HIQUEL®
HIGH QUALITY ELECTRONICS

SLS-5ØØ
Master Controller
Graphical programing with SLS-500-Configurator

SLS-500 Master Controller Software manual

CE

Herbert Weiß, Helmut Maurer:

SLS-500 Master Controller – User Manual

Version: 4.03

Great care has been taken in the creation of the text, illustrations and program examples in this manual. Neither HIQUEL, there authors nor their interpreters may be held responsible for any errors herein, nor can they be held responsible or liable for consequences arising from any errors herein.

Attention! You are handling dangerous electrical current!

- Disconnect the supply voltage before making any wiring modifications.
- Ensure that the system cannot be switched on accidentally.
- Ensure that the device and its surroundings are potential free.
- Please refer to the specific installation and mounting instructions.
- Qualified personal only should handle the device.
- The device has to be mounted in such a way that no unintentional operation may occur.
- All control and supply voltage wiring must be routed so that no inductive or capacitive interference or any other severe electrical noise disturbance may interfere with the device.
- Supply voltage variation must not exceed the specifications in the technical details. If so, proper performance of the device cannot be guaranteed.
- Emergency installations according to EN60204/IEC204 (VDE0113) must remain active in all modes of the automated installation. Activation of the emergency installation must not cause an uncontrolled or undefined start cycle.
- The software engineer has to make sure, that no failure functions of the automated installation may occur when line faults or core faults arise.
- Notwithstanding the above, local regulations must be observed in all installations.

Content

SLS-500 Master Controller

Safety precautions

Danger to life through electrical current!

Only skilled personal trained in electro-engineering should perform the described steps in the following chapters. Please observe the country specific rules and standards. Do not perform any electrical work while the device is connected to power.

Pay attention to following rules

- ❑ Switch off the automated installation.
- ❑ Disable any automatic restart system
- ❑ Electrically isolate the installation
- ❑ Cover any non-isolated areas

Preface

„Der Grund, warum die Menschen ihre Dienste zum Geschenk machen, ist der Wunsch, etwas zu tun, was – vielleicht im Gegensatz zu ihrer täglichen Arbeit - wirklich zählt!“

Charles Trueheart

System Requirements

System specification for SLS-500-Configurator:

Your system must meet the following requirements to run **SLS-500-Configurator**:

- A **free serial RS232** port (COM1 - COM8)
- A previously installed version of **Microsoft PowerPoint®** in version **Office 2000 or Office XP**
- **Processor:** 90 - 166 Pentium
- **RAM:** min. 16 MB (32 MB for Win NT)
  opt. 64 MB (128 MB for Win NT)
- **Free memory:** min. 20 MB
  opt. 40 MB

Create new project

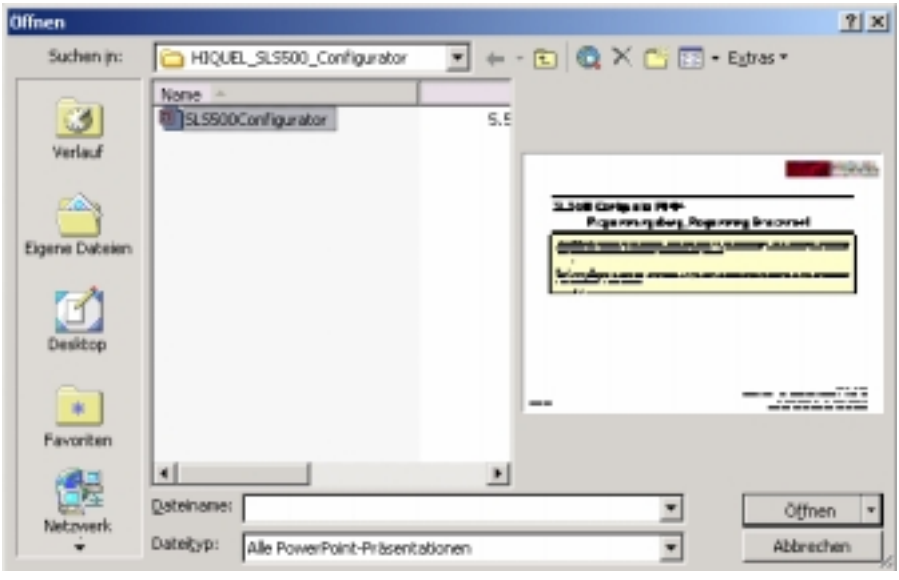
SLS-500-Configurator requires Microsoft PowerPoint.

Start PowerPoint

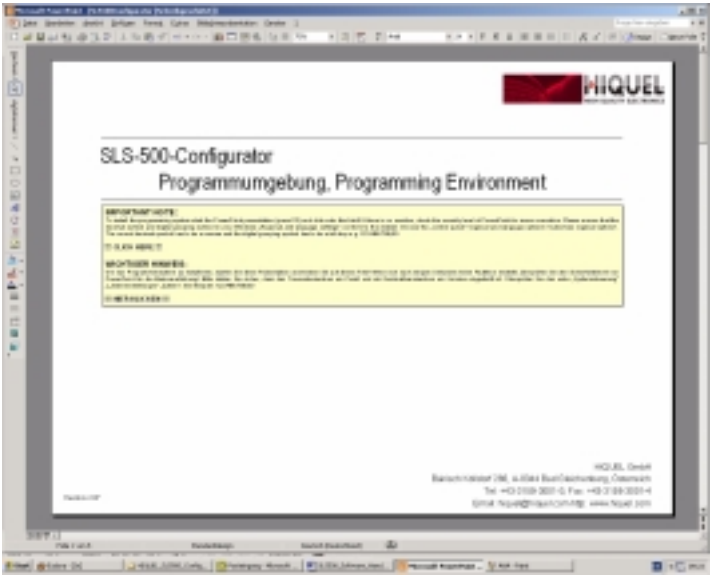
To work with **SLS-500-Configurator** you have to start PowerPoint first. Then open the file **SLS-500-Configurator.ppt**.

Open SLS-500-Configurator sample

Proceed as follows: After starting PowerPoint choose File/Open from the menu. Then choose the folder SLS-500-Configurator from the file dialogue. You will find the file SLS-500-Configurator.ppt.

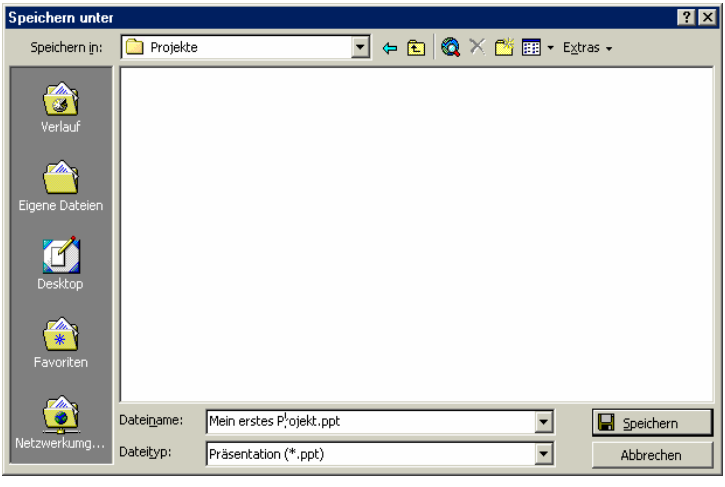


Open the file. The following screen will be displayed.

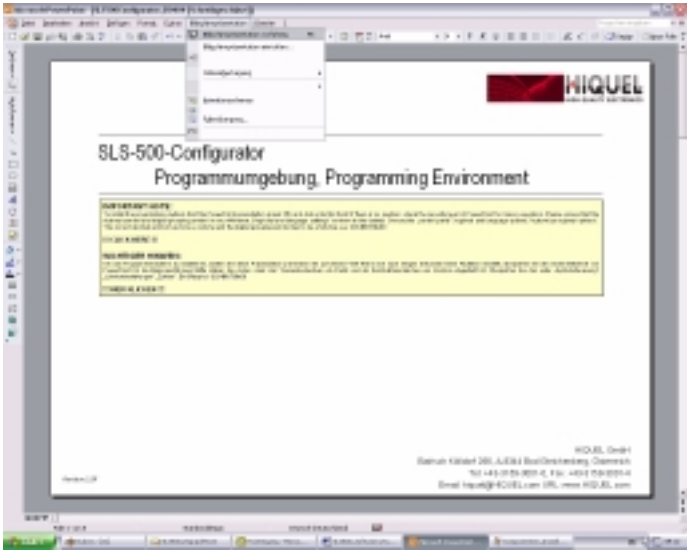


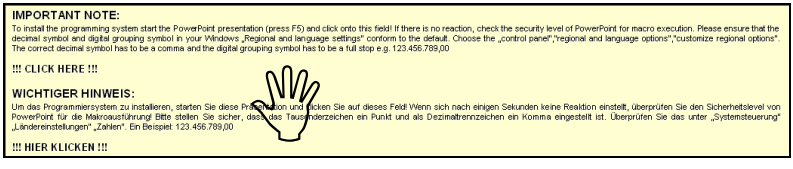
Save new project

Save the presentation under the project name of your choice in a file of your choice. To do these choose from the menu the entry file/save. The window shown below appears. Enter „My first project“ for example and confirm the input by clicking the save command button.



