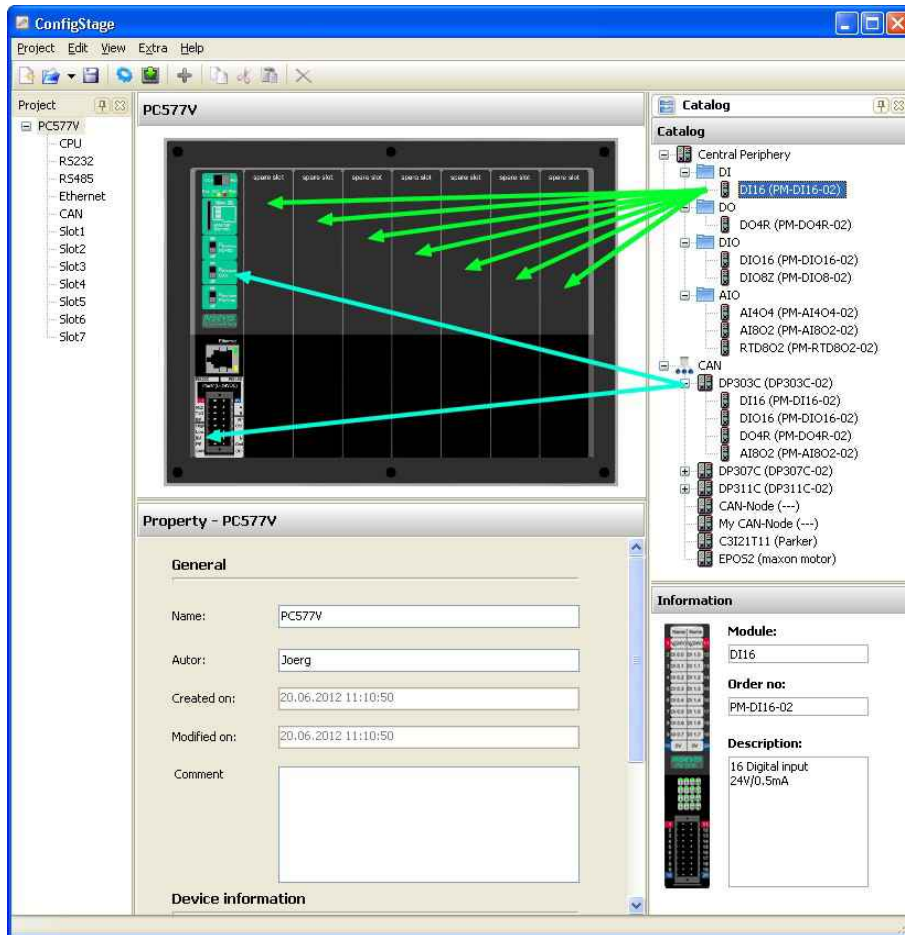
Configuration with the Software „ConfigStage“

It is very easy to configure and parametrize all INSEVIS- PLCs and internal or external CAN-Periphery with the 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.

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 will be configured
- Bottom right Information area of the selected module



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 off the Simatic®- Manager.

Configuration with the Software „ConfigStage“

Assign the IP-address

With ConfigStage 1.0.14.5 this software can **CHANGE** the IP-address of the target device.

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

(This needs the operating system 2.0.35 or higher in the INSEVIS-PLCs).

The IP-address of the target-device will be entered in the download-dialog box (F12).

In this sample a new IP-address was chosen in the new configuration (192.168.80.147, see below).

This new configuration must be downloaded to the old IP-address 192.168.80.148 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.

After the download the device got its new configuration and is available with the new IP-address 192.168.80.147.

Name	MAC address	IP Address	Netmask	Router address
INSEVIS PC10xP	00-50-C2-DF-30-F0	192.168.80.148	255.255.255.0	192.168.80.50

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 in the INSEVIS- PLCs

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

byte
 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.

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, these will be configured with the software tool „ConfigStage“ and the set up date will be stored in the system data blocks (SDBs).

Configuration with the Software „ConfigStage“

From version 1.0.14.7 the used periphery address area can be displayed comfortable in an own window.

The pull down menu „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.



Type	Address	Module	Node	Slot
Input	4 .. 5	DI16		1
Input	4 .. 5	DI16		2
Input	8 .. 9	DIO16		3
Output	8 .. 9	DIO16		3
Input	12 .. 23	DIO8Z		4
Output	12 .. 23	DIO8Z		4
Input	192 .. 199	AI404		5
Output	192 .. 199	AI404		5
Output	32 .. 32	DO4R		9
Input	0 .. 3	DP303C	1	
Output	0 .. 1	DP303C	1	

This conflict is shown in the address overview in red.

CPU settings

The CPU settings are compatible to the Siemens-CPU S7-315-2PN/DP 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.

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,...)
 This report will always 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-CPU's 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

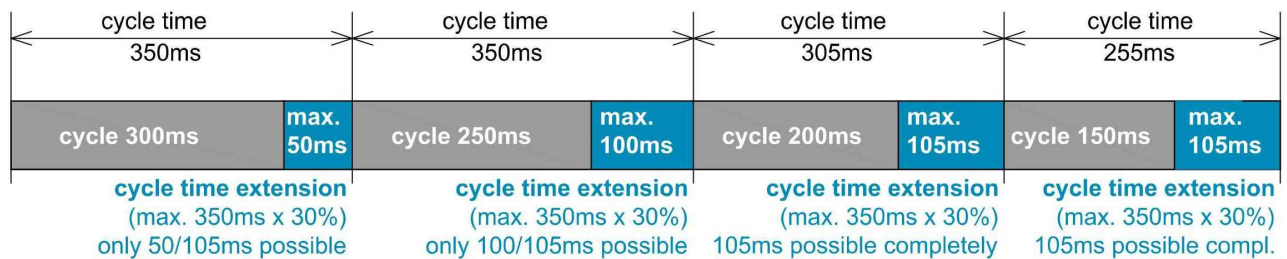
Cycle monitoring time:
(Insert it in ms, max. 6000ms = 6 seconds):

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

Cycle	
Scan cycle monitoring time [ms]:	350
Scan cycle load from communication [%]:	30
Process input image area size:	2048
Process output image area size:	1024

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

Clock	
<input checked="" type="checkbox"/> Clock memory byte	64

Retentive memory

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

Retentive memory	
Number of memory bytes starting MBO:	16
Number of S7 timers starting with T0:	24
Number of S7 counters starting with C0:	16

Time-Of-Day interrupt

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

Time-Of-Day interrupt		
<input checked="" type="checkbox"/> OB10 (Priority 2)	Execution:	Every minute
	Start date:	20.06.2012
	Start time:	12:00:00

Cyclic interrupt

CPUs -V/P support the OB35 only
Value in milliseconds (ms),
maximal value is 1 minute (60,000 ms)

Cyclic interrupt	
OB35 (Property 12)	100

CPU -T supports the OB32...OB34 too
Value in milliseconds (ms),
maximal value is 1 minute (60,000 ms)

Cyclic interrupt	
OB35 (Priority 12)	Execution [ms]: 100
OB34 (Priority 11)	Execution [ms]: 200
OB33 (Priority 10)	Execution [ms]: 500
OB32 (Priority 9)	Execution [ms]: 1000

Configuration with the Software „ConfigStage“

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-VI-P: There is ONE Ethernet-interface available (RJ45)

IP Protocol

IP Address:

Netmask:

Router:

Protection

Permit access with S7 Communication from remote partner (PG, PLC, HMI, OPC, ...) via Ethernet 1 Ethernet 2

Connections

ID	Type	Active	Local	Partner	Partner IP	Interface
1	S7 connect...	Yes	10.02	10.02	192.168.80.51	

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).

Property: Ethernet

General

Operation mode
 2-port ethernet Switch
 2 separate ethernet ports

Ethernet 1
 Activate this port for use
 Transmission medium / duplex:
 Disable auto negotiation

Ethernet 2
 Activate this port for use
 Transmission medium / duplex:
 Disable auto negotiation

IP Protocol

IP Address:

Netmask:

Router:

Protection

Permit access with S7 Communication from remote partner (PG, PLC, HMI, OPC, ...) via Ethernet 1 Ethernet 2

Connections

ID	Type	Active	Local	Partner	Partner IP	Interface
1	S7 connect...	Yes	10.02	10.02	192.168.80.51	

Both ports can be used

Property: Ethernet

General

Operation mode
 2-port ethernet Switch
 2 separate ethernet ports

Ethernet 1
 Activate this port for use
 Transmission medium / duplex:
 Disable auto negotiation

Ethernet 2
 Activate this port for use
 Transmission medium / duplex:
 Disable auto negotiation

IP Protocol

Ethernet 1 Ethernet 2

IP Address:

Netmask:

Router:

Protection

Permit access with S7 Communication from remote partner (PG, PLC, HMI, OPC, ...) via Ethernet 1 Ethernet 2

Connections

ID	Type	Active	Local	Partner	Partner IP	Interface
1	S7 connect...	Yes	10.02	10.02	192.168.80.51	0

Port 2 can not more communicate by S7-commu-
 nication (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*

parameters at TCP Send/Receive

- Local port,
- 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 again the „Mapping“ at Modbus-Server, but here as Modbus TCP)

Property - Ethernet

IP Protocol

IP Address:

Netmask:

Router address:

Connections

ID	Type	Active	Local	Partner	Partner IP
1	S7 connection (Active)	Yes	04.02	02.02	0.0.0.0
2	INSEVIS Panel-HMI		FF.02		
3	TCP Send/Receive	No	0	0	0.0.0.0
4	UDP Send/Receive		0		
5	ModBus TCP Server				

Properties - ModBus TCP Server connection

Discret inputs (Bits)

Area:

Block number:

Byte offset:

Length in bytes:

Coils (Output bits)

Area:

Block number:

Byte offset:

Length in bytes:

Input Registers

Area:

Block number:

Byte offset:

Length in bytes:

Holding (Output) Registers

Area:

Block number:

Byte offset:

Length in bytes:

Configuration with the Software „ConfigStage“

Communication / Information about TSAPs

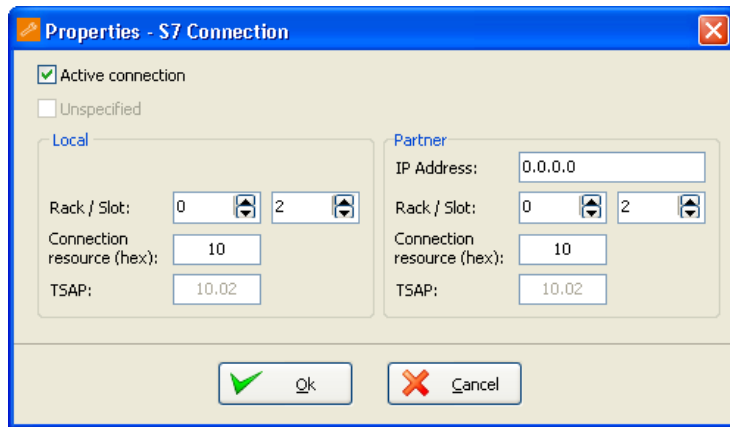
INSEVIS-CPU's contain as well as the Siemens CPU 315-2PN/DP system internal **16 passive S7-connections**.

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)

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.



CAN configuration

Decentral INSEVIS periphery

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

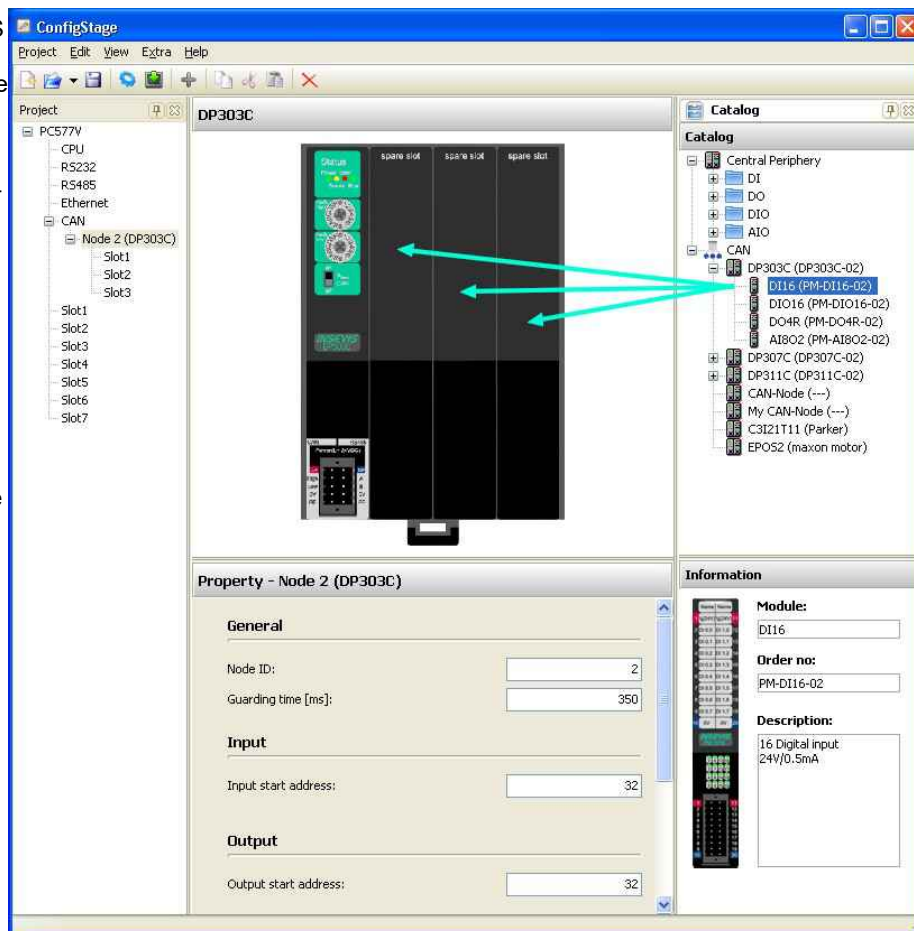
After having placed your INSEVIS head station on the CPU, this module appears in the project tree and in the display.

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“

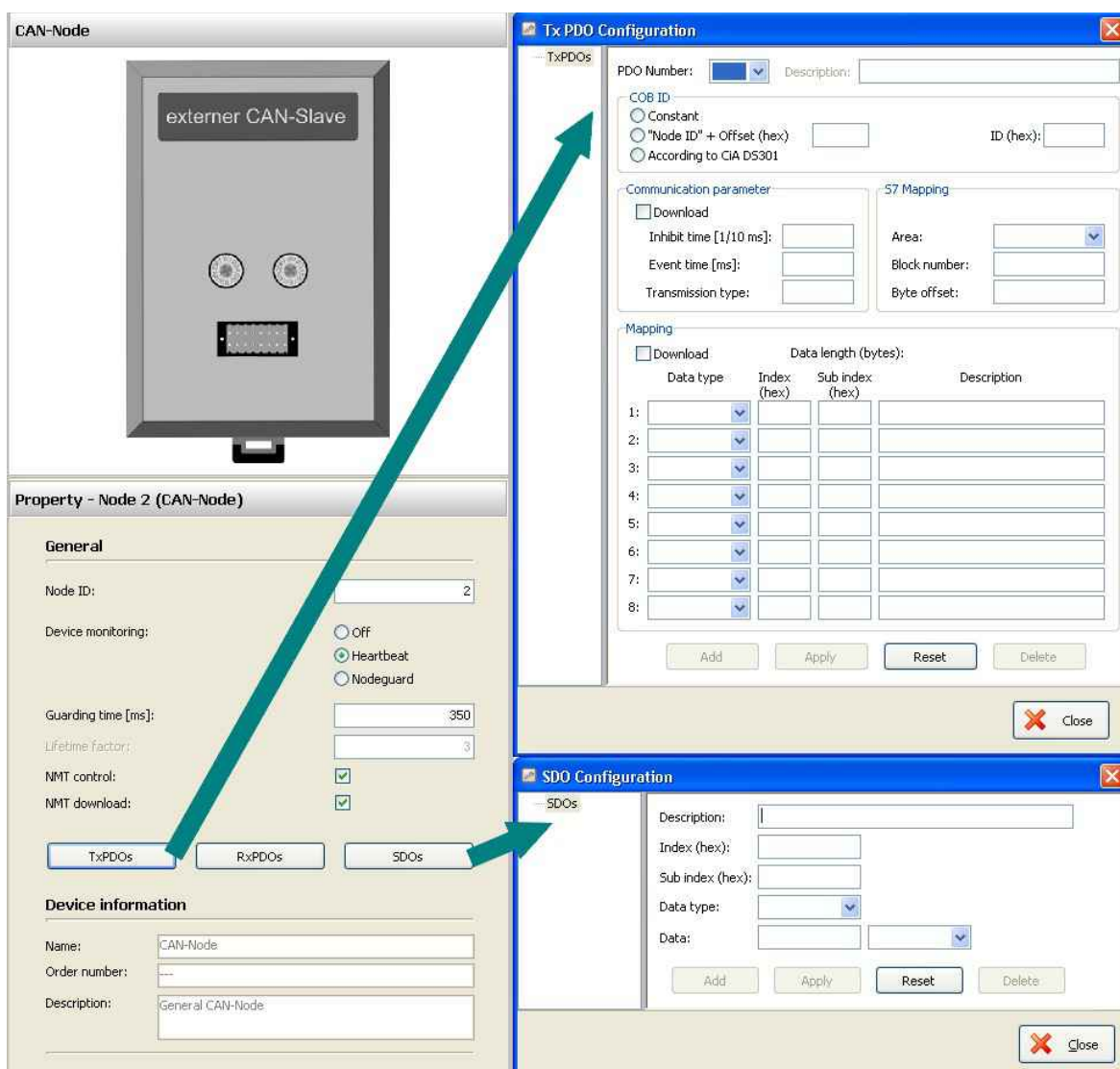
Configure decentral external periphery manually

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.