Start presentation (press F5)





In order to install the components necessary for SLS-500-Configurator you must start the presentation. Choose ‘Slide Show’/’View show’ from the menu options. Now the start page opens. Click in the black-bordered frame:

SLS-500-Configurator now installs all necessary components and confirms it has started with the following message:

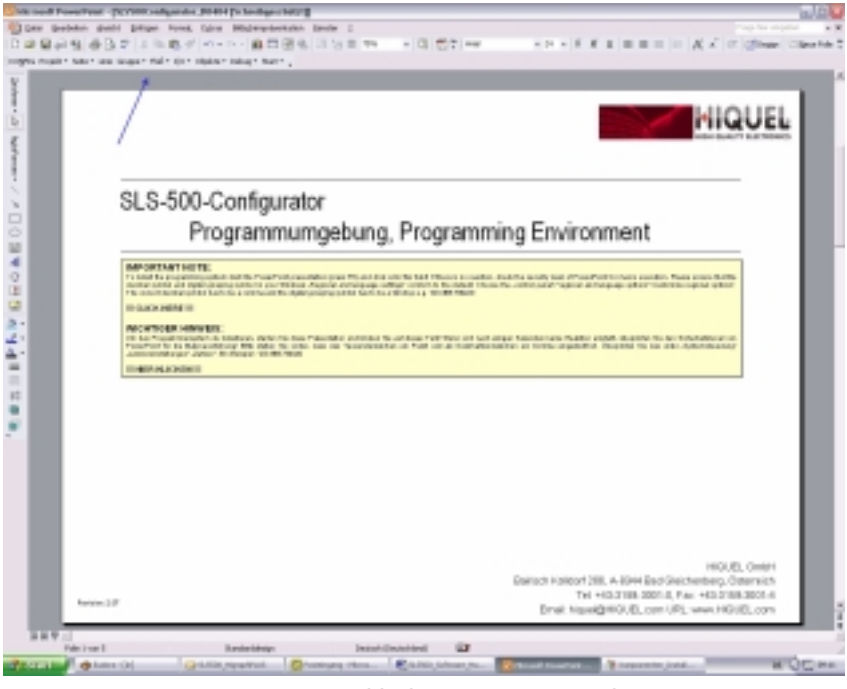
SLS-500-Configurator does not respond

If you have no response from SLS-500-Configurator after a half-minute, it is probably that your PowerPoint settings do not allow macros to run.

You can change this setting in the menu option 'Tools'/'Macro'/'Security'. If you chose the security level high, no macros are carried out. To activate the macros you have to choose a security level of medium or low. If you choose medium PowerPoint will question while loading whether macros may become carried out or not.

SLS-500-Configurator responds successfully

Now you can see an additional menu bar on your PowerPoint screen, which includes all components necessary to work with SLS-500-Configurator:



Now you can start with the program creation!

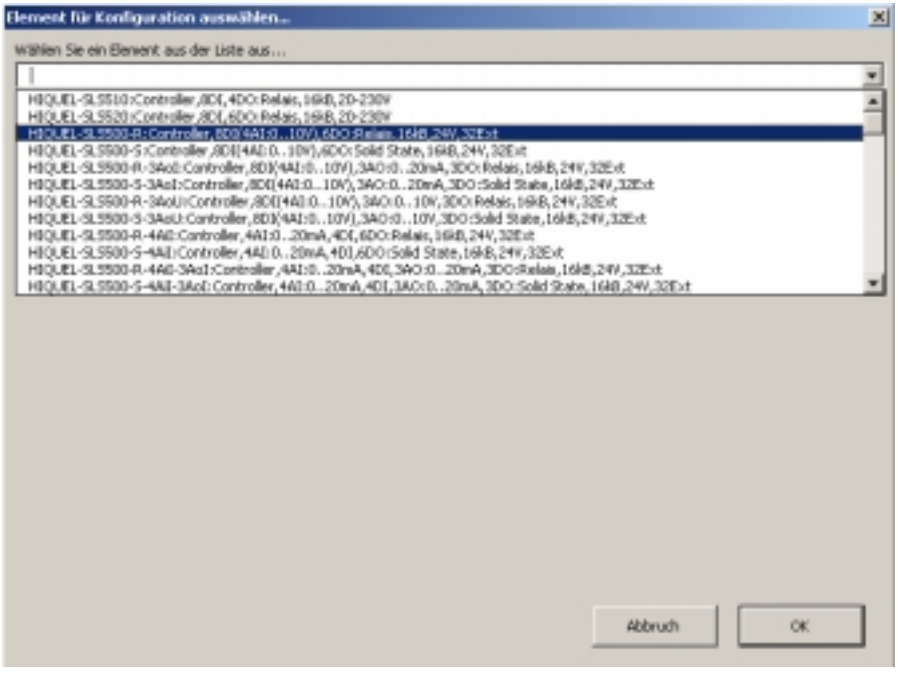
IMPORTANT ADVICE

Do not delete any objects of this PowerPoint presentation except those you have created yourself. If you do you will endanger the function of the SLS-500-Configurator program!!!

Configuration

Before you can draw a program plan with SLS-500-Configurator you must define a current configuration of your SPS System. Choose menu option CONFIGURATION. The following configuration page appears:

Configuration page



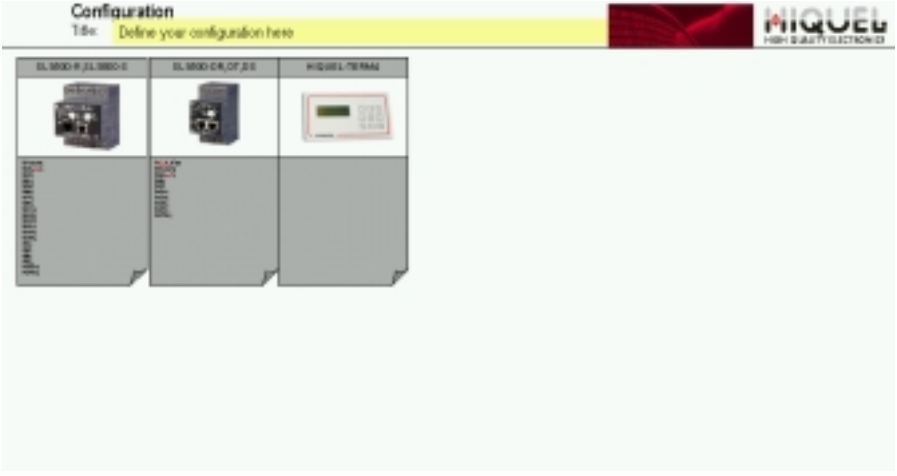
Newer software may show additional modules

Only the modules selected for your system must be physically connected in order to guarantee the correct function of the program.

Add objects

In order to add a new expansion module to the current configuration select the desired module from the configuration page and click OK:

The following display shows a system with 1 x SLS-500 base module, 1 x Analogue I/O module and 1 x Term 4 MMI.

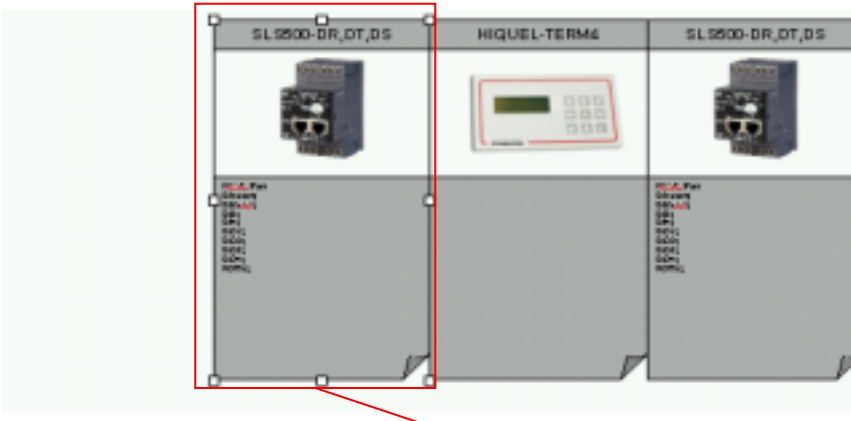


Every newly selected module will appear on the upper left of the page on top of the SLS500 base module graphic. You must drag and drop the module into the position you require in order of priority within the program.

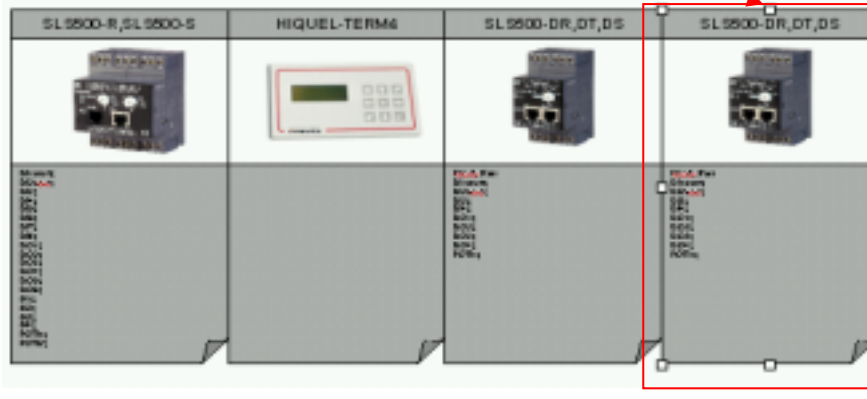
ADVICE: You can also adjust the communication speed of SLS-500 Master Control Modules. Choose Fast, Normal and Slow in the Priority drop-down menu.

- Fast: The module scans the system every 10ms.
- Normal: The module scans the system every 100ms.
- Slow: The module scans the system every second.

When new module added:



after new position selected!



Delete objects

Select the desired module and delete it by pressing Del.

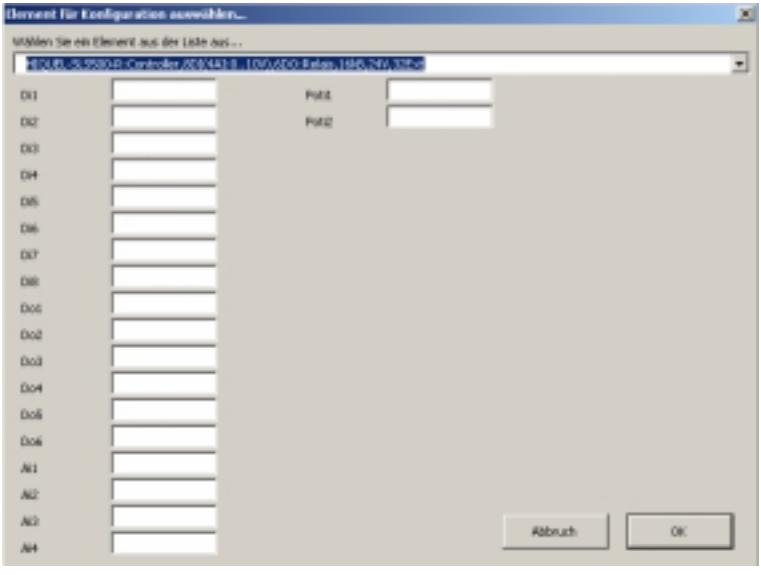
ADVICE: The module will only be deleted in the configuration page. Any programmed object of the deleted module will not be deleted from your program! This will be detected when you attempt to compile your program. These objects must be deleted manually

Program object priority

SLS-500-Configurator interprets the priority of the program objects from left to right and from top to bottom of the program page. The remote numbers are allocated exactly the same way. The base module has the definition L1. All expansion modules have the definition Remote. Beginning with a continuous number from 1. R1 is the first expansion; R2 is the second and so on.

Define in/outputs

If you add a module to the configuration, you can define a name for every digital or analogue input and output. When you use the input or output, the specified name will be displayed. This causes better understanding while programming.

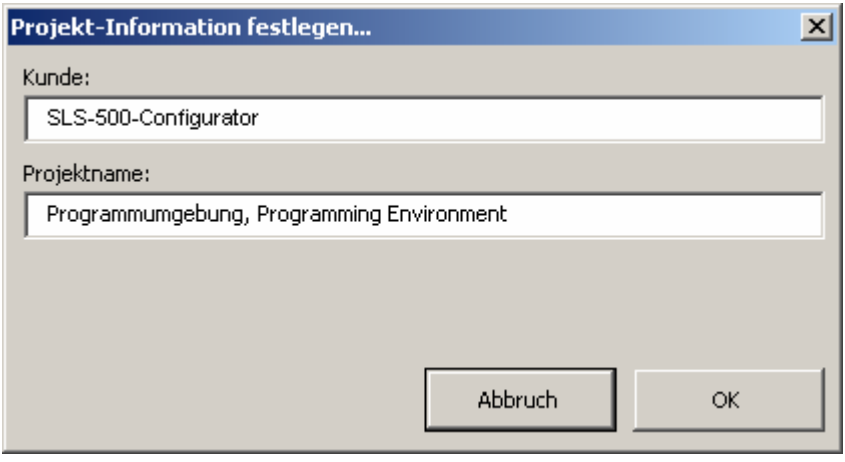


Project

SLS-500-Configurator makes creating information's and copies of projects easy. You have it all clearly on your start up page. Choose Project from the menu to get to all relevant program functions:

Project: Info

Choose Project-Info to get to the following dialog:

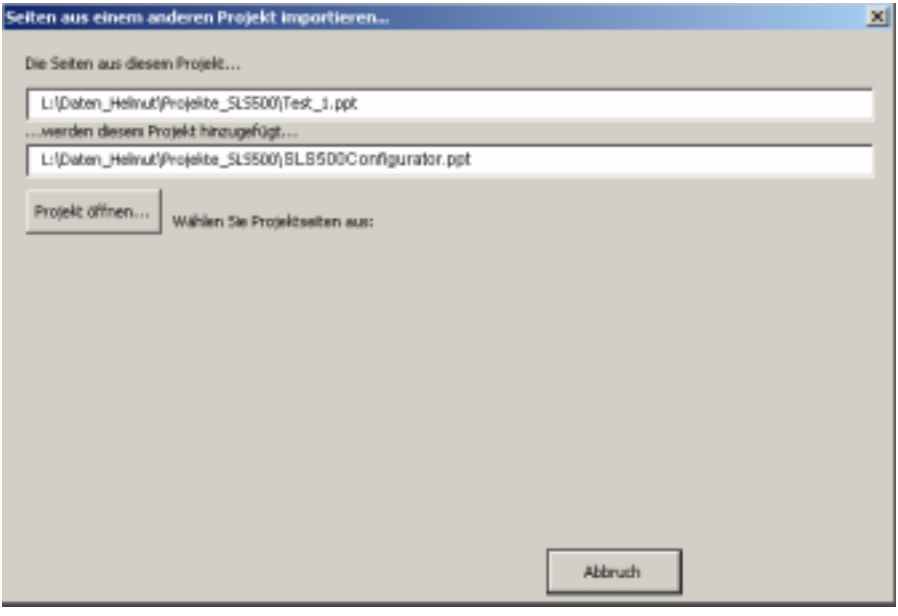


Use this function to edit the customer name and the project name on the starting page. To set the adjustments click the OK button.

Project: Import

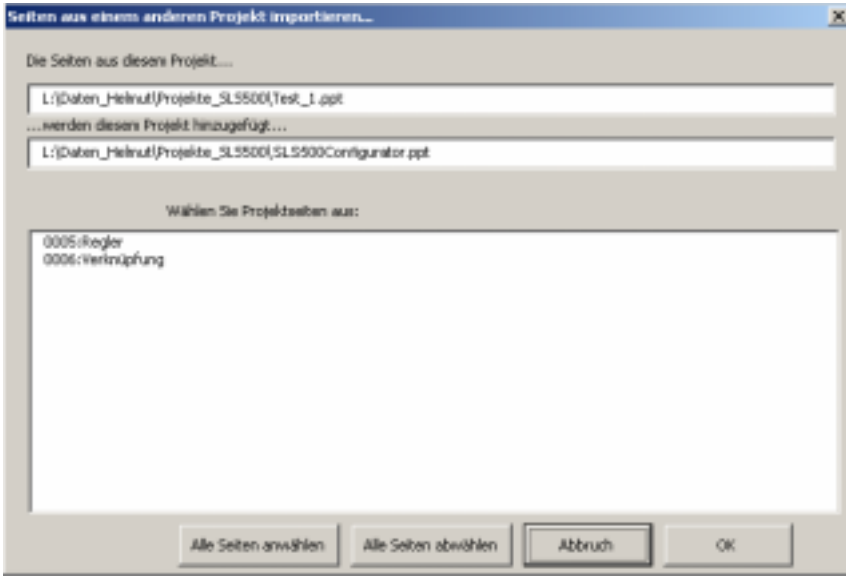
Choose this function to import a page from another project into your current project.

The following dialog will appear:



Click the x button to abort the process, otherwise click on Open Project.

The page number and the page name will be displayed.



Now choose the desired page of the project from the list.

After clicking the OK button the selected page will be put into your current project!

Project: Update I/Os

You can edit the already set descriptions of the inputs and outputs with one entry. The change of the descriptions has to be accomplished on the configuration page.

After updating the I/O names the description of the in- and outputs from the configuration page will correspond with the whole project again.

Choose Update I/Os from the menu to start the update.

Pages

SLS-500-Configurator enables you to draw as many complex graphs as desired over as many pages as you want. Choose the menu option Page to get to the following options:

Page: Zoom all

The active page will be displayed completely screen filling.

Page: Zoom 100%

The page will be displayed with a zoom factor of 100%

Page: Zoom 75%

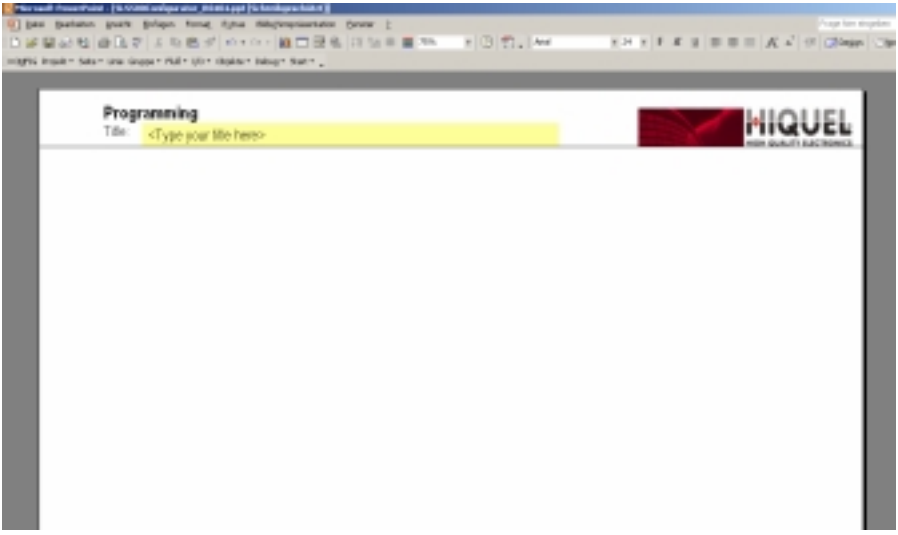
The page will be displayed with a zoom factor of 75%.

Page: Zoom 60%

The page will be displayed with a zoom factor of 60%.

Page: New

SLS-500-Configurator places a new programming page before the active page. Therefore if you want to insert a new page after the active page you must advance one page before inserting the new page



Now define the title of the new programming page:

Programming
Title: <Type your title here>

For this you have to click into the text field and type in the text:

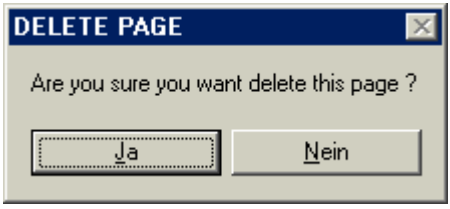
Programming
Title: My first program page

INFO: You can spread your program over as many SLS-500-Configurator pages as desired!

IMPORTANT: SLS-500-Configurator programs can only be drawn on programming pages. All other PowerPoint pages will be left out during compilation.

Page: Del

With this command you can delete the active SLS-500-Configurator programming page. After choosing this menu option the following message occurs:



If you press yes the page will be deleted and lost forever. Press No to cancel.