Configuration with the Software „ConfigStage“

The inhibit-time prevents a too 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.

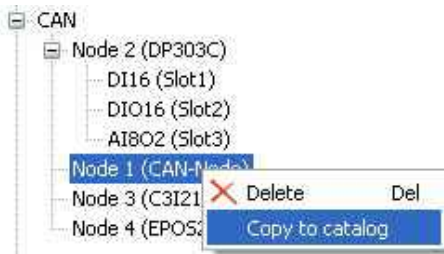
With activated download of complete mapping-parameter the PLC configures the content of the PDS during start up.

To assign more configurations in the start up, **SDOs** 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.

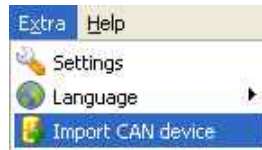


The nomenclature **TX** (Transmit) and **RX** (Receive) are at CANopen®-PDOs always from the CAN-nodes view (slave). It means, with a TX-PDO a node sends its input data to the PLC and with a RX-PDO it receives its output data.

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:



Then 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.

Tx PDO Configuration

— TxPDOs

PDO Number: 1 Description:

COB ID

Constant

"Node ID" + Offset (hex) ID (hex): 182

According to CIA D5301

Communication parameter

Download

Inhibit time [1/10 ms]: 100

Event time [ms]: 500

Transmission type: 255

S7 Mapping

Area: Input

Block number: 1

Byte offset: 0

Mapping

Download Data length (bytes): 8

	Data type	Index (hex)	Sub index (hex)	Description
1:	Byte	6000	01	ReadState8_InputLines.Digital Input By
2:	Byte	6000	02	ReadState8_InputLines.Digital Input By
3:	Byte	6000	03	ReadState8_InputLines.Digital Input By
4:	Byte	6000	04	ReadState8_InputLines.Digital Input By
5:	Byte	6000	05	ReadState8_InputLines.Digital Input By
6:	Byte	6000	06	ReadState8_InputLines.Digital Input By
7:	Byte	6000	07	ReadState8_InputLines.Digital Input By
8:	Byte	6000	08	ReadState8_InputLines.Digital Input By

CAN Objects

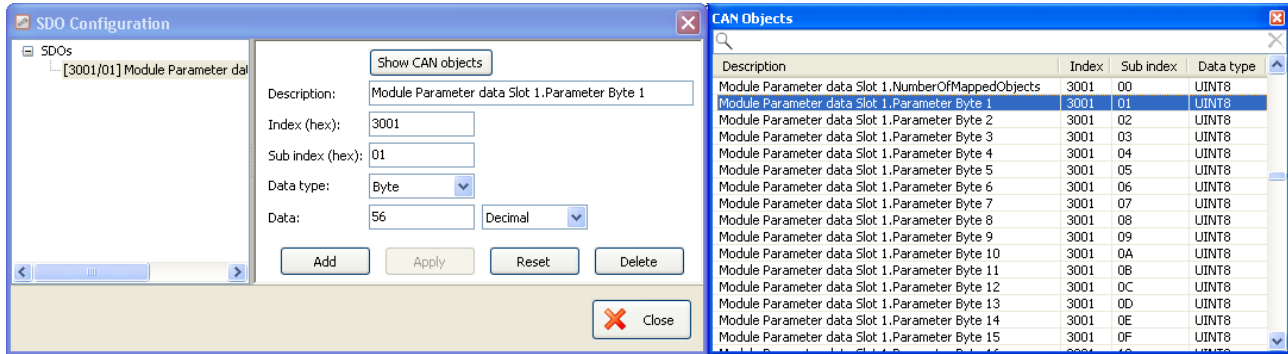
Description	Index	Sub index	Data type
ReadState8_InputLines.Digital Inp...	6000	01	UINT8
ReadState8_InputLines.Digital Inp...	6000	02	UINT8
ReadState8_InputLines.Digital Inp...	6000	03	UINT8
ReadState8_InputLines.Digital Inp...	6000	04	UINT8
ReadState8_InputLines.Digital Inp...	6000	05	UINT8
ReadState8_InputLines.Digital Inp...	6000	06	UINT8
ReadState8_InputLines.Digital Inp...	6000	07	UINT8
ReadState8_InputLines.Digital Inp...	6000	08	UINT8
ReadState8_InputLines.Digital Inp...	6000	09	UINT8
ReadState8_InputLines.Digital Inp...	6000	0A	UINT8
ReadState8_InputLines.Digital Inp...	6000	0B	UINT8
ReadState8_InputLines.Digital Inp...	6000	0C	UINT8
ReadState8_InputLines.Digital Inp...	6000	0D	UINT8
ReadState8_InputLines.Digital Inp...	6000	0E	UINT8
ReadState8_InputLines.Digital Inp...	6000	0F	UINT8
ReadState8_InputLines.Digital Inp...	6000	10	UINT8
ReadState8_InputLines.Digital Inp...	6000	11	UINT8
ReadState8_InputLines.Digital Inp...	6000	12	UINT8
ReadState8_InputLines.Digital Inp...	6000	13	UINT8
ReadState8_InputLines.Digital Inp...	6000	14	UINT8
ReadState8_InputLines.Digital Inp...	6000	15	UINT8
ReadState8_InputLines.Digital Inp...	6000	16	UINT8
ReadState8_InputLines.Digital Inp...	6000	17	UINT8
ReadState8_InputLines.Digital Inp...	6000	18	UINT8
ReadState8_InputLines.Digital Inp...	6000	19	UINT8
ReadState8_InputLines.Digital Inp...	6000	1A	UINT8
ReadState8_InputLines.Digital Inp...	6000	1B	UINT8
ReadState8_InputLines.Digital Inp...	6000	1C	UINT8
ReadState8_InputLines.Digital Inp...	6000	1D	UINT8
ReadState8_InputLines.Digital Inp...	6000	1E	UINT8
ReadState8_InputLines.Digital Inp...	6000	1F	UINT8
ReadState8_InputLines.Digital Inp...	6000	20	UINT8
ReadState8_InputLines.Digital Inp...	6000	21	UINT8
ReadState8_InputLines.Digital Inp...	6000	22	UINT8
ReadState8_InputLines.Digital Inp...	6000	23	UINT8
ReadState8_InputLines.Digital Inp...	6000	24	UINT8
ReadState8_InputLines.Digital Inp...	6000	25	UINT8
ReadState8_InputLines.Digital Inp...	6000	26	UINT8
ReadState8_InputLines.Digital Inp...	6000	27	UINT8
ReadState8_InputLines.Digital Inp...	6000	28	UINT8

Configuration with the Software „ConfigStage“

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

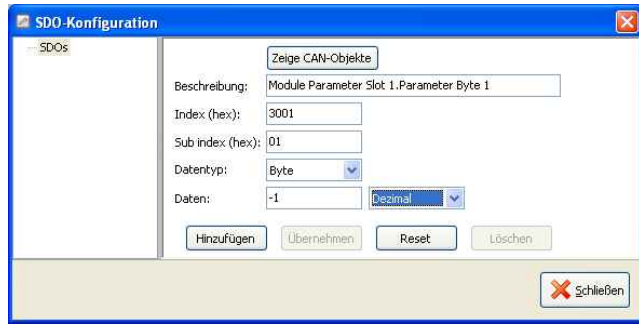
Therewith the in- and outputs can be used on the configured S7-address (in this sample from EB0, AB0) as usually.



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“

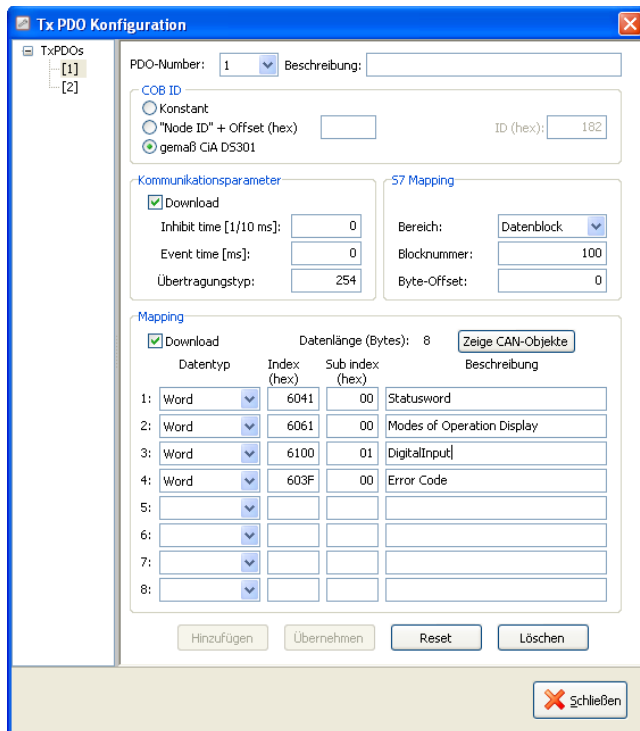
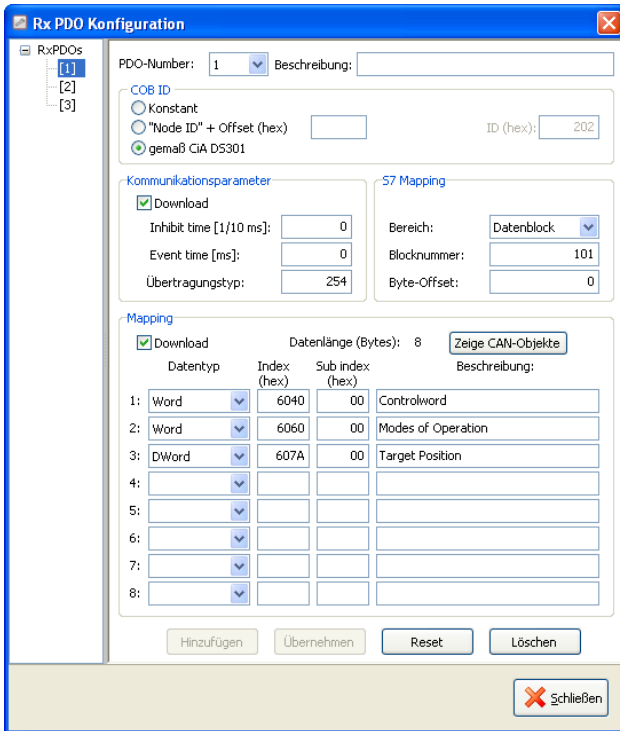
To transfer parameters (e.g. Metering ranges for analog modules), SDOs need to be configured specific referring to the vendor.



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



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

Visualization with the software „VisuStage“

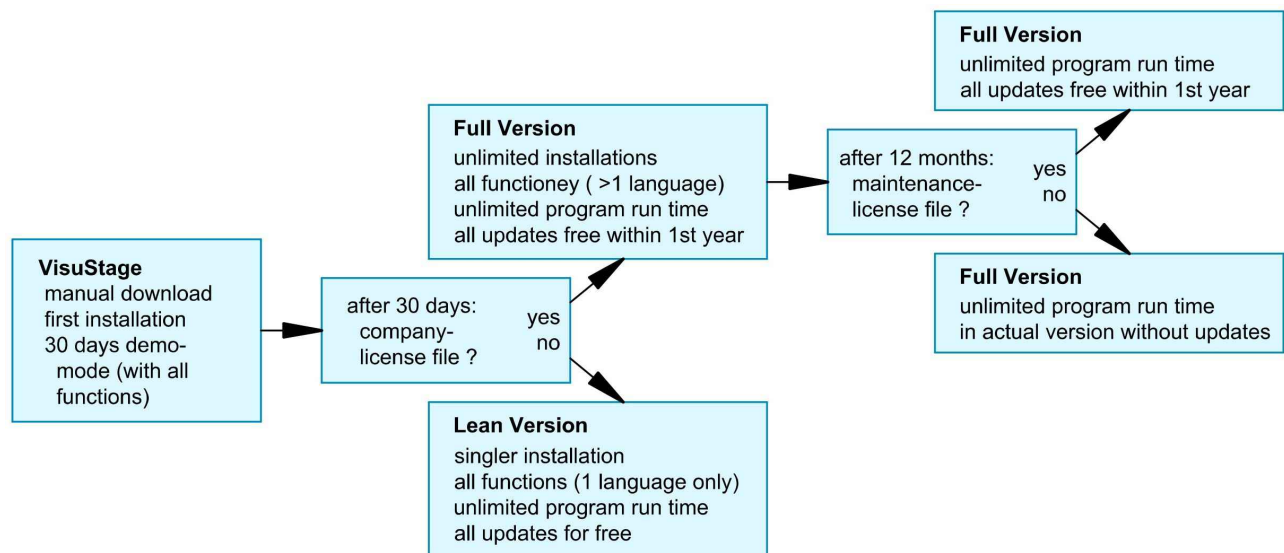
Download and licensing



The actual version of VisuStage is free to download at INSEVIS websites in the download area.

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 to 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 and Windows Vista. 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. (e.g. Insevis_S7-library_from_2_0_17.zip - works from OS-version 2.0.17 and higher).

Communication between PLC and external Panel-HMI

In a Panel-PLC these SFCs will be used from one CPU for PLC- and panel function as well. If you use PLCs with external Panel please note, that

- 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
  
```

Visualization with the software „VisuStage“

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

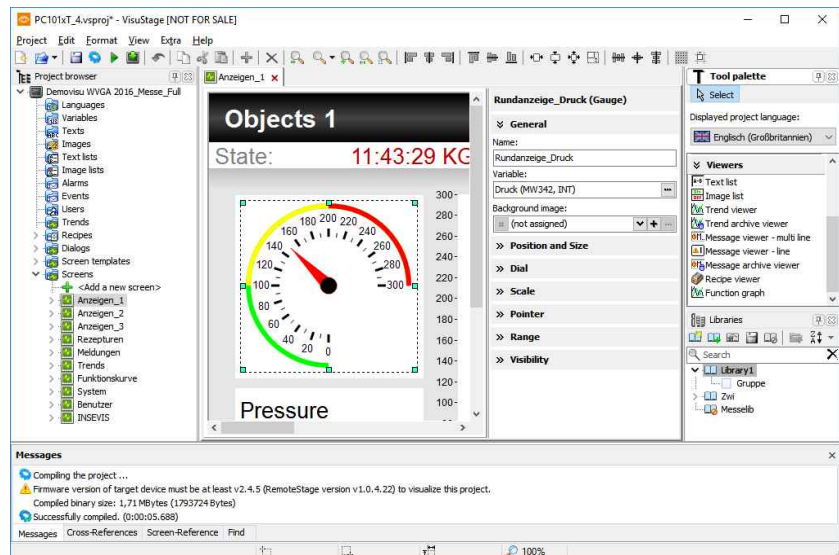
Top: **General functions** and drop down menus,

Left: **Project browser** with **Resource settings**, here the resources will be set up and parametrized
Screens (menus, view is self constructing, first screen is shown after boot-up)

Left middle: **Window** of the projected Menue

Right middle: **Display** of the objects parameters of the the selected object

Right: Tool bar with **Project language** (in this language the project will be displayed)
Function catalog with all objects what are available
Library catalog (to be assigned by one self)



Bottom: Message window (for messages, references, queries and filter results), to be switched on/off by F6-key

Demonstration project

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.

Visualization with the software „VisuStage“

General functionality

VisuStage uses PLC-variables in different visualization objects in different screens. The source implements with images and texts (with the fonts from the VisuStage-PC) and will be compiled into a binary, what will be transferred to the Panel-HMI / PLC by Ethernet. The firmware in the Panel-HMI-/PLC creates the images and touch fields at the touch display there. No source data can be read back from the Panel-HMI-/PLC. There is possible to get a remote on a PC-screen by RemoteStage, what requires the visualization binary (from the PC or read back from the Panel-HMI/PLC - if you allow this).

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
- 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 lossless 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.)

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 be stored only one time as 1 object. It does not matter, if symbols or texts belonging to these 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 coordinates.)
- Better to have less screens with more common objects than to have lots of nearly empty screens.
(Every new screen is stored as bmp 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 better 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 your PC for a further use in other projects.



Visualization with the software „VisuStage“

Project settings

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

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)

Project

General

Name:	Demovisu WVGA 20156_1
Author:	INSEVIS
Created on:	30.07.2011 12:13:41
Created version:	2.0.2.0
Modified on:	22.04.2016 19:16:05
Modified version:	2.0.5.2
Comment:	Demo-Visualisierung ab VisuStage 2.0.4.9, SPS: ab BS 2.3.4, HMI ab BS 1.2.4 mit Referenz im Handbuch ab November 2015 --> Tips in den Kommentarzeilen beachten Demo-Visualization from VisuStage 2.0.4.9 PLC: from OS 2.3.4., HMI from OS 1.2.4

Device information

Target IP Address:	192.168.80.73
Description:	PC710T, PC717T 7.1" WVGA (800x480), 16bit Color, TFT, 48MByte load memory for visualization

RemoteStage

Enable for uploading the visualization binary via RemoteStage

PIN:

Remote control (VNC Server)

Enable remote control (VNC Server)

Start behaviour

Start automatically

Controlled by variable (not assigned)

TCP Port number

Port number (static) 5900

From variable (not assigned)

Server name

Name (static): INSEVIS-PC710

From variable (not assigned)

Authentication

No authentication

With password 12345

Password from variable (not assigned)

Operation mode control

Monitoring mode (view only)

Controlling mode

Controlled by variable (not assigned)



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 authentication 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:

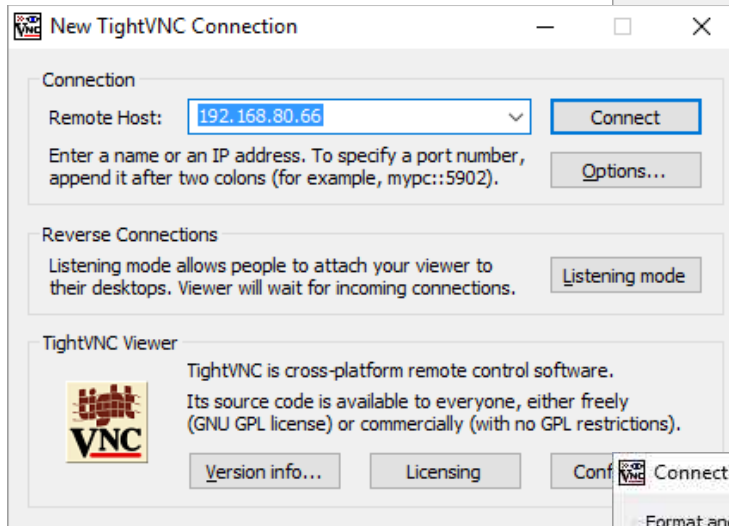
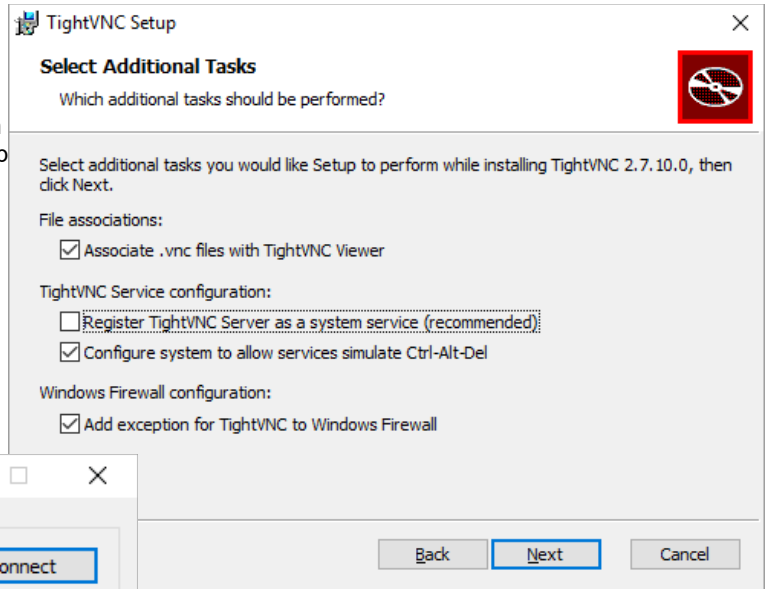
- Supporting RFB V 3.8 with encryption ZRLE, RAW-protocol
- Deselecting of „Clipboard transfer“ (copy & paste for texts)

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

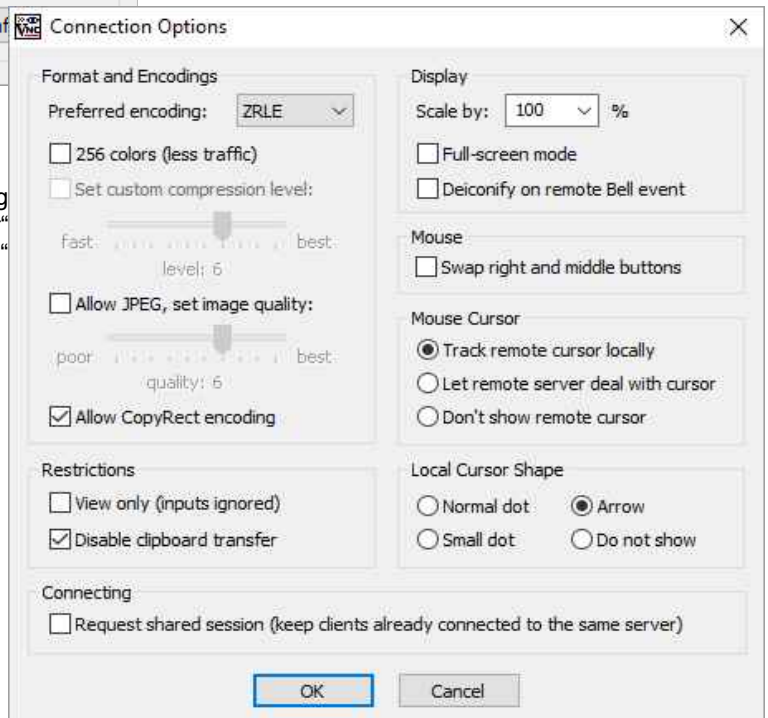


Images are made at installation of Tight VNC-Viewer. This is a free software easy to install and configure, so that we can recommend it.

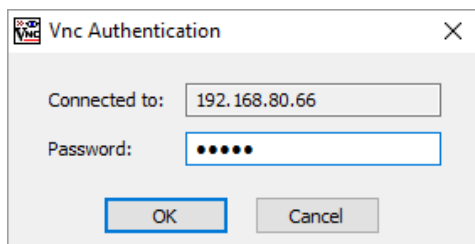


Assign IP-address of the remote device and go to „Options“

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



Insert password what was assigned in VisuStage



Visualization with the software „VisuStage“

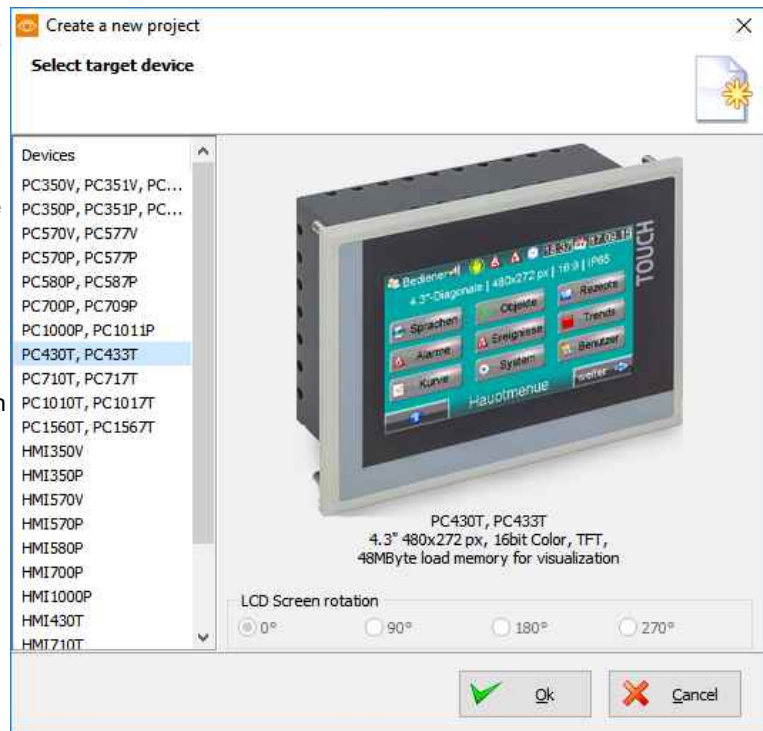
Change screen orientation or resolution

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.).

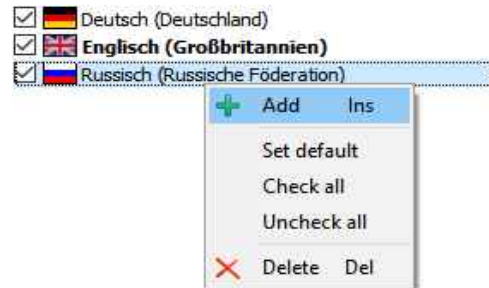


Create and administrate resources

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

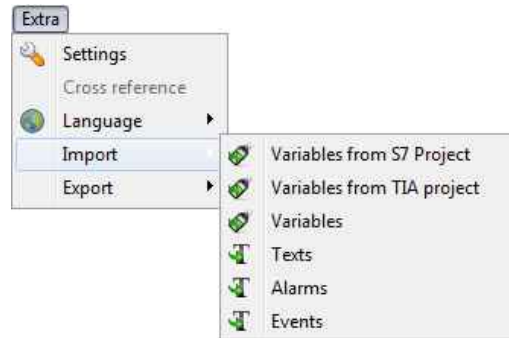
1) Import the variables by the system data file (*.sdf)

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

Visualization with the software „VisuStage“

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

- Start it by
 - Extra
 - Import
 - Variables from S7-Project
(SimaticManager must be installed on this PC)



- Mark and open the corresponding project

Name	Pfad	Autor	Erstellt	Geändert
Test App	D:\Projects\Step7\s7proj\Test_App		25.09.2012 10:53:57	25.09.2012 10:54:07
Test Comm CPU315	D:\Projects\Step7\s7proj\Test_Com		12.09.2011 13:19:43	23.09.2011 19:36:57
Test Comm PC35x	D:\Projects\Step7\s7proj\Test_C_1		15.09.2011 15:02:36	19.02.2013 12:08:57
Test S7pg	D:\Projects\Step7\s7proj\Test_S7p		07.03.2011 12:59:34	14.04.2011 16:27:46
Test SFCs	D:\Projects\Step7\s7proj\Test_SFC		16.03.2011 14:03:11	05.09.2011 18:24:55
Test TCP Communica...	D:\Projects\Step7\s7proj\Test_TCP		07.09.2011 17:13:26	07.09.2011 17:13:36
Test VisuStage	D:\Projects\Step7\s7proj\Test_Vis		25.08.2011 13:12:06	25.08.2011 15:08:37
Test_Egypt	D:\Projects\Step7\s7proj\Test_Egy		08.05.2012 13:37:15	08.05.2012 13:38:44
Test_Recipe	D:\Projects\Step7\s7proj\Test_Rec		07.12.2012 09:13:40	07.12.2012 09:13:49
Test_Trend	D:\Projects\101_Suite\Software\VisuStage\Re...		19.06.2012 10:52:20	19.06.2012 10:52:37
Test?	D:\Projects\Step7\s7proj\Test?		17.03.2011 16:04:52	24.12.2012 11:32:59

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

S7-Programm				
Blockname	Symbolname	Erstellt	Geändert	
DB122		25.09.2012 13:48:56	25.09.2012 13:48:56	
DB123		25.09.2012 13:46:59	25.09.2012 13:46:59	
DB432	iControlCenter CFG	25.09.2012 13:51:17	06.06.2010 19:38:21	
DB433	iControlCenter DATA	25.09.2012 13:51:17	06.06.2010 14:51:38	
DB444	iControlCenter Com...	25.09.2012 13:51:17	25.09.2012 13:57:12	

Visualization with the software „VisuStage“

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



Note:

There is a **VIDEO** available for that item at the INSEVIS-service web site

Name	Adresse	Datentyp	Kommentar
"iControlCenter CFG".header_title[0]	DB432.DBB0	CHAR	
"iControlCenter CFG".header_title[1]	DB432.DBB1	CHAR	
"iControlCenter CFG".header_title[2]	DB432.DBB2	CHAR	
"iControlCenter CFG".header_title[3]	DB432.DBB3	CHAR	
"iControlCenter CFG".header_title[4]	DB432.DBB4	CHAR	
"iControlCenter CFG".header_title[5]	DB432.DBB5	CHAR	
"iControlCenter CFG".header_title[6]	DB432.DBB6	CHAR	
"iControlCenter CFG".header_title[7]	DB432.DBB7	CHAR	
"iControlCenter CFG".header_title[8]	DB432.DBB8	CHAR	
"iControlCenter CFG".header_title[9]	DB432.DBB9	CHAR	
"iControlCenter CFG".header_title[10]	DB432.DBB10	CHAR	
"iControlCenter CFG".header_title[11]	DB432.DBB11	CHAR	
"iControlCenter CFG".header_title[12]	DB432.DBB12	CHAR	
"iControlCenter CFG".header_title[13]	DB432.DBB13	CHAR	
"iControlCenter CFG".header_title[14]	DB432.DBB14	CHAR	
"iControlCenter CFG".header_title[15]	DB432.DBB15	CHAR	
"iControlCenter CFG".header_title[16]	DB432.DBB16	CHAR	
"iControlCenter CFG".header_title[17]	DB432.DBB17	CHAR	
"iControlCenter CFG".header_title[18]	DB432.DBB18	CHAR	
"iControlCenter CFG".header_title[19]	DB432.DBB19	CHAR	
"iControlCenter CFG".header_title[20]	DB432.DBB20	CHAR	
"iControlCenter CFG".header_title[21]	DB432.DBB21	CHAR	
"iControlCenter CFG".header_title[22]	DB432.DBB22	CHAR	
"iControlCenter CFG".header_title[23]	DB432.DBB23	CHAR	
"iControlCenter CFG".header_title[24]	DB432.DBB24	CHAR	
"iControlCenter CFG".cell[0].id_cell	DB432.DBB26	BYTE	define type of cell,...
"iControlCenter CFG".cell[0].header[0]	DB432.DBB28	CHAR	
"iControlCenter CFG".cell[0].header[1]	DB432.DBB29	CHAR	

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

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

Name	Typ
AdditionalFiles	Dateiordner
IM	Dateiordner
Logs	Dateiordner
System	Dateiordner
TMP	Dateiordner
UserFiles	Dateiordner
INSEVIS-SPS.ap13	AP13-Datei

Then a window opens to select the TIA-project.



SELECTION

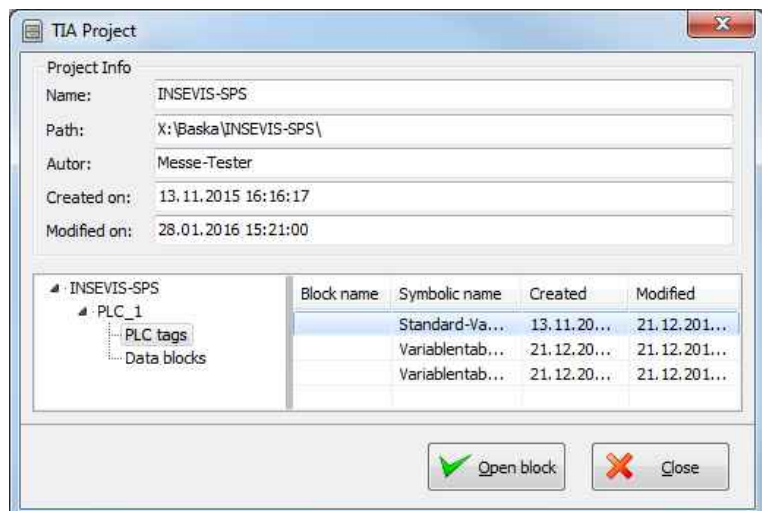
→ of the **Station**
(here INSEVIS SPS)

and than

→ of the **CPU**
(here PLC_1)

and than

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



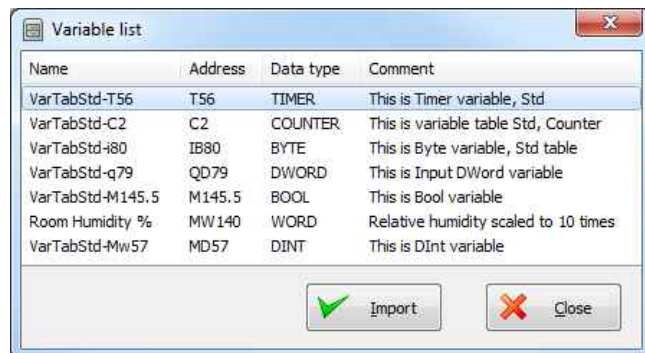
Visualization with the software „VisuStage“

(In the right window all variable tables will be displayed)

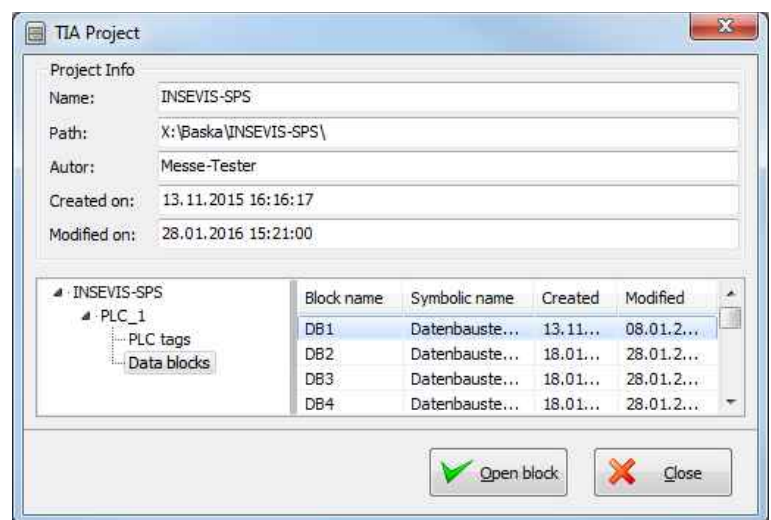
Open up a variable table and see all existing variable lists.

Selection of the variable lists by marking (multiple marking by Shift or Ctrl)

Import the selected variable lists



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



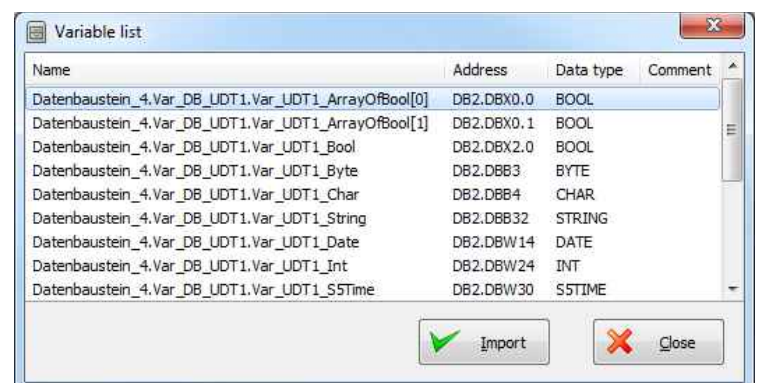
(In the right window all data blocks will be displayed)

Selection of the data block by marking (only single blocks)

Open a data block

Selection of variable from a data block by marking (multiple marking by Shift or Ctrl)

Import the selected variables from the data blocks



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



Caution:

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)

Set filter or find variables

Filter:

Address:

Data type:

Show only unused variables

Filter is active

Variables Multiplex variables

	Name	Address	Data type	Comment
1	El_H2O	MB20	BYTE	Variable für Element Wasser
2	El_ws	MB21	BYTE	Variable für Element weisses Pulver
3	El_ge	MB22	BYTE	Variable für Element gelbes Pulver
4	El_rt	MB23	BYTE	Variable für Element rotes Pulver
5	El_blue	MB24	BYTE	Variable für Element blaues Pulver
6	El_sw	MB25	BYTE	Variable für Element schwarzes Pulver

Variables can be filtered for:

- Name
- Address- and
- Data type

In the sample all variables are filtered, what

- contain „Var“ in the name,
- are defined as „Merker“ and
- with data type „BYTE“

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.

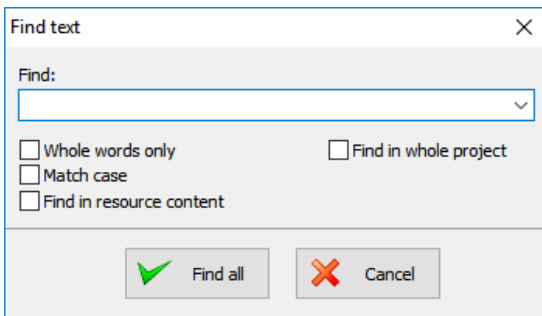
Close/open the message window by key „F6“.

Messages		Cross-References						
Resource type: Variable		Resource name: Ereignis 2 (M40.1, BOOL)						
	Number	Used in	At "Resource"	At "Access"	At "Visibility"	At "Appearance"	At "Function"	Type
Events			1					Events
▼ Ereignisse	2							Screen
		Ereignis_2_kommen					1	Radio box
		Ereignis_2_gehen					1	Radio box

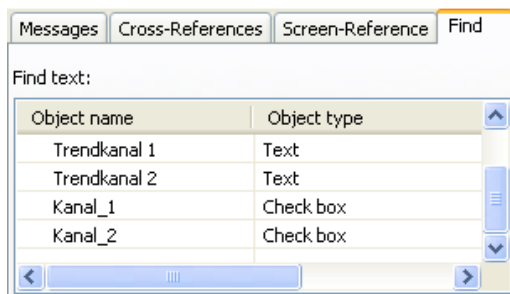
Visualization with the software „VisuStage“

Find variables by text phrases

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

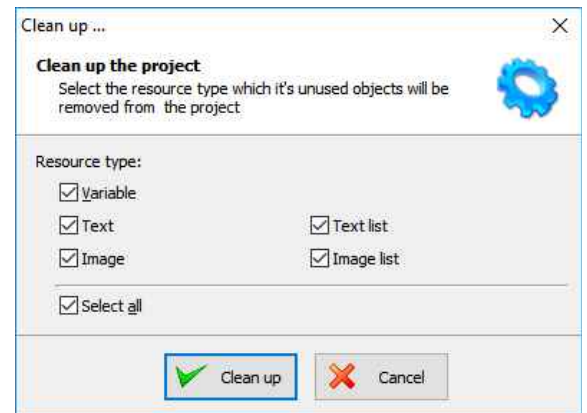


The result is shown in the message window (show/hide with key „F6“)



Clean up unused variables

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



Multiplex-variables

From V 2.0.5.3 it is possible to create multiplex variables.

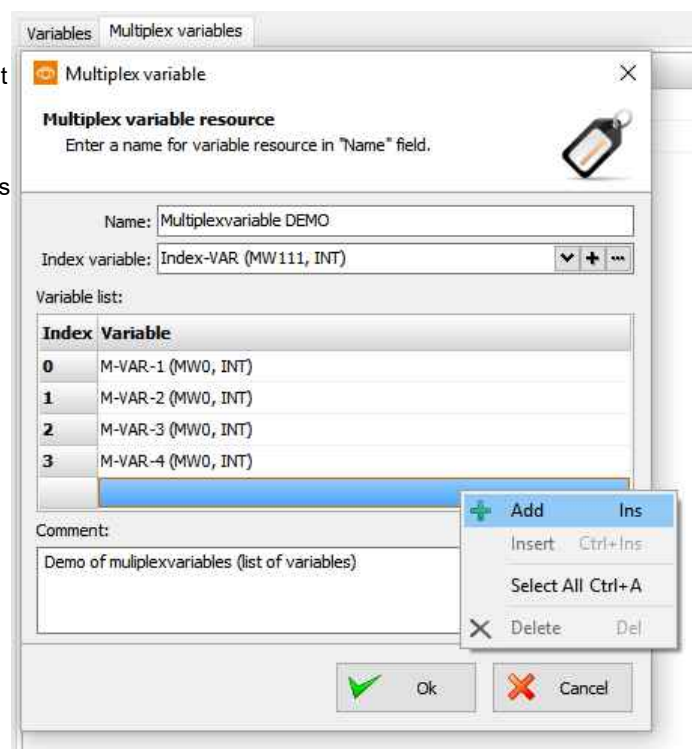
At the resource “Variable”, at the rider “Multiplex variables” a list of variables can be created (see sample right beside).

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	Variable 1 (DB4.DBW 10, INT)
2	Variable2 (DB 10.DBW0, INT)

With multiplex variables e.g. I/O-fields can be multiple used. Depending on the value of the index-variable pre-assigned multiplex-variables are displayed at runtime.



Visualization with the software „VisuStage“

Resources Texts and Text lists

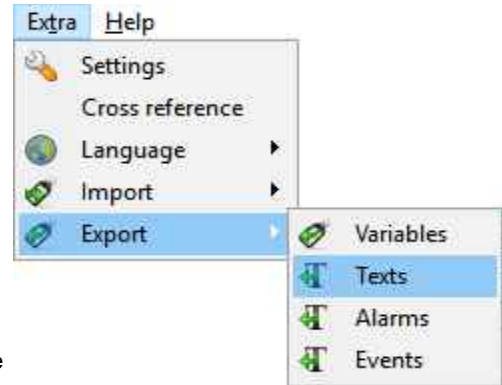
Texts

Will be created in the project language and can be imported or exported as a csv-file

(This helps for external translation.)

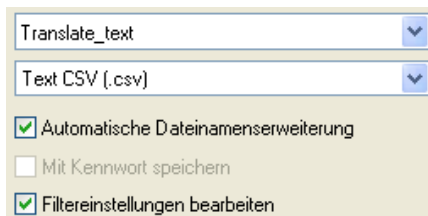
- Export by:→ Extra → Export → Texts
- Choose the languages to be exported
- select your csv-format and save the csv-file.
- Open/import it with a table calculation program (csv-settings must be the same!)
- Edit the text while keep the structure as it is (no cells may be removed or added!)
- Import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



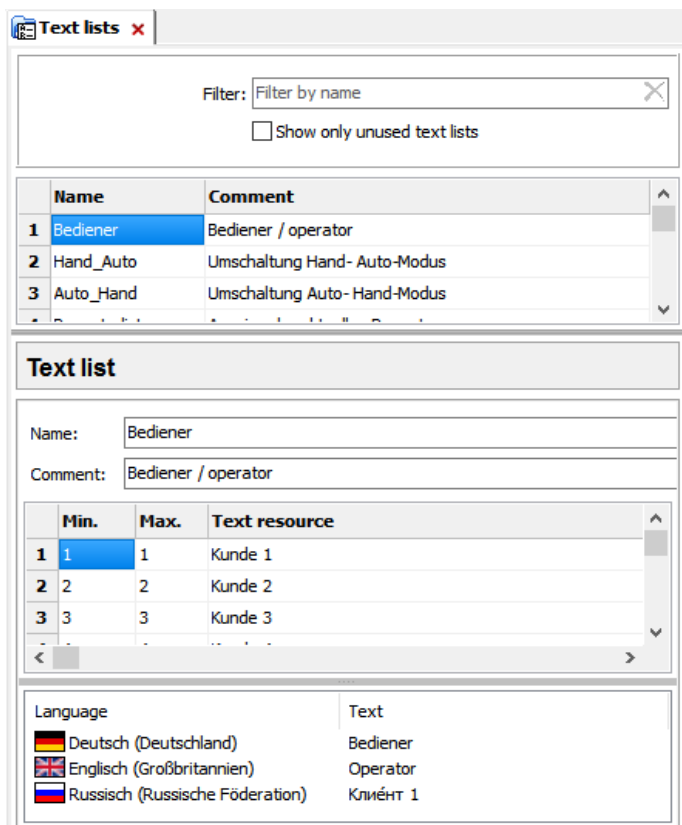
Hint: at some Windows7 installations it is necessary to check "Quote / Set All text cells"

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).

Visualization with the software „VisuStage“

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“.

Messages								
Resource name: Bediener				Resource type: Text list				
	Number	Used in	At "Resource"	At "Access"	At "Visibility"	At "Appearance"	At "Function"	Type
▼ Benutzer	1							Screen
		Benutzerliste	1					Text list viewer

Messages | Cross-References | Screen-Reference | Find

Find texts / text lists by text phrases

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

Find text

Find:

Whole words only Find in whole project

Match case

Find in resource content

Find all Cancel

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

Object name	Object type
Trendkanal 1	Text
Trendkanal 2	Text
Kanal_1	Check box
Kanal_2	Check box

Clean up unused texts / text lists

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

Clean up ...

Clean up the project
Select the resource type which it's unused objects will be removed from the project

Resource type:

Variable Text list

Text Image list

Image

Select all

Clean up Cancel

Visualization with the software „VisuStage“

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. We did use „PhotoFiltre“ for that.

- 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

(the best tool for color changes or screen changes 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)

From V2.0.3.5 the image resources used in the image lists will be displayed below to keep a better overview



ATTENTION:

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

Filter:
 Show only unused image lists

	Name	Comment
1	Pipe_hori	horizontaler Rohrabschnitt
2	Pipe_vert	vertikaler Rohrabschnitt
3	Angle_1	Eckverbinder
4	Hand_Auto	Umschaltung Hand- und Auto-Moduls

Image list

Name:

Comment:

	Min.	Max.
1	0	0
2	1	1
3	2	2
-	-	-

Deutsch (Deuts...

Visualization with the software „VisuStage“

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“.

Messages								
Resource name: Pipe_vert				Resource type: Image list				
	Number	Used in	At "Resource"	At "Access"	At "Visibility"	At "Appearance"	At "Function"	Type
▼ Anzeig...	1							Screen
		Seg_re_vert	1					Image list viewer

Messages | Cross-References | Screen-Reference | Find

Find images/image lists by text phrases

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

Find text ✕

Find:

Whole words only Find in whole project
 Match case
 Find in resource content

✔ Find all
✘ Cancel

Clean up unused images/image lists

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

Clean up ... ✕

Clean up the project

Select the resource type which it's unused objects will be removed from the project

Resource type:

Variable Text list
 Text Image list
 Image
 Select all

✔ Clean up
✘ Cancel

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

Messages Cross-References Screen-Reference Find	
Object name	Object type
Trendkanal 1	Text
Trendkanal 2	Text
Kanal_1	Check box
Kanal_2	Check box

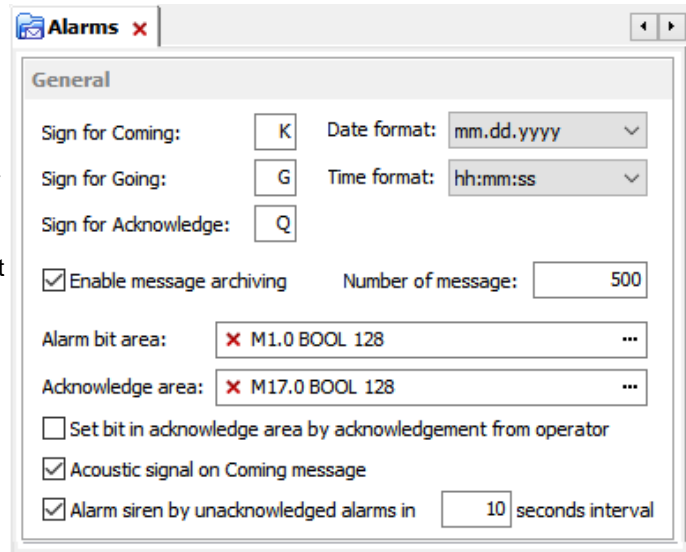
Visualization with the software „VisuStage“

Resource Messages (Alarms and Events)

Alarms / Events

It can be processed 128 alarms at CPU-V and 1024 alarms at CPU-P/T and 128 events at CPU-V/P and 1024 at CPU-T as well as archiving 500 messages (alarms as well as events).

- 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)

Important:

- 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

Alarm messages							
	Deutsch ...	Englisc...	Russi...	Group	Trigger bit address	Acknowledge bit address	Variable
1	Alarmtext von ...	alert text of ...	тревога 1	1	M1.0	M17.0	
2	Alarmtext von ...	alert text of ...	тревога 2	2	M1.1	M17.1	

- 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!
- **Variable** (optional) 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

Visualization with the software „VisuStage“

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.



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.

Visualization with the software „VisuStage“

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