Page: Copy

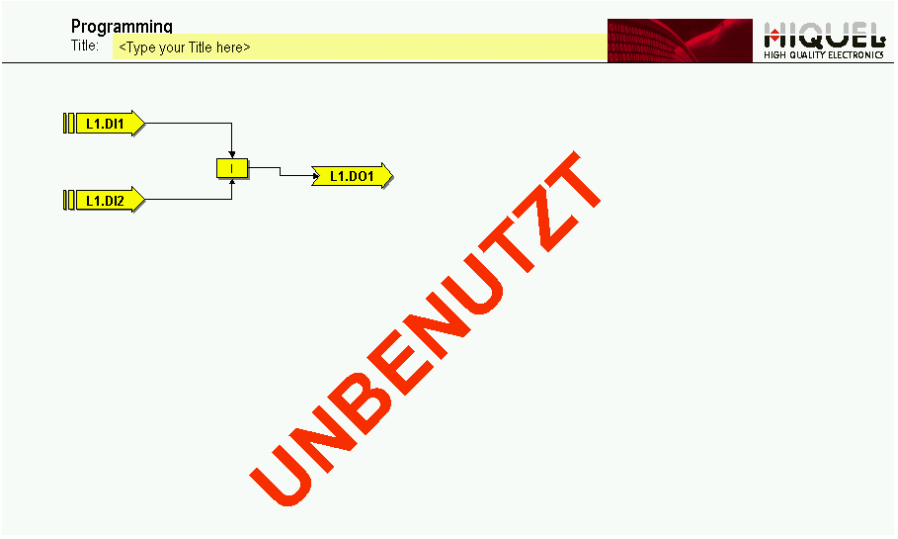
The active page will be copied with this command.

Page: Ignore

Use this command to leave out the whole content of the page during the next compilation.

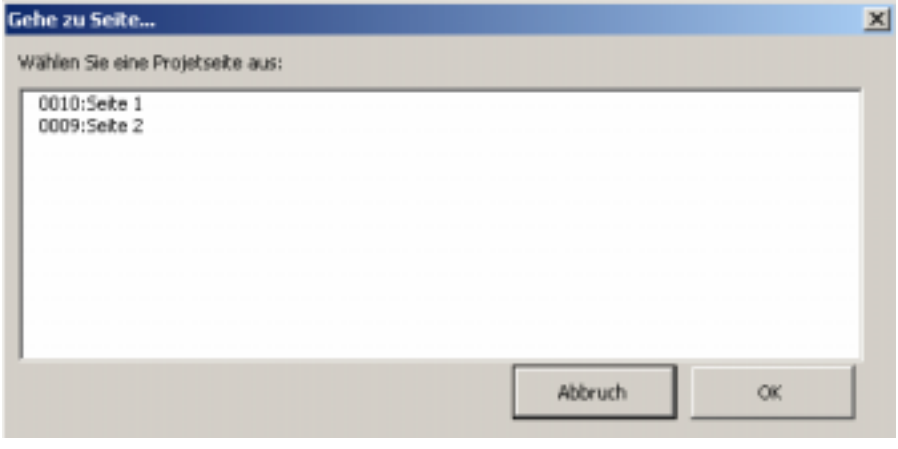
To warn you of this, UNUSED will be written cross the page.

Select this command a second time, UNUSED will disappear and the page will be included again with the next compilation.



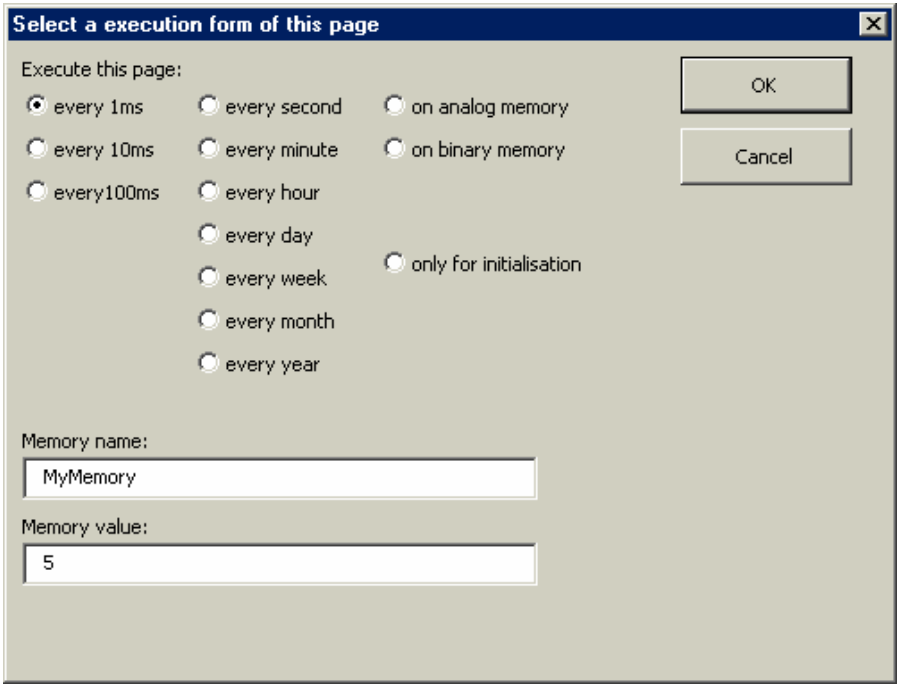
Page: Go to

With this command you can quickly jump to another page of the project. SLS-500-Configurator shows you a detailed overview of all pages with page numbers and titles. Just click onto the desired page and press OK. The page will display immediately!



Page: Execute

You can select the execution rate or variable dependant operation of each SLS-500-Configurator page with this menu option. The following dialogue will occur:



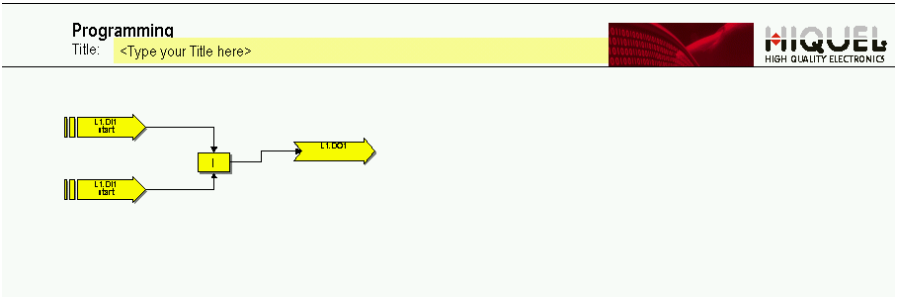
For further details read chapter Page execution!

Page execution

This chapter deals with the various types of SLS-500-Configurator page execution.

Standard page

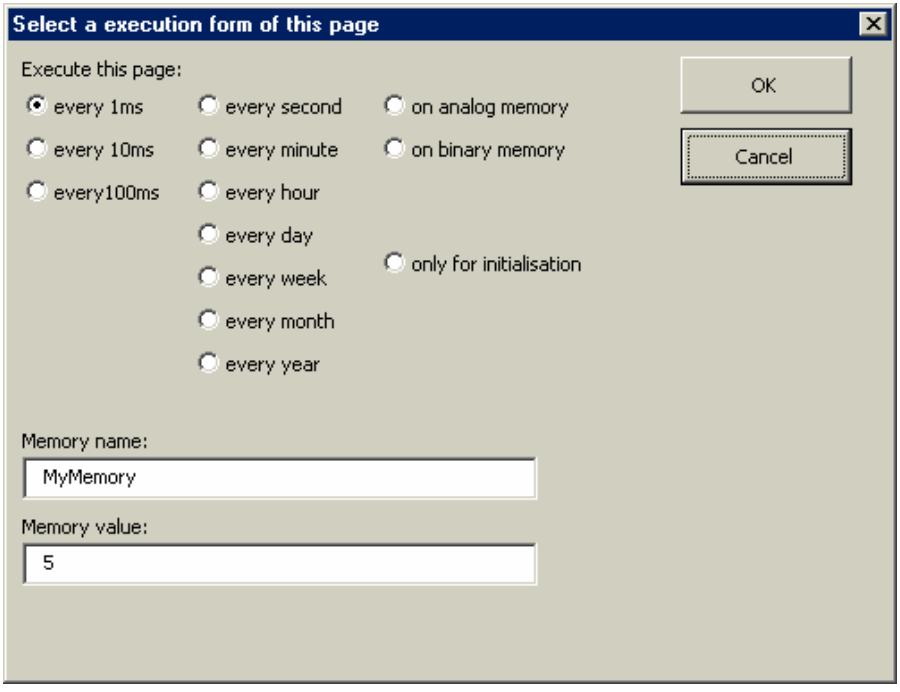
A regular SLS-500-Configurator page is created with the command Page/New. If you create a procedure on this page, as shown below, the page will be executed permanently.



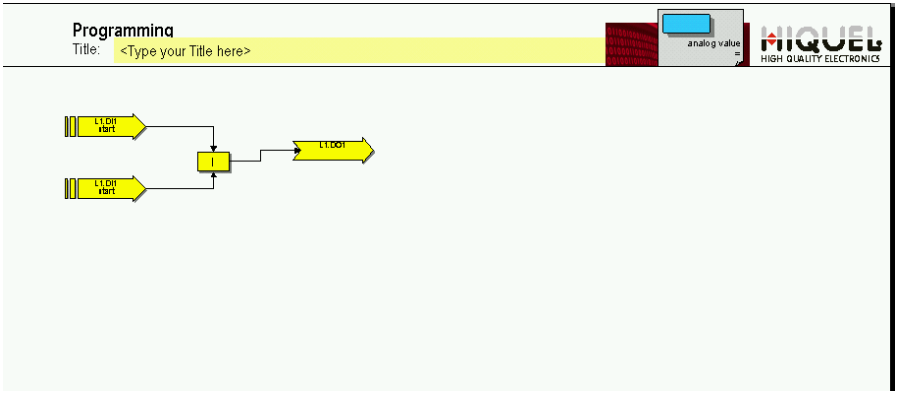
This means that SLS500 executes the page as often as it is possible bearing in mind program length and other program priorities.

You can also select the execution of the page by adding an execution format.

Choose Page/Execute from the menu to get to the following dialogue:



After choosing an execution format the setting will be displayed on the top right of the page.

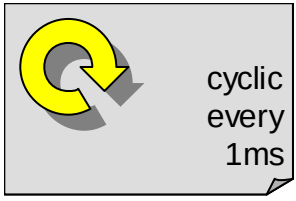


To delete the execution format, you just have to click the symbol on the top right and press the key Del.

Choose from the following execution formats:

Page/Execute/every 1ms

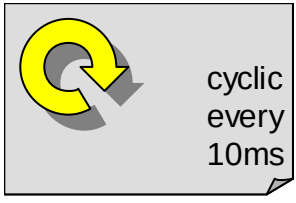
Symbol:



Function: The page will be executed every 1ms. This function is not available with all SLS500 types!

Page/Execute/every 10ms

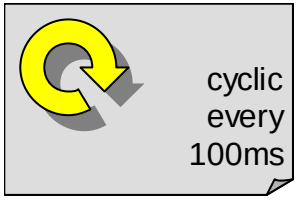
Symbol:



Function: The page will be executed every 10ms.

Page/Execute/every 100ms

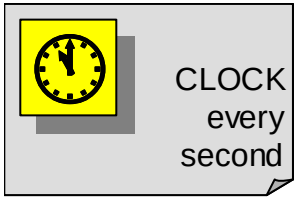
Symbol:



Function: The page will be executed every 100ms.

Page/Execute/clock every second

Symbol:



Function: The page will be executed exactly every second. The function is only available with SLS500, which have a real time clock.

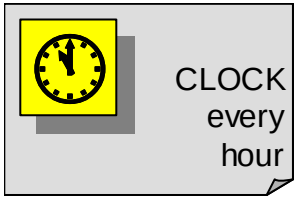
Page/Execute/clock every minute

Symbol:

Function: The page will be executed exactly every minute. The function is only available with SLS500, which have a real time clock.

Page/Execute/clock every hour

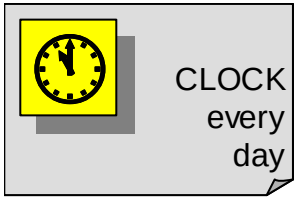
Symbol:



Function: The page will be executed exactly every hour. The function is only available with SLS500which have a real time clock.

Page/Execute/clock every day

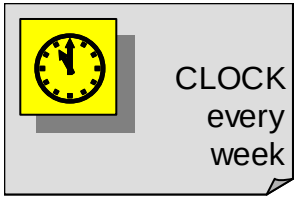
Symbol:



Function: The page will be executed every day at exactly 00:00:00. The function is only available with SLS500, which have a real time clock.

Page/Execute/clock every Week

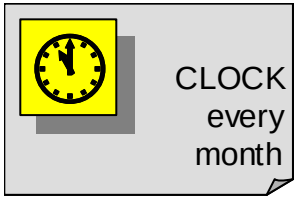
Symbol:



Function: The page will be executed every Monday at exactly 00:00:00. The function is only available with SLS500, which have a real time clock.

Page/Execute/clock every Month

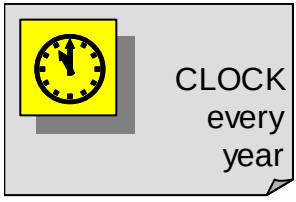
Symbol:



Function: The page will be executed exactly on the first of every month at 00:00:00. The function is only available with SLS500, which have a real time clock.

Page/Execute/clock every Year

Symbol:



Function: The page will be executed exactly every year on the 1st January at 00:00:00. The function is only available with SLS500, which have a real time clock.

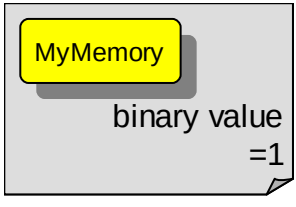
Page/Execute/only for initialisation

Symbol:

Function: The page will be executed with every program start up. Use this function for example to initialise the system.

Page/Execute/on binary memory

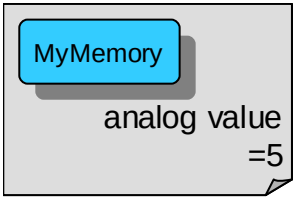
Symbol:



Function: This function defines that the page will only be executed if the binary value MyMemory is 1.

Page/Execute/on analogue memory

Symbol:

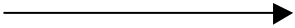


Function: This function defines that the page will only be executed if the analogue value MyMemory is 5.

Connections

Use the connections to connect the individual objects with each other. You can add a new connection object by choosing Line from the menu.

Creation

Symbol: 

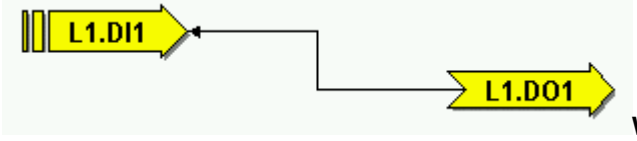
Data type: Depending on the object, connections can operate with all data types.

Function: The line connects the output of an object to the input of another object. It's important for the connection that you have the correct direction of the arrow.

Mind the direction of the arrow

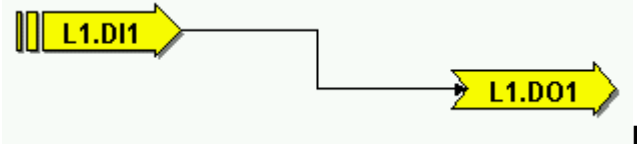
The arrowhead has always to be next to the input of the following object.

Example:



Wrong!

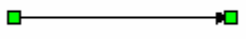
The connection was created the wrong way, since the arrowhead points at the output of the digital input. Take a look at the correct version:



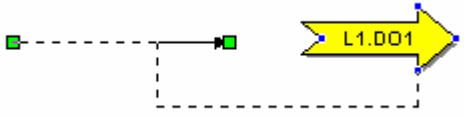
Right!

Create connections

When you click on the connection object, you will see coloured rectangles on both ends:

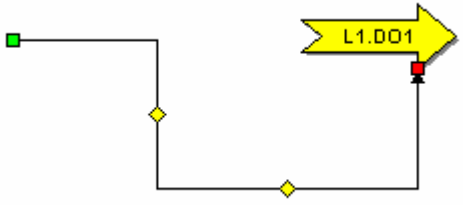


If the rectangles are green, the ends are free and are not linked with an object. Now move the cursor to one of the ends and left-click the arrow. Hold the mouse key and drag the line to an object.

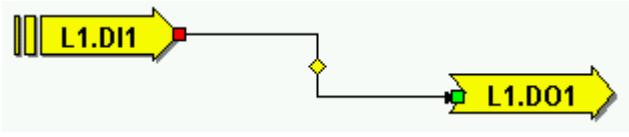


You will notice that small blue symbols appear on the object that you drag the line to and that the line snaps to the nearest blue symbol. Select a suitable blue symbol and release the mouse key. The selected symbol turns from green too red. This is confirmation of a correct connection.

With the yellow symbol you can change the exact position of the connection:

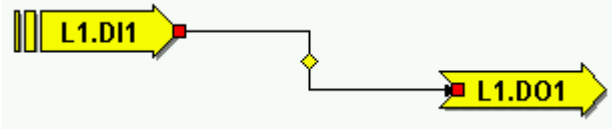


Correct connections: Click on the connecting line. Both rectangles must be red:



Wrong!

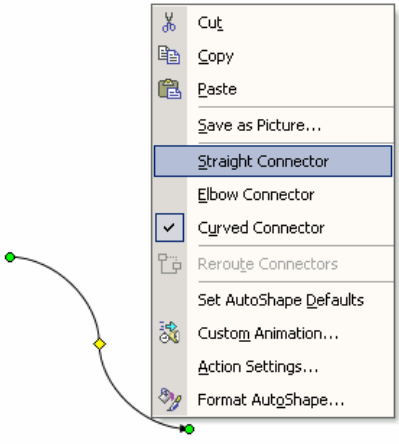
A connection may seem visually to be correct, but if one of the rectangles is be green the connection has not been made. Connect the line with the object again:



Right!

Change the style of the line

To change the line style, right-click the connection line and the following menu will appear:



Choose from, straight Connector (default), Elbow Connector or Curved Connector.

Data types of SLS-500-Configurator

SLS-500-CONFIGURATOR supports three different data types:

Bit data

This data type can save exactly 1 Bit or the information 0 or 1.

Examples for bit data are digital inputs or outputs or status markers.

Analogue data

This data type has the ability to process signed analogue values to three decimal places. The maximum numerical range is –2147483.647 to +2147483.648.

Examples for analogue data are analogue inputs or analogue outputs.

Text data

This data type can save text messages. Depending on the destination system, character strings with different lengths are supported. Maximum 20 characters per text.

Examples for text data are messages for a display or serial communication objects.

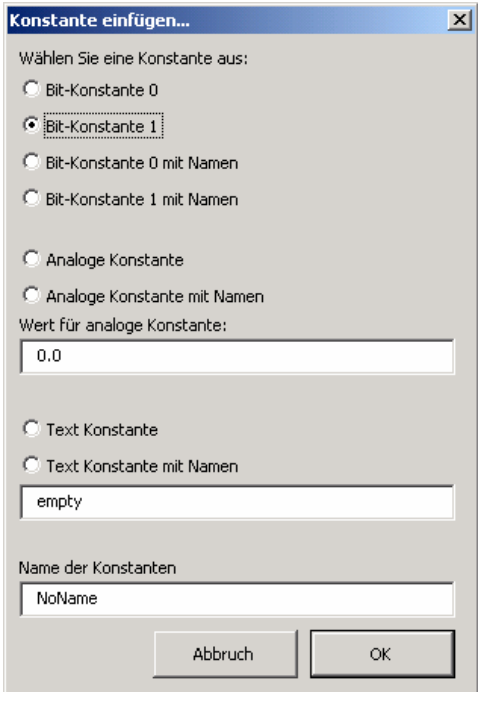
Constants of SLS-500-Configurator

Constants define a fixed value. You can set constants for every data type of SLS-500-Configurator:

Using several constants with the same value, a „constant name“ can be predefined and jointly changed.

Binary constants

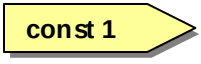
Binary constants define a value of 0 or 1. Choose from the SLS-500-Configurator – menu bar the command Flow/Constants. You will get to the following dialogue:



Now choose binary constant 0 and confirm your choice with OK.