```

Visualization with the software „VisuStage“

Resource Partner-PLC (for HMI only)

The HMI communicates with its partner device by via Ethernet S7-communication.

This connection will be

- a) in the BIOS of the Panel-HMIs assigned directly or
- b) in VisuStage and ConfigStage assigned as written below

For INSEVIS-Panels with INSEVIS-PLCs

1. Set up a connection in the CPU by ConfigStage (CPU-> Ethernet) with the type „INSEVIS-Panel-HMI“ and keep in mind the ID-No. of this connection
2. Assign the IP-address of the partner-PLC into the field „Partner-PLC“ in VisuStage-project
3. Configure the TSAP by assigning rack- / slot- / ID-no. of this connection (results in that sample in FF.02),
4. Type in the TSAP (in that sample. FF.02) into the Ethernet connection data in the ConfigStage project of the PLC

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

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

ID	Type	Active	Local	Partner	Partner IP
1	INSEVIS Panel-HMI		FF.02		

For INSEVIS-Panels and Siemens-CPUs

1. Assign the IP-address of the partner-PLC into the field „Partner-PLC“ in VisuStage-project
2. Configure the TSAP by assigning **rack- / slot- / ID-no.** of the connection resource for Siemens-CPUs 300/400 it is **0, 2, 02**, for Siemens-CPUs 1200 it is **0, 1, 02**

Partner-PLC Synchronization (for HMI only)

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

→ Please see above screenshot

- 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.