The active programming page will insert the following symbol:

If you choose binary constant 1 the following symbol will be inserted:



Define a name for a constant:

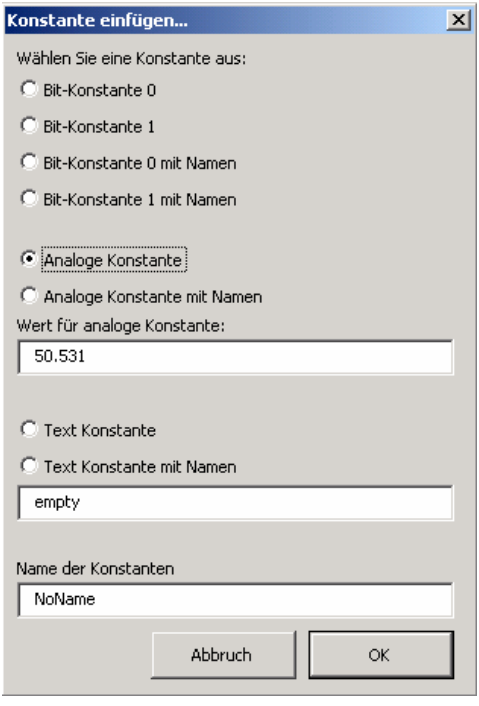
or

Using a named constant:

A normal binary constant is added, the name is adjusted to the definition. This constant represents the binary state 0 or 1 and can be used as often as desired.

Analogue constants

Analogue constants define an analogue value. Choose Flow/Constants and the following dialogue will occur:



Choose Analogue constant and set a fixed value for the new constant in the field Analogue constant value. Then confirm with OK.

The following symbol will be inserted:

For negative constants:

Also hexadecimal constants will be processed. Write hexadecimals as follows: starting character is 0x, a character string follows consisting of 0.9 or A.F or a..f. You can use a dot as a visual cut-off signal between the characters as often as you want. Example: 0xFF.A0. Hexadecimal constants will be processed as 32-Bit values:

In addition binary constants are supported. Binary constants start with a % character. A binary number 0 or 1 follows. You can use dots as visual cut-off signals.

Examples: %0 or %1

%1111.0101.0000

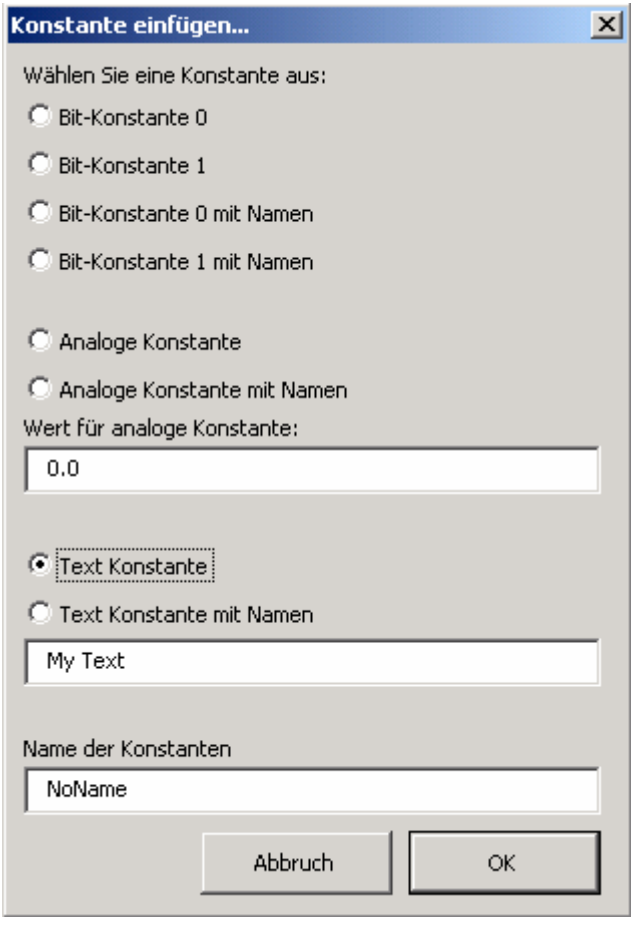
Define a name for a constant:

Using a named constant:

An analogue constant is added, the name is equal to the definition. This constant represents the analogue value 43,5 and can be used as often as desired.

Text constants

Text constants define fixed character strings. Choose Flow/Constants and type the following into the text fields of the dialogue:



After clicking OK the following symbol will occur:

INFO To change the value of a constant afterwards, click the text of the symbol and edit the text!

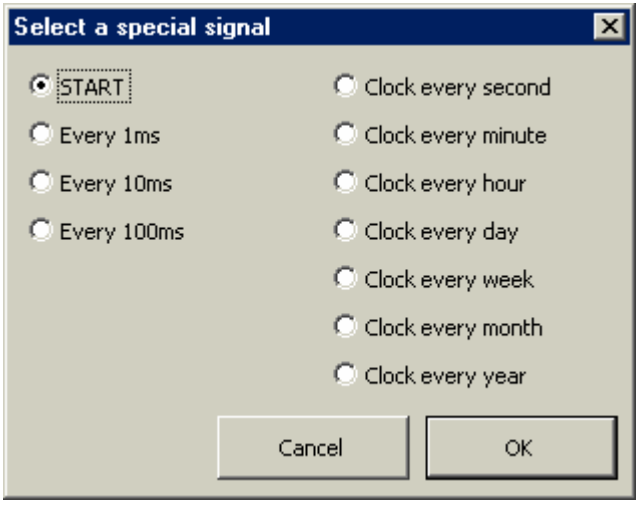
Define a name for a constant:

Using a named constant:

A normal text constant is added, the name is equal to the definition. This constant represents the text „MyText“ and can be used as often as desired.

Special flags

SLS-500-Configurator has a series of special flags, which display special signals. To insert a special flag choose Flow/Special flags. Select the desired flag and click OK.



Special flag: START

Symbol: 

Data type: Bit

Function: This flag has the value 1only during the first program cycle. Otherwise this bit is always 0. Use this flag for example to initialise values.

Special flag: every 1ms

Symbol: 

Data type: Bit

Function: This flag is not available on every SLS-500 Master-Controller. The flag has the value 1 for one program cycle at intervals of 1mS. Otherwise the flag is always 0. Use this flag for example with signal time measuring.

Special flag: every 10ms

Symbol: 

Data type: Bit

Function: The flag has the value 1 for one program cycle at intervals of 10mS. Otherwise the flag is always 0. Use this flag for example with signal time measuring

Special flag: every 100ms

Symbol: 

Data type: Bit

Function: The flag has the value 1 for one program cycle at intervals of 100mS. Otherwise the flag is always 0. Use this flag for example with signal time measuring.

Special flag: Clock every second

Symbol: 

Data type: Bit

Function: an integrated real time clock creates this flag. The flag returns the value 1 every second for exactly one cycle, otherwise it is 0. Use this flag for a flasher signal for example

Special flag: Clock every minute

Symbol: 

Data type: Bit

Function: an integrated real time clock creates this flag. The flag returns the value 1 every minute for exactly one cycle, otherwise it is 0.

Special flag: Clock every hour

Symbol: 

Data type: Bit

Function: an integrated real time clock creates this flag. The flag returns the value 1 every hour for exactly one cycle, otherwise it is 0.

Special flag: Clock every day

Symbol: 

Data type: Bit

Function: an integrated real time clock creates this flag. The flag returns the value 1 every day at 00:00:00 for exactly one cycle, otherwise it is 0.

Special flag: Clock every week

Symbol: 

Data type: Bit

Function: an integrated real time clock creates this flag. The flag returns the value 1 every week on Sundays at exactly 00:00:00 for one cycle, otherwise it is always 0.

Special flag: Clock every month

Symbol: 

Data type: Bit

Function: an integrated real time clock creates this flag. The flag returns the value 1 on the first of every month at exactly 00:00:00 for one cycle, otherwise it is always 0.

Special flag: Clock every year

Symbol: 

Data type: Bit

Function: an integrated real time clock creates this flag. The flag returns the value 1 every year exactly on the 1st of January at 00:00:00 for one cycle, otherwise it is always 0.

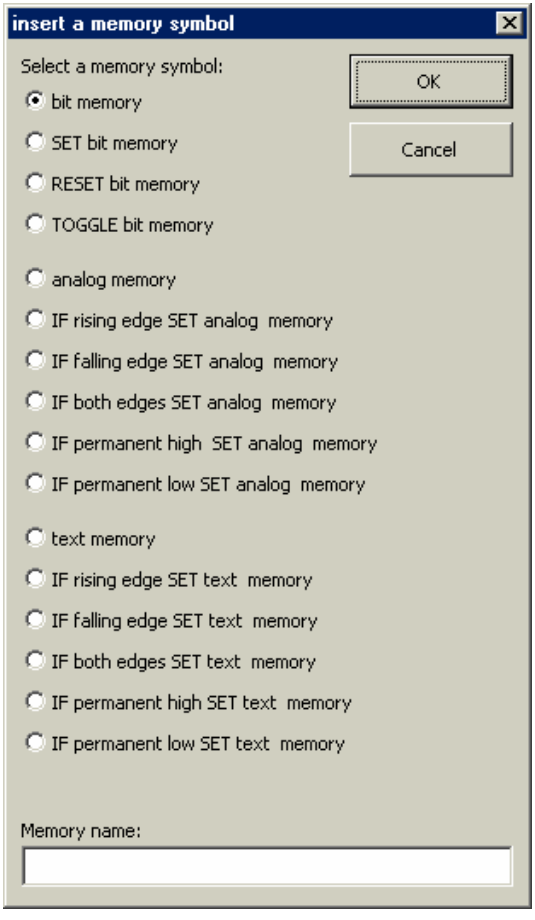
Memories

Use the memory spaces to store values of one of the three data types. These values can be reloaded any time at another place within the program to continue processing.

Every memory has a name.

INFO You can define the same name for a binary memory and an analogue memory the graphic colour tells you the difference. However take care which memory you are actually accessing!

Choose Flow/Memories from the menu, you can select the following memories:



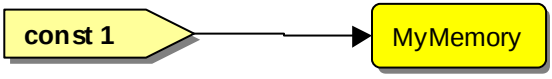
Bit memory

Symbol:

Data type: Bit

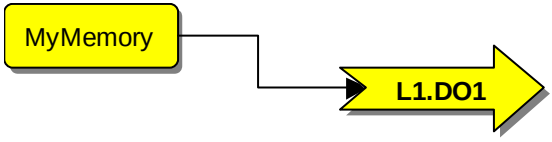
Function: Bit memory saves one Bit and transmits it.