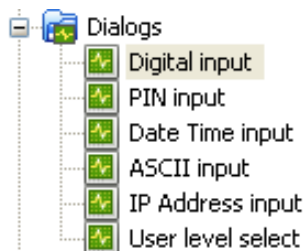
Visualization with the software „VisuStage“

Resource Dialogs

The dimension and the design of the virtual keyboards appearing at

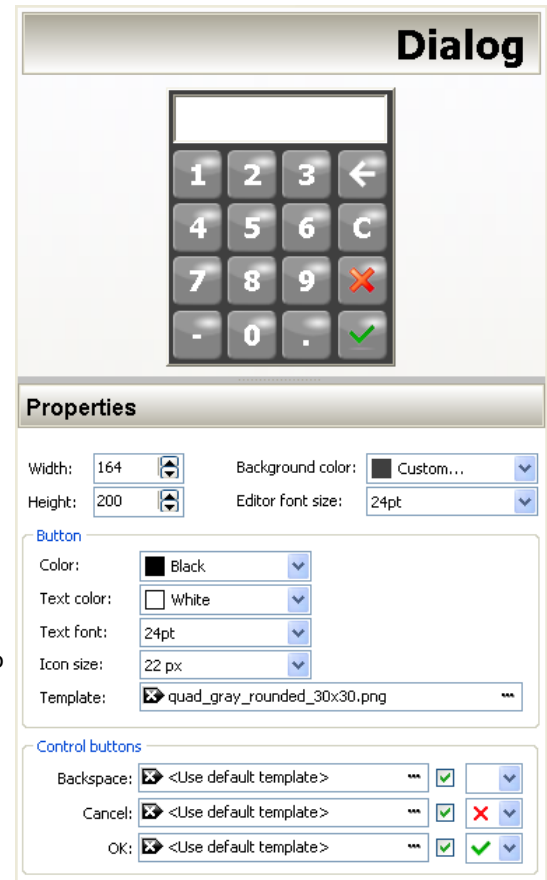
- I/O-field,
- Login field,
- Date-/Time field
- Stringinput field
- IP-address field
- User level select

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.

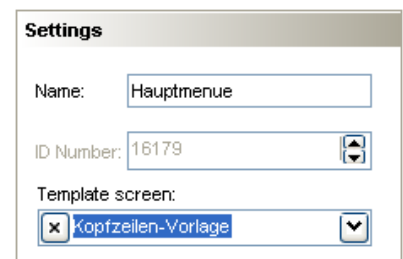


Resource Screen templates

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.

Use this e.g. for top or bottom menus, headlines and so on..



Visualization with the software „VisuStage“

Resources Trends

There can be processed 4 trends with 16 channels each. This represent values by time, smallest time base is 1 sec.

- One ruler caption can be displayed per trend, all other trend graphs are exaggerated vertically.
- The size of the Y-axis will be generated by the assigned Min./Max. values of the trend.
- Assigning an unique color to each channel is the best way to keep orientation
- Selection of the trends by check boxes or by touching on it on the touch screen.

Name	Data type	Channels	Comment
1 Druck	WORD	2	
2 Luft	BYTE	0	
3 Temp.	BYTE	0	

Name	Variable	Min.	Max.	Deci...	Color
1 Kanal 1	Trend (MW12, WORD)	0	255	0	Black
2 Kanal 2	Trend1 (MW7, WORD)	0	510	0	Red

The configuration of trends is done by the function „start trend“, what is assigned to a button or to a touch area.

If „Archive the samples“ is activated, there can be typed in the number of samples before the first sample will be overwritten by the last (FIFO).

It will be archived only to the external micro-SD-card.

Each trend will be saved as own file. This binary will be converted by the software „RemoteStage“ on the PC into a csv- format.

Trend data can be archived either
 - cyclic (in seconds) or
 - variable controlled by the S7-program.

The shortest distance between 2 archived samples is 1 second (see figure right).

Function

- At pushing the button
 - <Add function>
- At releasing the button
 - Start the trend**
 - <Add function>

Function: Start the trend

Select your desired trend from the list or add a new
 Enter the settings of trend

Trend: **Druck**

Sampling mode
 Sample once Sample cyclical

Archive the samples

Number of samples: 1234

Interval in seconds
 Const: 1
 From variable: (not assigned)

Ok Cancel

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“.

Resource name: **Druck** Resource type: **Trend**

	Number	Used in	At "Resource"	At "Access"	At "Visibility"	At "Appearance"	At "Function"	Type
▼ Trends	7							Screen
		Trend-Viewer	1					Trend viewer
		Kanal_2				1		Check box
		Trend archive viewer	1					Trend archive ...
		Trend_fortsetzen				1		Button

Messages Cross-References Screen-Reference Find

Visualization with the software „VisuStage“

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 itself automatically.

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

Visualization with the software „VisuStage“

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

```

Visualization with the software „VisuStage“

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

```

Visualization with the software „VisuStage“

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

```


Visualization with the software „VisuStage“

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

Visualization with the software „VisuStage“

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
```

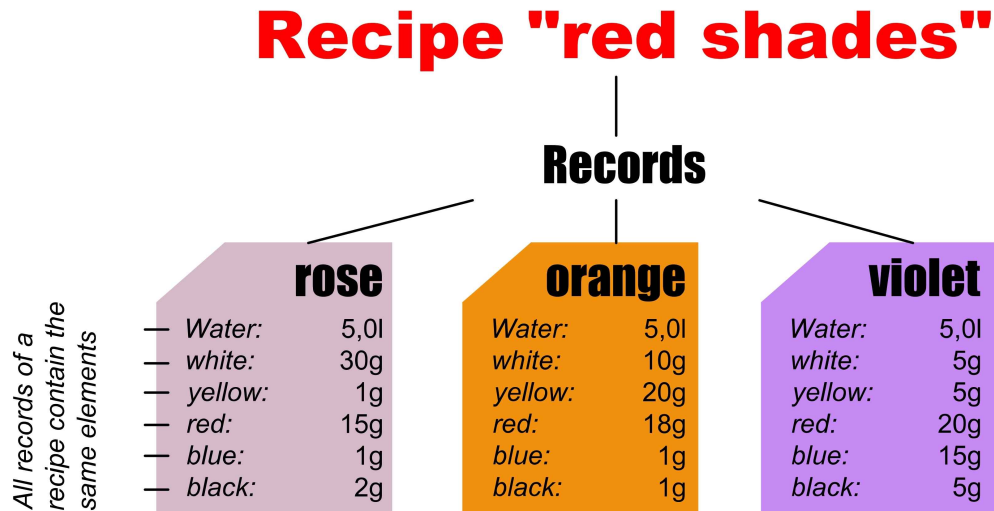
Visualization with the software „VisuStage“

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.

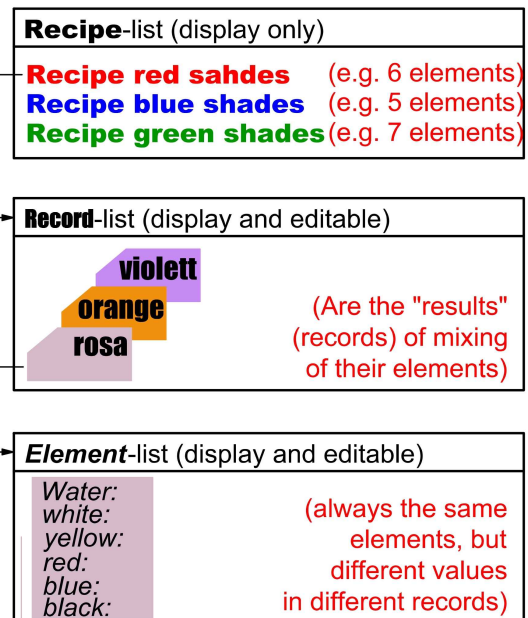
The record list shows existing records. A record can be added, selected for further operation, saved as or deleted here.

(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

The screenshot shows a configuration window titled 'Rezeptur_Rot'. It has two main sections:

- General:**
 - Recipe name:
 - Number:
 - View name: (with expand, add, and delete icons)
 - Comment:
- Recipe structure:** A table with 8 columns: Element, View name, Variable, Min., Val..., Max., and Decimal point. It contains 5 rows of data.

	Element	View name	Variable	Min.	Val...	Max.	Decimal point
1	Wasser (Liter)	Wasser	El_H2O (MB20, BYTE)	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 schwarz (g)	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.

Visualization with the software „VisuStage“

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
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#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)

Visualization with the software „VisuStage“

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
R        M    1500.6      // reset request signal

U        M    1002.0      // If successful done, then
BEB

UN       M    1002.1      // if no error occurred, then
BEB

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

BEA
                                // end of function

```

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
 - 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 more memory and are recommended only if 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.

Visualization with the software „VisuStage“

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

Object name	Object type	Property	Resource name	Resource type
▶ Ansprache	Text			
▶ Version	Text			
▶ Objekte	Button			
▶ Rezepturen	Button			
▶ Alarme	Button			
▶ Ereignisse	Button			
▶ Trends	Button			
▼ System	Button			
		Text	Syst	Text
		Function (Change screen with PIN input)	Sprachen	Screen
		Function (Change screen with PIN input)	Benutzer	Screen
		Function (Change screen with PIN input)	System	Screen
▶ Sprachen	Button			
▶ Benutzer	Button			
▶ Benutzer1	Button			

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**

Position and Size

X:

Y:

Text font

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

Text font

Arial

A

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

Border

Flat

Flat
Lowered
Raised
None

Margins

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

Margins

Visualization with the software „VisuStage“

Visibility

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

Visibility
 Variable:

Hide
 Variable value: Range Bit
 number
 value

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

Visibility
 Variable:

Hide
 Variable value: Range Bit
 from
 to

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

Access rights

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

Access right
 Level:

Variable:

Variable value: Range Bit
 from
 to

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

Access right
 Level:

Variable:

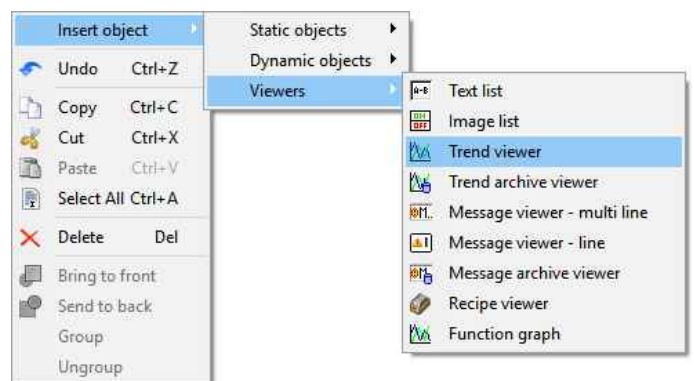
Variable value: Range Bit
 number
 value

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 menu window
- a key combination without mouse in the menu window (to see right beside the object in the catalog-window)
- by right mouse key in the menu window by a popup window (see image right)



Group / Ungroup objects

Group objects is necessary to fix multiple objects in an pre assigned position by the right mouse key. It makes sense e.g. to create library elements.

Visualization with the software „VisuStage“

The PLC can request what screen menu is active and 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

```

Visualization with the software „VisuStage“

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

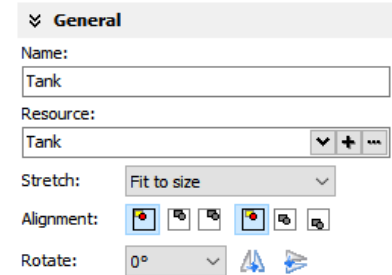
Images

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



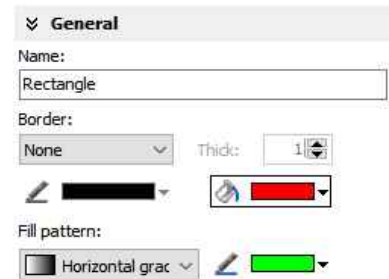
Rectangles

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



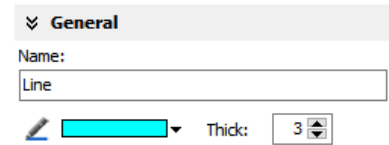
Lines

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

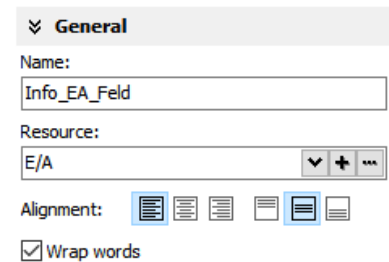
Place an object: [\(see basic funtions\)](#)

Assign visibility: [\(see basic funtions\)](#)

Assign text fonts: [\(see basic funtions\)](#)

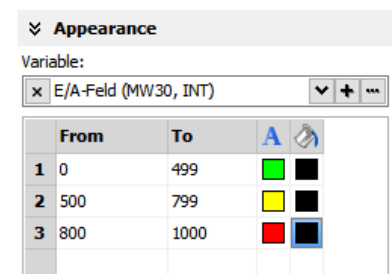
Parameterize the object: (register "General")

- Use an existing **resource** or create a new one directly here
- Assign font, bride and italic style
- Assign horizontal/vertical alignment
- Check, if this is a multi line 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



General hints

- static objects **may overlap each other**
- 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)

Visualization with the software „VisuStage“

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: [\(see basic funtions\)](#)

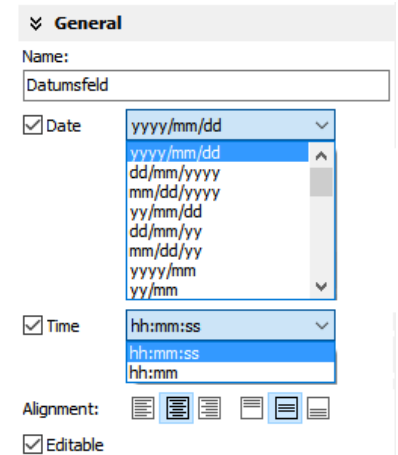
Assign border: [\(see basic funtions\)](#)

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



General hints



- If a DateTime field is too narrow, then characters, what can not be displayed completely will not be displayed at all
- dynamic objects shall **not overlap each other** (Exception: touch area may).
- simulation with „▶“ creates an error report, click on error and you come directly to the wrong object.
- 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).

Visualization with the software „VisuStage“

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)

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

	From	To	A	
1	0	499	Green	Black
2	500	799	Yellow	Black
3	800	1000	Red	Black

General hints



- 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
- dynamic objects shall **not overlap each other** (Exception: touch area may).
- simulation with „▶“ creates an error report, click on error and you come directly to the wrong object.

Visualization with the software „VisuStage“

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.

General

Name:

Mode: PIN input
 PIN change

Change screen by valid PIN input

2a.) 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.

The disadvantage is, that the screen is not automatically changeable with this function.

Function

- Stop the trend
- Clear the alarm buffer
- Clear the event buffer
- Soft-Key
- Invoke PIN-Input dialog
- Invoke PIN-Change dialog
- Log-Out the user
- Backlight Off
- Activate Clean screen
- Change system setting
- Change screen with PIN input
- Delete the alarm archive
- Delete the event archive
- Delete the trend archive

2b.) Change screen with PIN-input (function)

This is the right way to assign a different screen to change for every single user level.

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

Function: Change screen with PIN input

Assign screen to user level
Select your user level and assign the desired screen

PIN input
 Change to the screen which is assigned to current user level (without asking PIN)
 Always ask for PIN input

Level	Name	Screen
1	Operator	Anzeigen_1
2	Master	Rezepturen
3	Chief	Benutzer
4	Service	Trends
5	Superuser	System
6		
7		
8		
9		

General hints

- dynamic objects shall **not overlap each other** (Exception: A touch area may overlap other dynamic objects).
- Simulation with „▶“ creates an error report, click on error and yo will be lead directly to the wrong object.



Visualization with the software „VisuStage“

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 sideways).

IMPORTANT HINT:

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

General

Name:

Template:

Execute functions too, when leave the button

Space between symbol and label:

Text label:

Wrap words

Symbol:

Layout:

Use of selfmade buttons

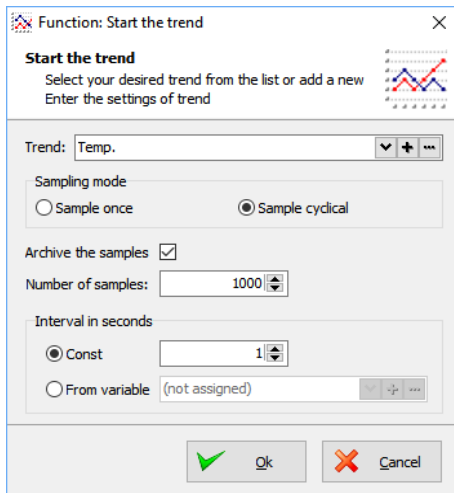
- Copy your 3 buttons (all with the same name) each in one of those 3 directories
 -\inactiv,
 -\pressed and
 -\unpressed
 of the main directory C:\Programs\INSEVIS\ VisuStage\Buttons.
- Choose the same color for the are in the middle, where your text and/or symbol will appear.
- Note: If you forward 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“

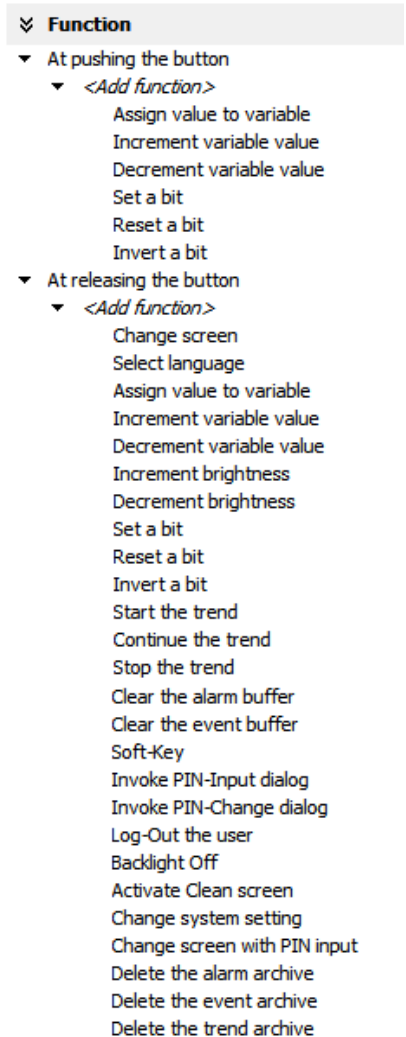
Assign a function: (register “Function”)

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

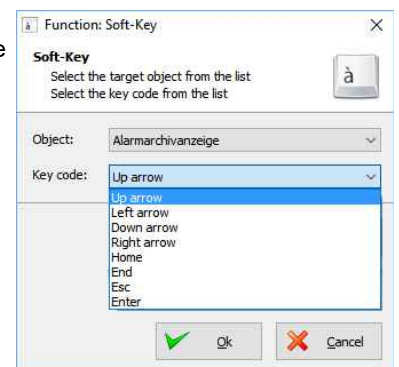


- There can be assigned multiple functions to one object as well
- There can be assigned functions for pushing and releasing the button as well



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.



Visualization with the software „VisuStage“

Dynamic 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”)

- **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 shall be shown on the dynamic button
- **Symbol changes:** (in the sample manually/automatic mode sign) choose (or create a new) an **image list**, what shall 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

	From	To	A	
1	0	0	Yellow	Red
2	1	1	Green	Black

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.

Touch areas – invisible buttons

These objects will be placed above an other object to add a special function by pressing it (like an invisible button).

- Place an object: [\(see basic funtions\)](#)
- Assign access right: [\(see basic funtions\)](#)
- Assign a function: (register “Function”)

like at the simple buttons.



General hints

- this dynamic object may overlap other dynamic objects
- simulation with „▶“ creates an error report, click on error and yo will be lead directly to the wrong object.

Visualization with the software „VisuStage“

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

General hints



- dynamic objects shall **not overlap each other** (xception: touch area).
- 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).
- using of similar graphic objects and less languages saves memory resources.
- simulation with „ ► “ creates an error report, click on error and yo will be lead directly to the wrong object.

Visualization with the software „VisuStage“

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“)
- 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

General

Name: Auswahlfeld_IP

Label: schreiben

Text label at left side

Alignment: [Left] [Center] [Right] [Justify] [None]

Box size: 30 x 30

Group: 0

Variable: IP_Einstell (M600.0, BOOL)

Value checked: 1

Value unchecked: 0

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

General

Name: Kanal_2

Label: Kanal 1

Text label at left side

Alignment: [Left] [Center] [Right] [Justify] [None]

Box size: 22 x 22

Function: Filter trend channel

Trend: Druck

Channel: 2

General hints

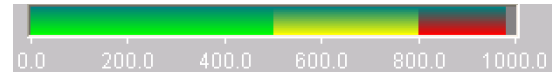


- dynamic objects shall **not overlap each other** (Exeption: A touch area may overlap other dynamic objects).
- simulation with „ ► “ creates an error report, click on error and yo will be lead directly to the wrong object.

Visualization with the software „VisuStage“

Progress bars

This item is used 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:** [\(see basic functions\)](#)
- Assign visibility:** [\(see basic functions\)](#)
- Assign margins:** [\(see basic functions\)](#)
- Assign font:** [\(see basic functions\)](#)
- Assign access rights:** [\(see basic functions\)](#)

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

General

Name: Fortschrittsbalken_hor

Variable: E/A-Feld (MW30, INT)

Decimal point: 1

Max value: Const 10000

Min value: Const 0

Enable limit area

Max limit: Const 7999
 Constant value
 Value from variable

Min limit: Const 4999
 Constant value
 Value from 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!

Appearance

Horizontal bar Vertical bar

3D Bar style

Direction: Right

Coloring: Entire bar Area

Filling: Solid Gradient

Colors:

Border: [Color swatch]

Background: [Color swatch]

Gradient: [Color swatch]

Normal area: [Color swatch]

Low area: [Color swatch]

High area: [Color swatch]

Ruler: Bottom

Divisions: 10

Caption height: 16

General hints



- dynamic objects shall **not overlap each other** (Exception: A touch area may overlap other dynamic objects)
- Simulation with „▶“ creates an error report, click on error and you will be lead directly to the wrong object

Visualization with the software „VisuStage“

Sliders

This object is a good solution to display a variables value along a straight 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**

General

Name:

Variable:

Changeable

Background image:

Rotate:

Show rail Size:

Slider point:

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)

Ruler

Scale value:

Maximum:

Minimum:

Show ruler

Increment:

Position: Size:

Show scale sub mark

Increment:

Size:

Show scale label

Arial

A **B** *I*

General hint:



By the dimension of the objects when putting into the menu by mouse it will be set automatically, if it is a

- vertical (height > width) or an
- horizontal (width > height) slider.

Visualization with the software „VisuStage“

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

⌵ **General**

Name:

Variable:
 ⌵ + ...

Alignment: ⌵ ⌵ ⌵ ⌵ ⌵

Editable

Color the object: (register „Appearance“)

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

⌵ **Appearance**

Variable:
 ⌵ + ...

	From	To	A	⌵
1	0	0	■	■
2	1	1	■	■

General hints:



- this function needs a S7-program with a SFC to run.
- dynamic objects shall **not overlap each other** (Exception: A touch area may overlap other dynamic objects).
- simulation with „▶“ creates an error report, click on error and yo will be lead directly to the wrong object.

Visualization with the software „VisuStage“

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 deactivated, 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 displayed
- Insert the **Angle** of the circle segment for the scale area
 - Start at **Min**, end at **Max**,
 - **Pointer always runs clockwise**
 - Information angle position: $-270^\circ = \text{„6 o'clock“}$ / $-180^\circ = \text{„9 o'clock“}$
 - $-90^\circ = \text{„12 o'clock“}$ / $0^\circ = \text{„3 o'clock“}$ / $90^\circ = \text{„6 o'clock“}$
 - $180^\circ = \text{„9 o'clock“}$ / $270^\circ = \text{„12 o'clock“}$
- 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

▼ **Range**

Show scale range

Position: Thick:

	From	
1	0	■
2	100	■
3	200	■

General hints:



- this function needs a S7-program with a SFC to run.
- dynamic objects shall **not overlap each other** (Exception: A touch area may overlap other dynamic objects).
- simulation with „▶“ creates an error report, click on error and yo will be lead directly to the wrong object.

Visualization with the software „VisuStage“

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”)

- 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

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

	From	To	A
1	1	1	Grey
2	2	2	Blue
3	3	3	Yellow
4	4	4	Teal
5	5	5	Pink

General hints:



- this function needs a S7-program with a SFC to run.
- dynamic objects shall **not overlap each other** (Exception: A touch area may overlap other dynamic objects).
- simulation with „▶“ creates an error report, click on error and yo will be lead directly to the wrong object.

Visualization with the software „VisuStage“

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")

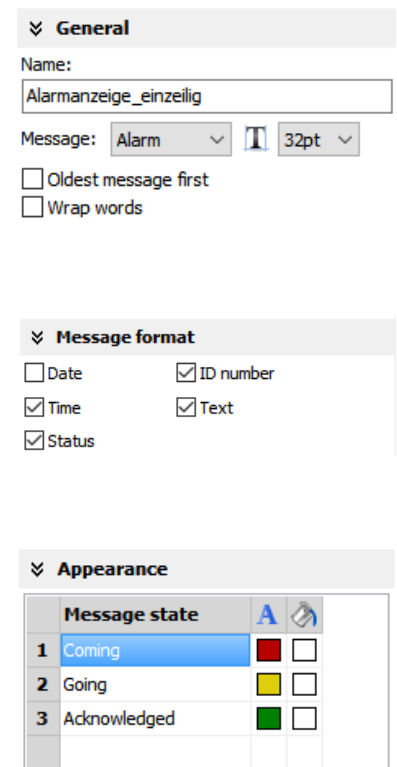
- Select "events" or "alarms" to display
- Adjust, if oldest or newest message will be displayed
- Activate word wrapping

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).



Visualization with the software „VisuStage“

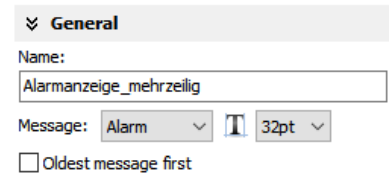
Message viewer multiline

This message viewer is made to show all **active messages**. It contains navigation functions (line **scroll**) and (for alarms) an **acknowledgment** function.

- 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)

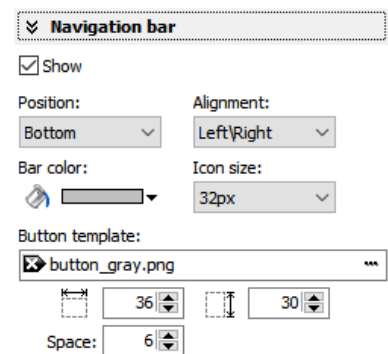
Parameterize the object: (register "General")

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



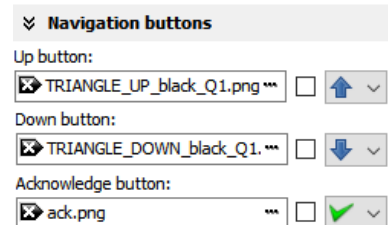
Formatting navigation bar: (register "Navigation bar")

- **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



Message archive viewer

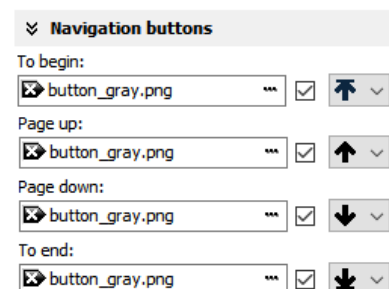
This message viewer is made to show all **archived messages**. It contains navigation functions (line and page scroll).

- 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)
- Formatting navigation bar:** (register "Navigation bar" at the multiline message viewer)

Designing navigation buttons: (register "Navigation buttons")

It is also like at the multiline viewer, but there are other buttons.

- No **ACK**nowledgement (because this is an archive)
- But GoTo **START/END** to reach the first/last archive value.



Visualization with the software „VisuStage“

Trend viewer and trend archive viewer

This object shows the samples of up to 64 values by time in a graphic way.

Place an object: [\(see basic funtions\)](#)

Assign border settings: [\(see basic funtions\)](#)

Parameterize the object: (register "General")

- Assign a **trend resource**
- **Format the text** of the displayed channel name
- Check, if the **channel name** should be displayed

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

- **Activate and color the Y-axis**
- Assign **scale divisions**
- 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

Information for time axis (X-axis)

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.

After the graph reached the right border, the graph is moved app. 10% to the left (and the displayed times are changing).

You can select the number of displayed samples only in the trend archive viewer (in the time axis set up box).

for trend archive viewer only:

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



General hints

- trends can be archived only, if there is a **micro-SD-card** inserted
- 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.
- dynamic objects shall **not overlap each other** (Exception: A touch area may overlap other dynamic objects).
- simulation with „ ► “ creates an error report, click on error and yo will be lead directly to the wrong object.

Visualization with the software „VisuStage“

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

Visualization with the software „VisuStage“

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

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 users “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.)

Navigation buttons

Recipe list:

Select: ack.png

Record list:

Select:

New:

Save as:

Delete:

Copy:

Back:

Element list:

Edit:

Save:

To PLC:

From PLC:

Back:

Name width [%]:

Messages

Record list:

Function: "Save as"

Request confirmation in case of existing recipe: (not assigned)

Function: "Delete"

Request confirmation: __SYSTEXT_RECIPVIEW_DELETE_

Show notification on successful delete: (not assigned)

Show notification on delete failure: (not assigned)

Visualization with the software „VisuStage“

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

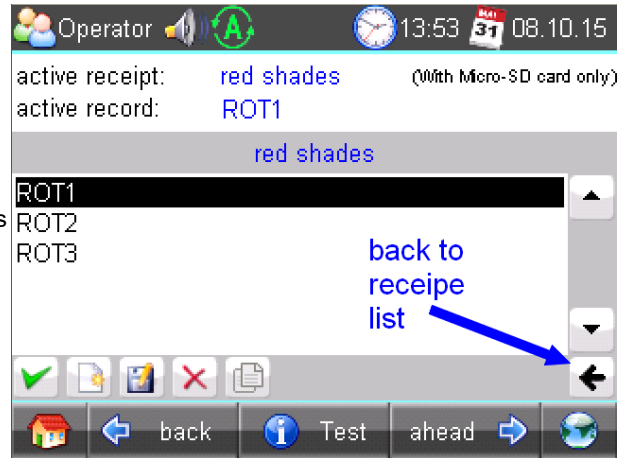
Recipe list

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“).

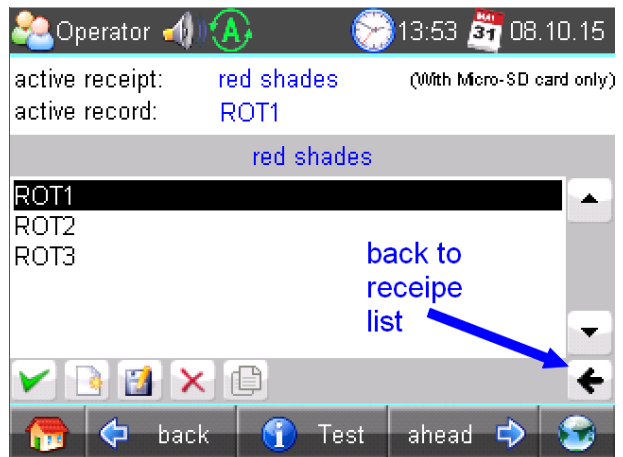
The regarding recipe name is displayed on the title list. Select it by touch on the name and press „Edit“ or create a new one. Than it switches directly into the element table to edit values and to store it in an automatically displayed string input field.

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“)

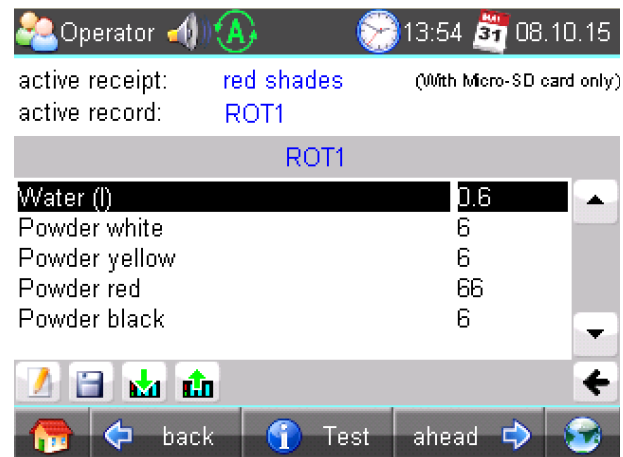
The regarding record name is displayed on the title list.

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).



Visualization with the software „VisuStage“

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


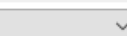


Designing navigation buttons: (register “Navigation buttons” / see right)

- 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)

Horizontal (X) axis
 Show axis  
 Show label  
 Range
 Begin:
 End:
 Decimal point:

- Activate and color X-axis**
Activate and color the label of the X-axis
Assign scale values
- Start value
 - End value
 - Decimal point

Vertical (Y) axis
 Show axis  
 Show label  
 Range
 Begin:
 End:
 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








Help line
 Show help line  
 At:

- Activate and assign help line**
- Y-Value
 - Color (one help line possible for an Y-value)

General
 Name:

 Data block:
 Offset:

Navigation bar
 Show
 Position:
 Alignment:
 Bar color:  
 Icon size:
 Button template:
 
 Space: Size:

Navigation buttons
 To beginning 
 Backward 
 Forward 
 To end 
 Zoom in 
 Zoom out 
 Update 

Visualization with the software „VisuStage“

The data block with the x;y-values to display must be divided 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: Red 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

Adresse	Name	Typ	Anfangswert	Kommentar
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	E#16#5	X coordinate data type
+11.0	DataTypeY	BYTE	E#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		

Visualization with the software „VisuStage“

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.