Examples:



The constant value 1 will be transmitted to MyMemory.

The current value of digital input L1.DI1 will be saved to the 1stMemory and also to the 2ndMemory.



The active value of MyMemory will be transmitted to digital output L1.DO1.

SET bit memory

Symbol:

Data type: Bit

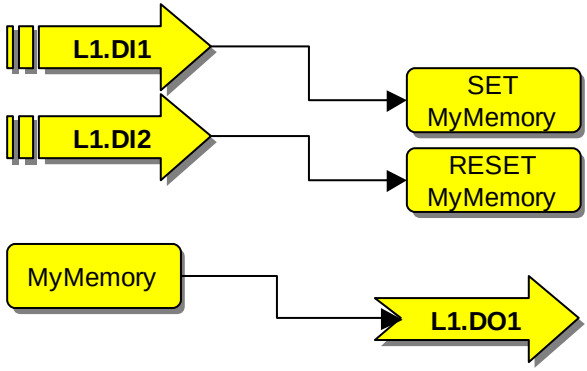
Function: If the input of the bit memory receives the value 1, MyMemory will be set to 1.

RESET bit memory

Symbol:

Data type: Bit

Function: If the input of the bit memory gets the value 1, MyMemory will be reset to 0.



Example: (see above)

If digital input L1.DI1 is activated the variable of MyMemory will be set to 1. This status of MyMemory stays active until the input L1.DI2 is activated. MyMemory will then be set to 0. The status of digital output L1.DO1 will be on when MyMemory is 1 and off when MyMemory is 0.

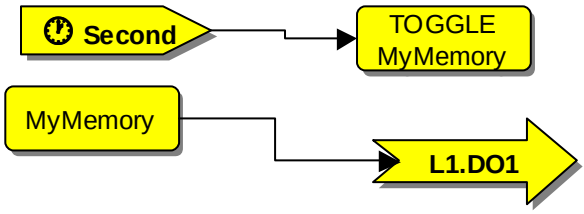
TOGGLE bit memory

Symbol:

Data type: Bit

Function: If the input of the bit memory is the value 1, the current content of MyMemory will be inverted.

Examples:



The value of MyMemory is inverted every second. Digital output L1.DO1 flashes every second.

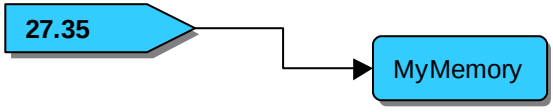
Analogue memory

Symbol:

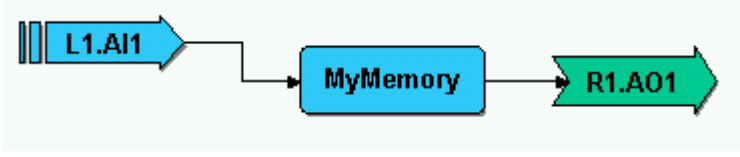
Data type: Analogue

Function: The analogue memory is able to store an analogue value and to transmit it.

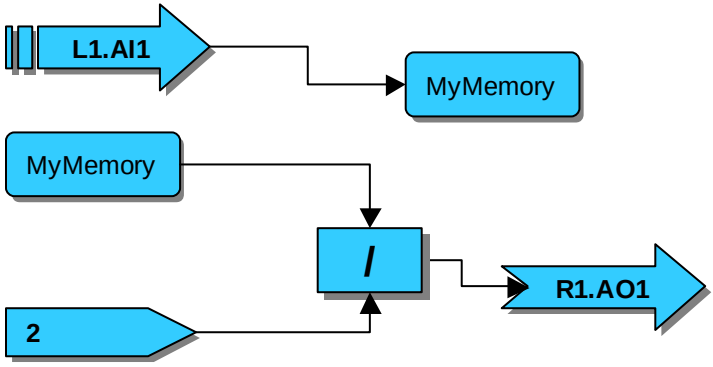
Examples:



The constant value 27.35 is transmitted to the analogue memory MyMemory.



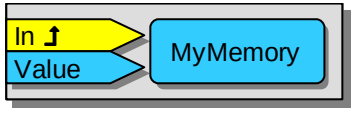
The current value of analogue input L1.AI1 is transferred to MyMemory. Also the value of MyMemory will be transmitted to analogue output R1.AO1.



The current value of analogue input L1.AI1 would be transmitted to MyMemory. Then the current value will be divided by 2 and transferred to analogue output R1.AO1.

IF rising edge SET analogue memory

Symbol:

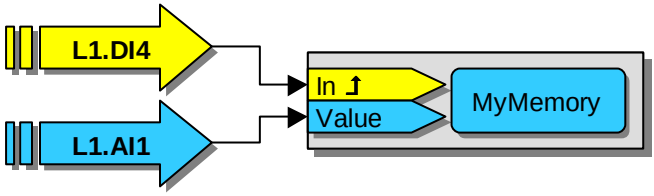


Data type: In Bit

Value Analogue

Function: When digital input ***In*** reads a rising edge, the value of input ***Value*** will be saved to MyMemory.

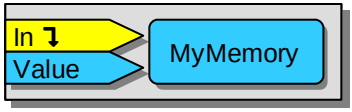
Example:



With every rising edge of digital input L1.DI4, the existing value of analogue input L1.AI1 will be saved to MyMemory.

IF falling edge SET analogue memory

Symbol:



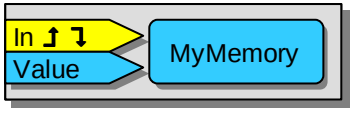
Data type: In Bit

Value Analogue

Function: When digital input ***In*** reads a falling edge, the existing value of input ***Value*** will be saved to MyMemory.

IF both edges SET analogue memory

Symbol:



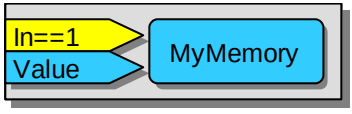
Data type: In Bit

Value Analogue

Function: When digital input ***In*** reads a rising or a falling edge, the value of input **Value** will be saved to MyMemory.

IF permanent high SET analogue memory

Symbol:

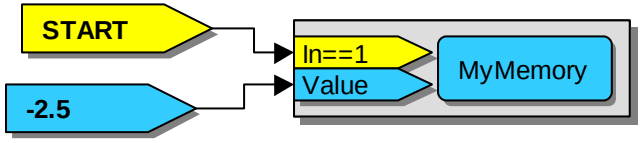


Data type: In Bit

Value Analogue

Function: All the time digital input ***In*** reads the value 1, the value of input ***Value*** will be saved to MyMemory.

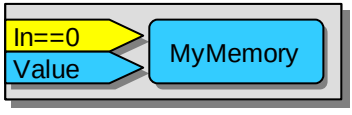
Example:



Just at program start up, the value –2.5 will be saved to the variable MyMemory.

IF permanent low SET analogue memory

Symbol:



Data type: In Bit

Value Analogue

Function: All the time digital input ***In*** reads the value 0, the value of input ***Value*** will be saved to MyMemory.

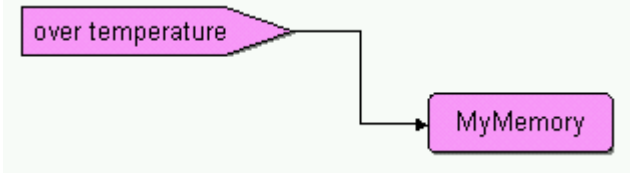
Text memory

Symbol:

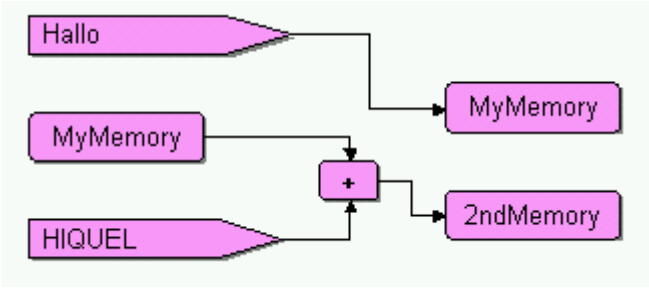
Data type: Text

Function: The text memory is able to store a text value and to transmit it.

Examples:



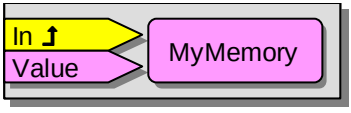
The constant value will be saved to the text memory MyMemory.



The text memory MyMemory is loaded with the constant value „Hallo „. After this the constant value „HIQUEL“ will be added to the content of MyMemory and saved to 2nd Memory. The result at 2nd Memory is „Hallo HIQUEL“

IF rising edge SET text memory

Symbol:



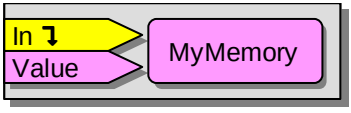
Data type: In Bit

Value Text

Function: If digital input ***In*** reads a rising edge, the value of input ***Value*** will be transmitted to MyMemory.

IF falling edge SET text memory

Symbol:



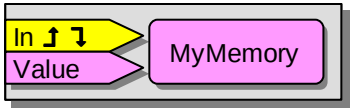
Data type: In Bit

Value Text

Function: If digital input ***In*** reads a falling edge, the value of input ***Value*** will be transmitted to MyMemory.

IF both edges SET text memory

Symbol:



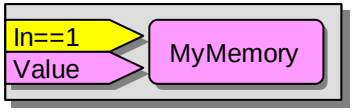
Data type: In Bit

Value Text

Function: If digital input ***In*** reads a rising or falling edge, the value of input ***Value*** will be transmitted to MyMemory.

IF permanent high SET text memory

Symbol:

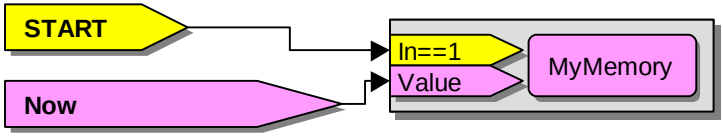


Data type: In Bit

Value Text

Function: As long as digital input ***In*** reads the value 1, the value of input ***Value*** will be transmitted to MyMemory.