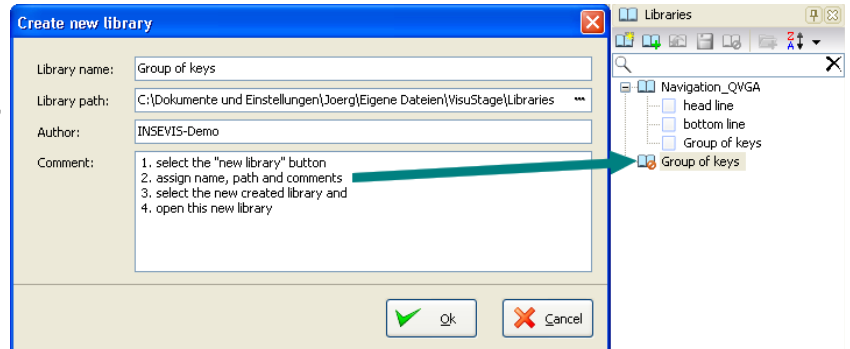
Creating libraries and ~ elements

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

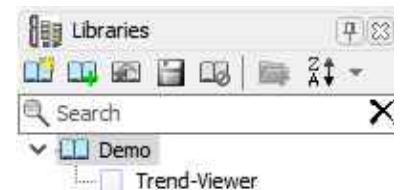
- 1. open your library
- 2. move objects or groups directly on the library sign

Using library elements

Activate library window at the menu VIEW → LIBRARY.

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.

These properties will be taken over 1:1 from the library element into the new screen/project:

- Variables,
- Texts and
- Images

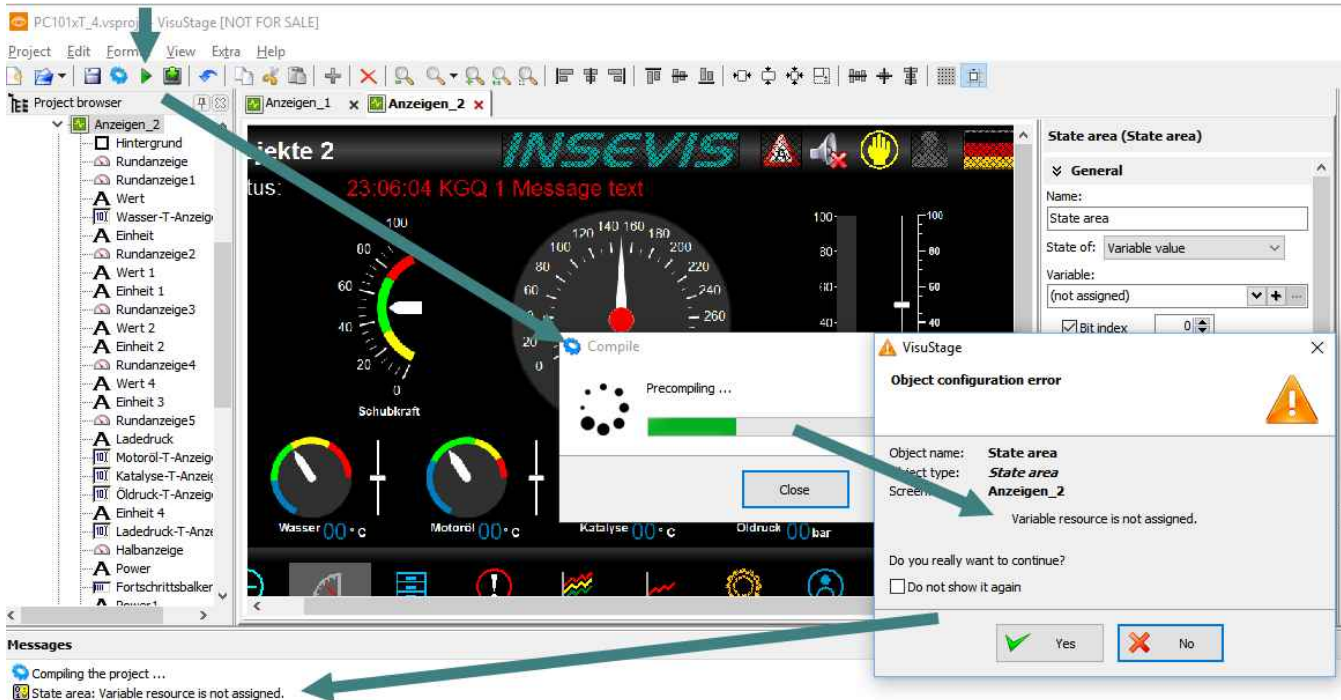
All other resources must be assigned new. Library elements will be integrated in the visualization project (*.vsproj).

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

Visualization with the software „VisuStage“

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.



General hint

- The error message area will be closed by pressing „F6“

Visualization with the software „VisuStage“

Simulation and download

The VisuStage starts with compiling project and start 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.

Index	Meldungstext	Zustand	Quitt.
1	Alarm 1 hat ausgelöst	<input type="checkbox"/>	<input type="checkbox"/>
2	Alarm 2 hat ausgelöst	<input type="checkbox"/>	<input type="checkbox"/>

Index	Meldungstext	Zustand
1	Meldetext zu Ereignis 1	<input type="checkbox"/>
2	Meldetext zu Ereignis 2	<input type="checkbox"/>

Index	Variablen	Statuswert
1	MO_1	0
2	MW350	1031
3	MB11	0
4	MW340	90
5	MW330	90
6	MW332	70
7	MW334	80
8	MW336	50
9	MW338	40
10	M300.0	1
11	M300.2	0
12	M300.1	0

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.

Transfer the project (start by key F12 or icon)

- Use the IP-target-address from the project data
or
Use the IP-addresses in the network area you are connected to.



General Hint

- 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 software, what not needs to be installed from version 1.0.3.3 any more. 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).

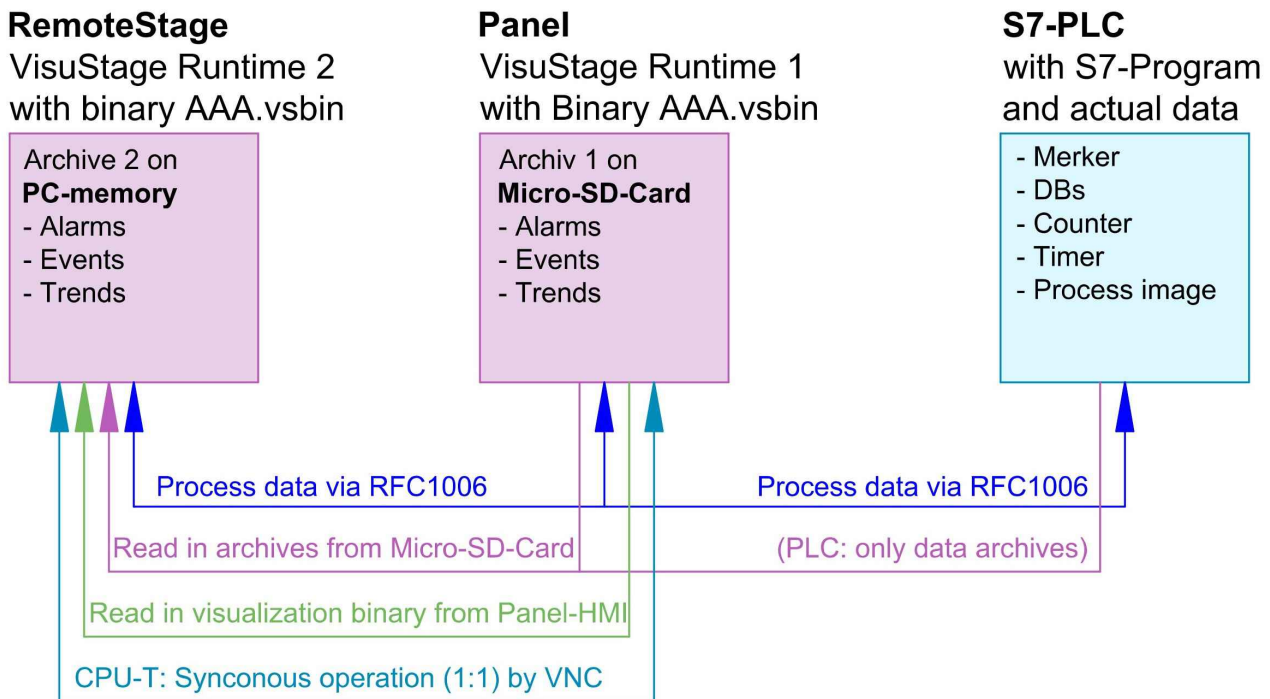
The software RemoteStage uses the binary files (binaries / *.vsbin) of visualization projects, made with „VisuStage“. These binaries are not backreadable, what offers an effective protection of the users know-how and allows to forward these files towards the final user or operator.

With version 1.0.4.0 it is possible to download the visualization binary directly by Ethernet from the Panel-PLC / Panel-HMI (See right button). This helps to reduce the organization efforts by far. In VisuStage you may assign a PIN-code to protect your 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 remote visualization and account to external S7-PLCs as well. This is a function nearly similar to WinCC runtime of a 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:

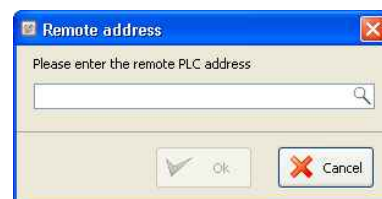
```
[path of RemoteStage]remotestage.exe /r=[IP-address of the remote-PLC in the same sub net] /V=[path of visualization binary]complete file name] /start
```

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“

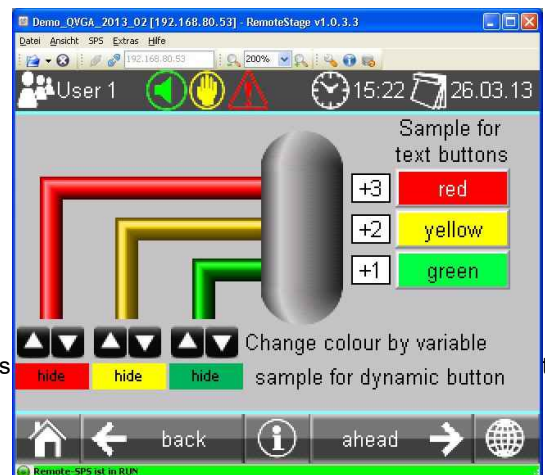
Using and setting up the remote screen

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

- Yellow:** connecting (set up connection)
- Green:** connected (online) and PLC in RUN
- Red:** connected (online) and PLC in STOP

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 PC-system data will be used, not these of the remote device.

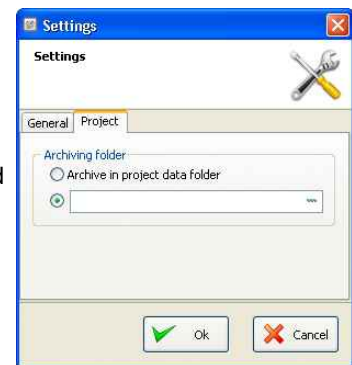


Storing the remote (on the PC) archived data

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 visualization binary is kept) or
- at another path.



Converting archive data into csv-files

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

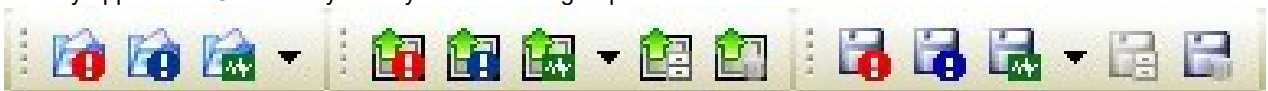
- Messages** (alarms, events) by all Panel-PLCs and Panel-HMIs
→ by activating the archive funtion „archiving“ in the VisuStage-project
- Trends** (with all channels) by all Panel-PLCs and Panel-HMIs
→ by activating the archive funtion „archiving“ in the VisuStage-project
- Recipes** (with all records)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

Most of the data is stored as a binary on the Micro-SD-card and can be converted into csv-format by the RemoteStage only. Therefore you may open a special data converting mode within the RemoteStage program



CAUTION: Always open the binary suiting to your visualization on the remote device, or upload it as binary!

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



Displays archive by-inserting the Micro-SD-card in PC-card slot
left->right - Alarm archive
- Event archive
- Trend archive

Read in the archives over Ethernet by IP-address directly into PC
left->right: - Alarm archive
- Event archive
- Trend archive
- Recipe archive
- Data(DB-)archive

Export / save the archive data to thePC / into the PC-network
left->right: - Alarm archive
- Event archive
- Trend archive
- Recipe archive
- Data(DB-)archive

Remote access with the software „RemoteStage“

Sample for message archive viewer and csv-export

Below: View of the event archive in the RemoteStage

Date	Id	Status	Text
26.03.2013 15:11:29	1	K	alert text of alert 1
26.03.2013 15:11:32	1	Q	alert text of alert 1
26.03.2013 15:11:33	1	G	alert text of alert 1
26.03.2013 15:11:34	1	K	alert text of alert 1
26.03.2013 15:11:35	2	K	alert text of alert 2
26.03.2013 15:11:38	2	Q	alert text of alert 2
26.03.2013 15:11:39	1	Q	alert text of alert 1
26.03.2013 15:11:41	1	G	alert text of alert 1
26.03.2013 15:11:41	2	G	alert text of alert 2
26.03.2013 15:11:42	1	K	alert text of alert 1
26.03.2013 15:11:44	2	K	alert text of alert 2
26.03.2013 15:11:58	2	Q	alert text of alert 2
26.03.2013 15:11:59	1	Q	alert text of alert 1
26.03.2013 15:12:00	1	G	alert text of alert 1
26.03.2013 15:12:00	2	G	alert text of alert 2
26.03.2013 15:13:23	1	K	alert text of alert 1
26.03.2013 15:13:30	1	G	alert text of alert 1
26.03.2013 15:14:12	1	K	alert text of alert 1
26.03.2013 15:14:17	1	G	alert text of alert 1
26.03.2013 15:14:20	1	K	alert text of alert 1

(Displays all archived alarm messages of the Panel-PLC / Panel-HMI with the IP-address 192.168.80.50)

CAUTION:

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.

Below: Export of the event archive as csv-file

Export messages
Select the languages
Select the text delimiter and separator characters

Languages:

- Deutsch (Deutschland)
- English (Großbritannien)
- Russisch

Select all

Field delimiters: Semicolon Tab Comma Space

Text separator: { " } { }

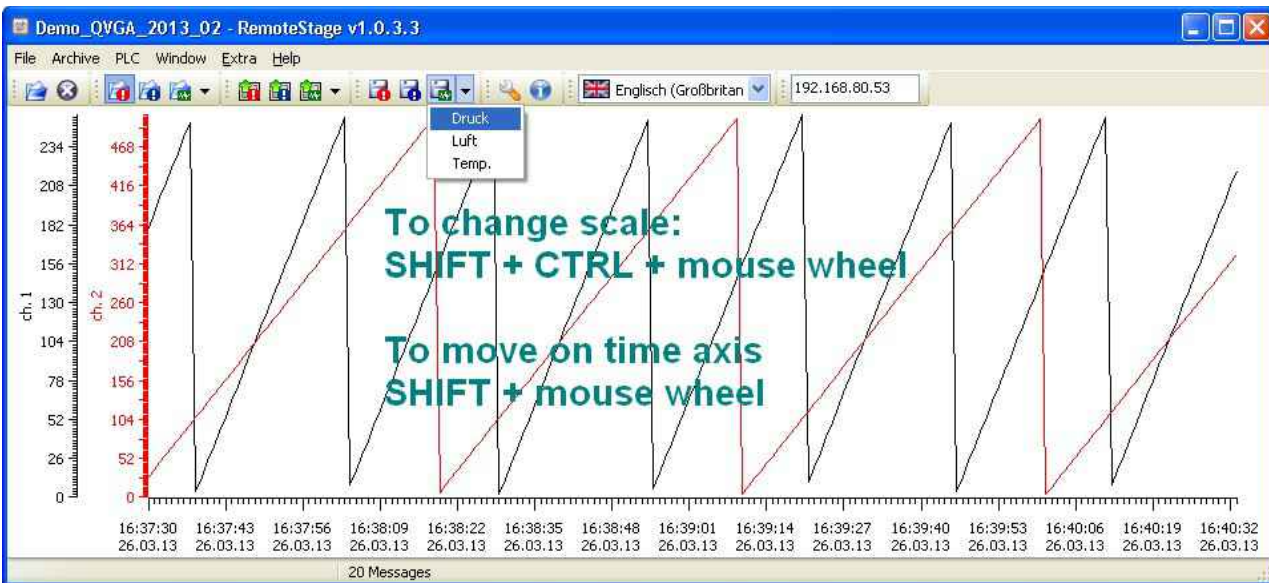
Preview:

```
"Id";"Status";"Time stamp";"Value";"2057 English (Großbritannien)"
"1";"K";"26.03.2013 15:11:29";"0";"alert text of alert 1"
"1";"Q";"26.03.2013 15:11:32";"0";"alert text of alert 1"
"1";"G";"26.03.2013 15:11:33";"0";"alert text of alert 1"
"1";"K";"26.03.2013 15:11:34";"0";"alert text of alert 1"
"2";"K";"26.03.2013 15:11:35";"0";"alert text of alert 2"
"2";"Q";"26.03.2013 15:11:38";"0";"alert text of alert 2"
"1";"Q";"26.03.2013 15:11:39";"0";"alert text of alert 1"
"1";"G";"26.03.2013 15:11:41";"0";"alert text of alert 1"
"2";"G";"26.03.2013 15:11:41";"0";"alert text of alert 2"
```

Ok Cancel

Sample for trend archive viewer and csv-export

Below: View of the trend „Druck“ archive in the RemoteStage



Above figure displays all archived trend with name „Druck“ of the Panel-PLC / Panel-HMI with the IP-address 192.168.80.30. The time will be displayed in the Language format you assigned on your PC (here in German = DE)

CAUTION:

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.

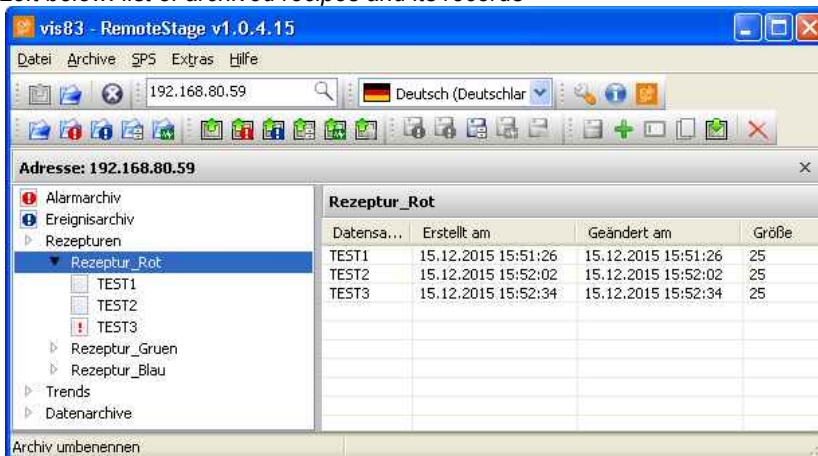
Remote access with the software „RemoteStage“

Recipe import, display, converting, editing and export

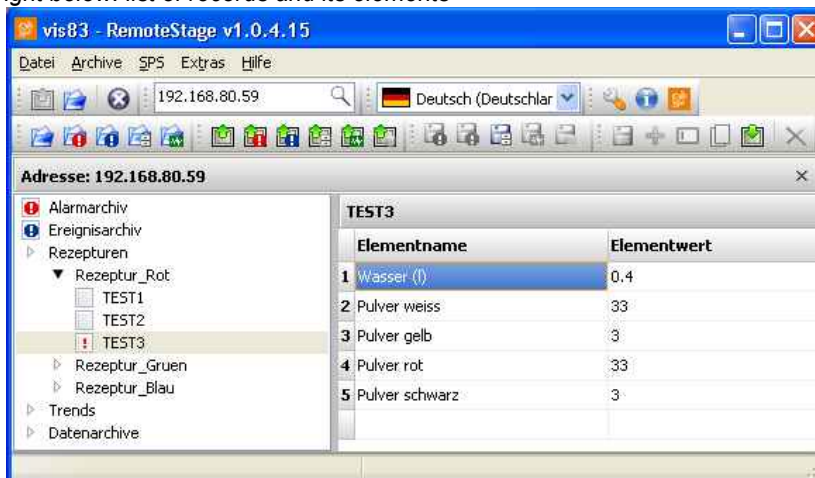
Recipe archive data from Micro-SD-card can be

- read in / uploaded (→ Select the whole root-folder of the Micro-SD-card !),
- displayed (self explaining)
- converted into csv
- modified with RemoteStage itself or a calculating PC-program and
- written back / downloaded into the PLC

Left below: list of archived recipes and its records



right below: list of records and its elements



The record „TEST3“ was modified 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.

With these icons record can be renamed, copied, downloaded into the remote device and deleted there.



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

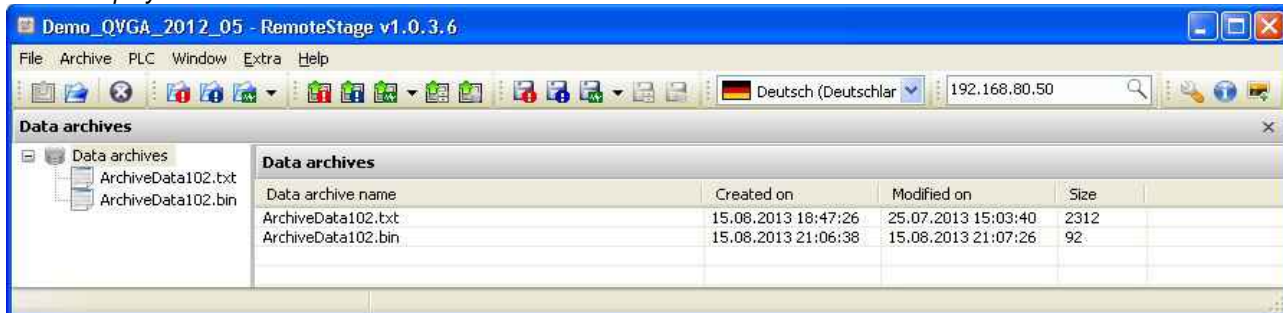
Any data can be archived with the **SFC 207 ARCHIVE** onto the Micro-SD-card (binary or csv-data) and read back with the **SFC 209 READFILE** (see system functions).

Data archive display and storing

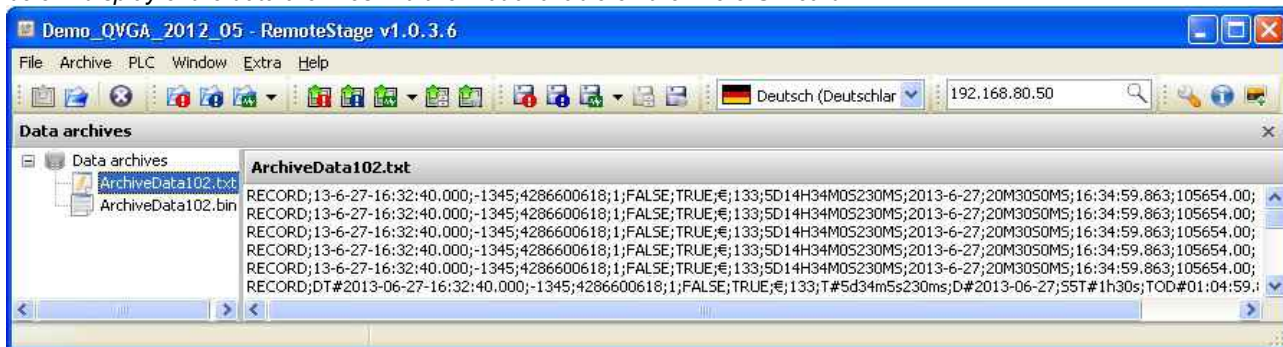
These data (DB) archived over S7-program to Micro-SD-card, can be read in and displayed and stored to the PC in the assigned format.

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).

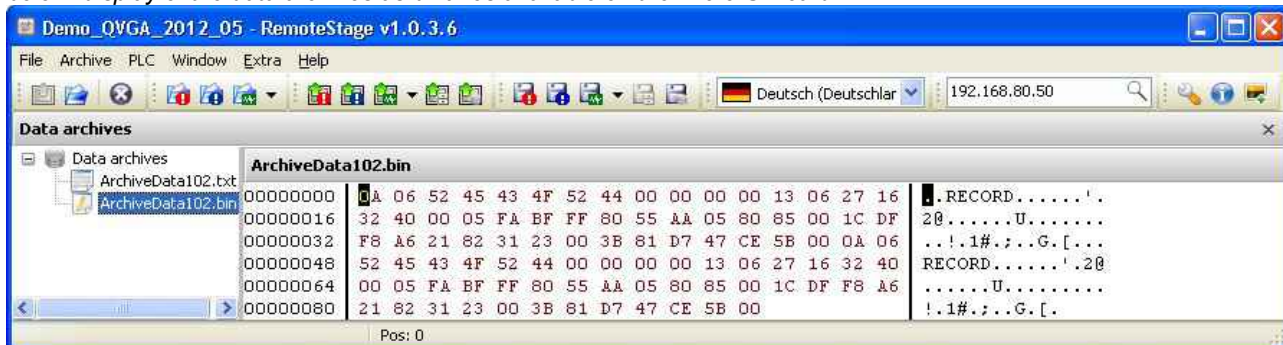
below: display of the data archives available on the Micro-SD-card



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



With these icons data archives will be renamed, copied and - from Remote Stage V 1.0.4.18- downloaded into remote device or deleted.



Remote access with the software „RemoteStage“

Command line of RemoteStage (Viewing mode)

RemoteStage can be inserted in „planned tasks“ of the remote PC. 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)

```
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...)

```
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.

```
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.

Remote access with the software „RemoteStage“

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 menu → 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)
- 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 number which is configured in VisuStage. It is only used in "trend_archive" mode.

Sample

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 can execute from command

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

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:

```
C:\>remotestage.exe /mode=recipe /r=192.168.80.50 /v=d:\visu\myvisu.vsbm
/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:

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

Remote access with the software „RemoteStage“

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 recipes 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

<i>project binary</i>	Binary file of visualization project
<i>recipe name</i>	In VisuStage projected recipe name (ATTENTION: not view name!)
<i>record file(s)</i>	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

```
remotestage.exe /mode=recipe_download /v=d:\visu\process.vsb  
/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

```
remotestage.exe /mode=recipe_download /v=d:\visu\process.vsb  
/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 SFC207 to 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 data (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:

```
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
```


Remote access with the software „RemoteStage“

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:

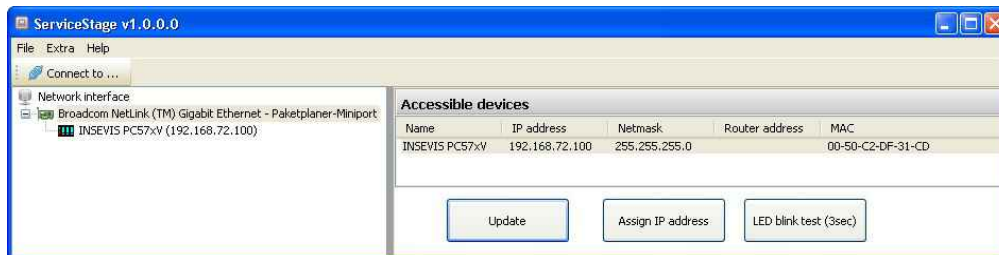
```
@remotestage /mode=alarm_archive /r=192.168.80.50 /o=d:\archive\alarm.csv /v=d:\visu\myvisu.vsbin
@echo.
@goto res%ERRORLEVEL%

: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-CPU's online and to change their state or program data. 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, what makes the network access to the CPU's). Select one of the CPU's displayed in the left window and press „Update“.

The „LCD-blink test“ helps to identify the selected CPU. (yellow battery-LED blinks for 3 seconds). Also you can assign a new IP-address, Net mask and Router-IP-address of the selected CPU here.

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

General information	
Device name:	PC717T-PNC
Station name:	F65 PC717-PNC
Plant designation:	
Location designation:	
Serial number:	1234
Firmware version:	T2.3.0
IP address:	192.168.80.73
Netmask:	255.255.255.0
MAC address:	1C-BA-8C-95-AB-D1
	Firmware update
	Assign IP address
	LED blink test (3sec)

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.

Operating mode		
Current mode:	RUN	STOP
Mode switch position:	RUN	RUN

Date and time

For manual adjustment of system date and time. By checking the box „Take from PC“ these data will be taken over from your PC after pressing „Apply“.

Date and Time	
12.02.2013	08:48:32
<input checked="" type="checkbox"/> Take from PC	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).

No.	Time	Date	Event
1	09:40:19	05.02.2013	Mode transition from STARTUP to RUN
2	09:40:19	05.02.2013	Request for automatic warm restart
3	09:40:19	05.02.2013	Mode transition from STOP to STARTUP
4	09:40:19	05.02.2013	Power on
5	19:09:08	04.02.2013	Power failure
6	18:26:23	04.02.2013	Mode transition from STARTUP to RUN
7	18:26:23	04.02.2013	Request for automatic warm restart
8	18:26:23	04.02.2013	Mode transition from STOP to STARTUP
9	18:26:23	04.02.2013	Power on
10	16:30:59	04.02.2013	Power failure

Know-how-protection

With version 1.0.1.1 can be set different levels of to protect the S7-program against unauthorized reading or writing. Therefore the PLC will be switched to STOP-mode.

Protection level	Read access	Write access
<input type="radio"/> No protection	✓	✓
<input checked="" type="radio"/> Read protection	✗	✓
<input type="radio"/> Write protection	✓	✗
<input type="radio"/> Read write protection	✗	✗

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 authentication 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. Then 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. Then 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. Then the S7-program is deleted in the PLC and the unprotected original program may be downloaded into the PLC again.

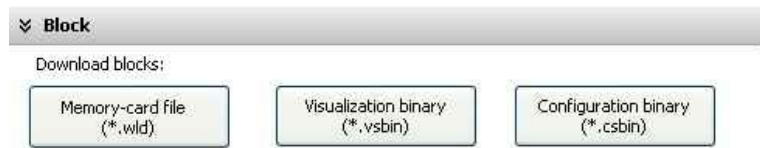
Working with the software „ServiceStage“

Block Update

This function makes it possible to download

- the S7-user program as MemoryCard-file ***.wld**
- the INSEVIS-binary for visualization file as ***.vsbin** and
- the INSEVIS-configuration file as ***.csbin**


via the network into the CPU



By this software „ServiceStage“ it is possible to give away your data in a wld (S7) or binary (INSEVIS) format to those, who care for diagnostics, maintenance or update. You can keep your source data in your company and must not fear to be copied.


* 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 menu: „File → Memory Card File → New“) you can copy DIFFERENT DBs with or without their system data 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,

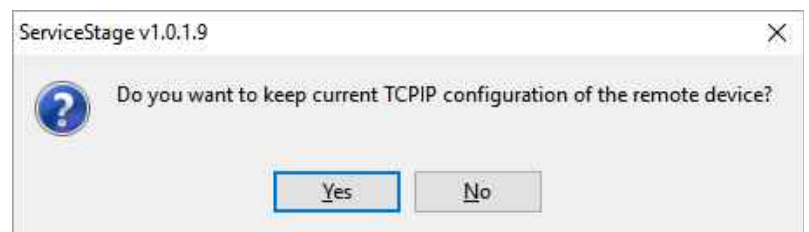
- they shall be uploaded from a PLC with included ConfigStage-configuration (Menu: „PLC → Upload Station to PG“), because they are “ConfigStage-configured” already or
- the system data of the SimaticManager overwrite the ConfigStage-system configuration. In that case the *.csbin-file of the project must be downloaded again after the WLD-file was downloaded.



ATTENTION: When using Block Upload for restore

- With firmware 2.3.6 a Restore can only be done by WLD- and VSBIN-file. CSBIN-file will be ignored. So the WLD-file MUST CONTAIN these system data, which were downloaded with CSBIN before.
- If the WLD-file does not contain system data, program stops after restore because of missing data.

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 lose 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.



Working with the software „ServiceStage“

Online Backup

This function creates an WLD-file with all the S7-system data and all OB, DB, FB, SFB and SFC and copies this file with the visualization binary file into a folder „backups“.

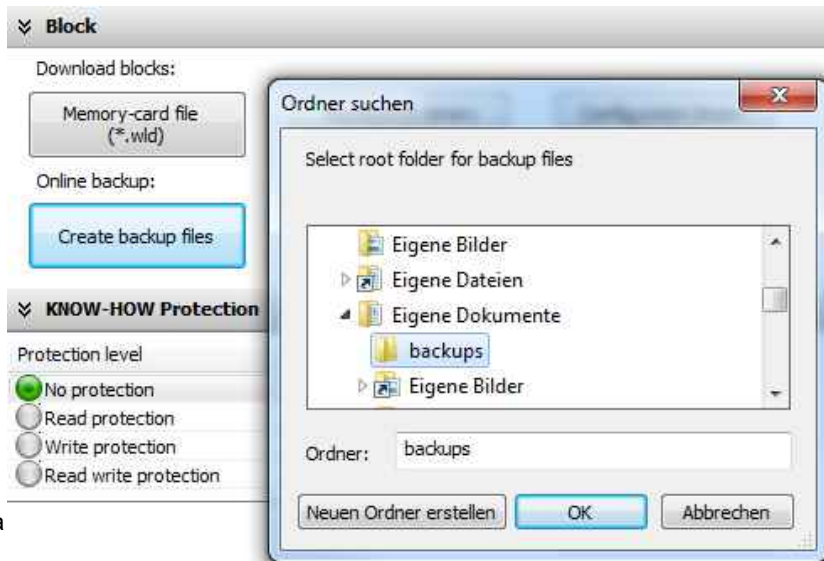
Bibliothek "Dokumente"

backups

Name

- s7programs.wld
- visudata.vsbm

With these data S7-programs and visualizations can be updated 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.

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