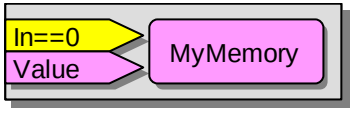
Example:



The value „Now“ will only be saved to the variable MyMemory at program start up.

IF permanent low SET text memory

Symbol:

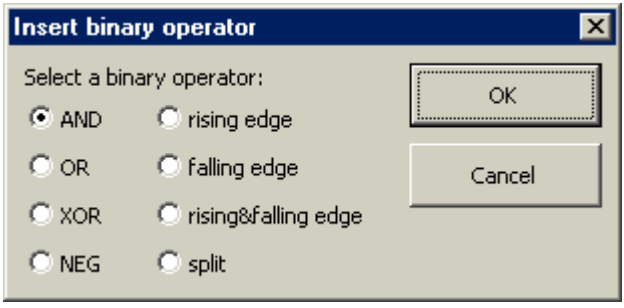


Data type:	In	Bit
	Value	Text

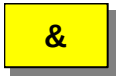
Function: As long as digital input ***In*** reads the value 0, the value of input ***Value*** will be saved to MyMemory.

Binary operators

There are a series of operators available for binary calculations. Choose Flow/Bit handling from the menu and select one of the following operators:



Binary operator: Binary AND

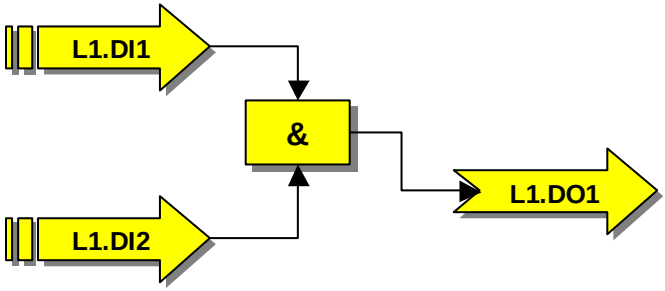
Symbol: 

Data type: In1,In2 Bit

Out Bit

Function: This function calculates the AND-connection by using two input signals and delivers the result to the output.

In1	In2	Out
0	0	0
0	1	0
1	0	0
1	1	1



Example:

Digital output L1.DO1 is active, only if both digital inputs L1.DI1 and L1.DI2 are simultaneously active.

Binary operator: Binary OR

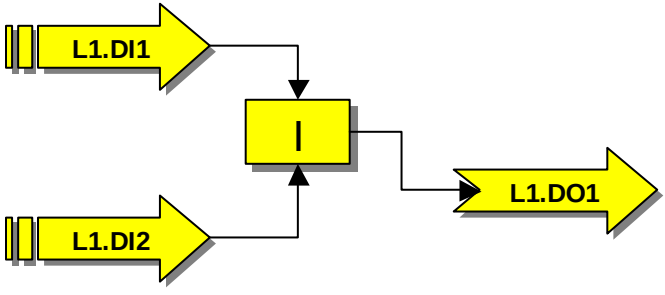
Symbol: 

Data type: In1,In2 Bit

Out Bit

Function: This function calculates the OR-connection by using two input signals and delivers the result to the output.

In1	In2	Out
0	0	0
0	1	1
1	0	1
1	1	1



Example:

The digital output L1.DO1 is active as soon as one of the two digital inputs L1.DI1 and L1.DI2 are active. If both are active the digital output will be active too.

Binary operator: Binary EXCLUSIVE OR

Symbol:

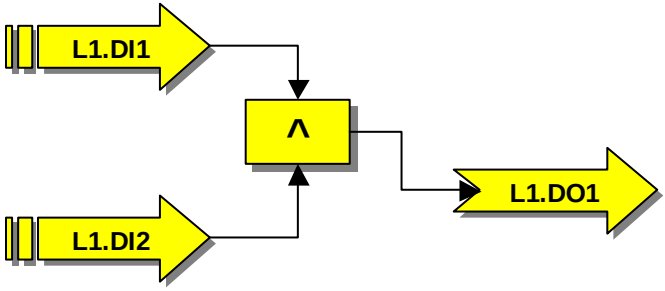
Data type: In1,In2 Bit

Out Bit

Function: This function calculates the EXCLUSIVE OR-connection by using two input signals and delivers the result to the output.

In1	In2	Out
0	0	0
0	1	1
1	0	1
1	1	0

Example:



Digital output L1.DO1 is active, as long as one of the two digital inputs L1.DI1 and L1.DI2 is active. If both are simultaneously active, the digital output will not be active.

Binary operator: Binary NEGATION

Symbol: 

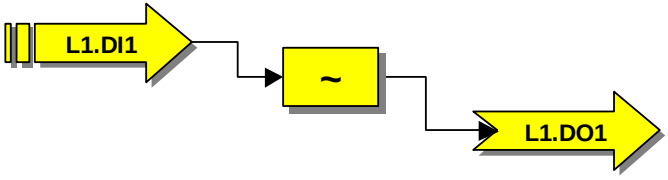
Data type: In Bit

Out Bit

Function: The current input value will be inverted.

In	Out
0	1
1	0

Example:



Digital output L1.DO1 always has the opposite signal status of digital input L1.DI1.

Binary operator: Rising edge

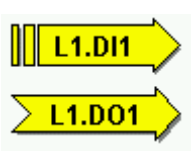
Symbol: 

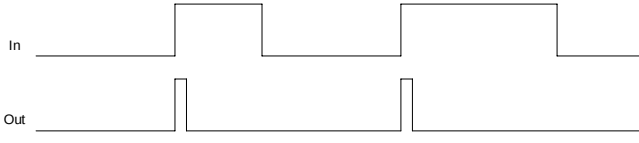
Data type: In Bit

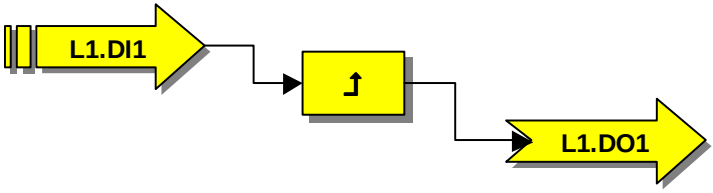
Out Bit

Function: If the input signal has a rising edge, this function is high for exactly one cycle.

Example:







If digital input L1.DI1 reads a rising edge, digital output L1.DO1 will be high for exactly one cycle.

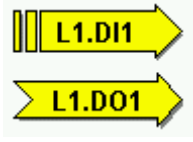
Binary operator: falling edge

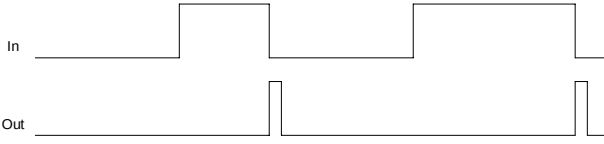
Symbol:

Data type: In Bit

Out Bit

Function: If the input signal reads a falling edge, the function is high for exactly one cycle.





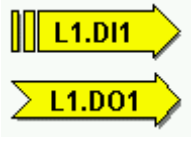
Binary operator: Both edges

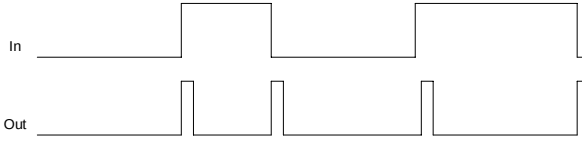
Symbol:

Data type: In Bit

Out Bit

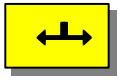
Function: If the input signal reads a rising or a falling edge, the function is high for exactly one cycle.





Binary operator: Split

Symbol:

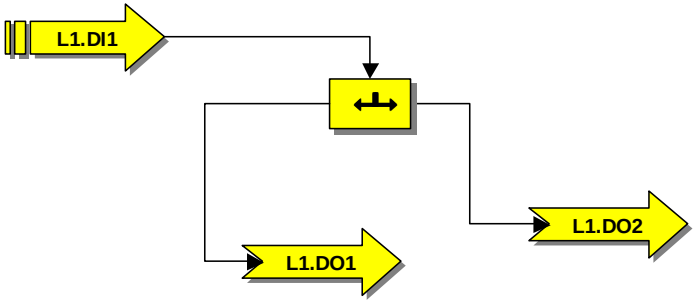


Data type: In Bit

Out1,Out2 Bit

Function: This function splits the data into two paths. Both of the outputs have the same signal as the input.

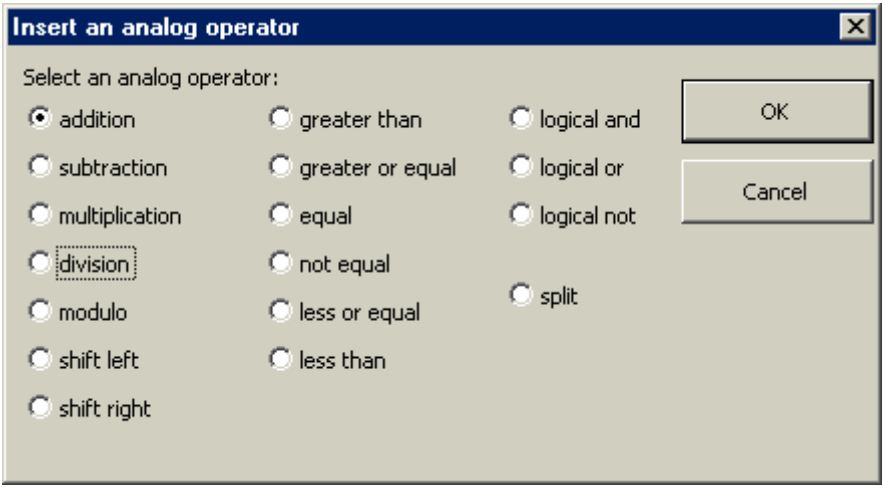
Example:



The input signal L1.DI1 will be simultaneously transmitted to outputs L1.DO1 and L1.DO2.

Analogue operators

The following operators are available for processing the analogue signals. Choose Flow/Analogue handling from the menu:



Analogue operator: Addition

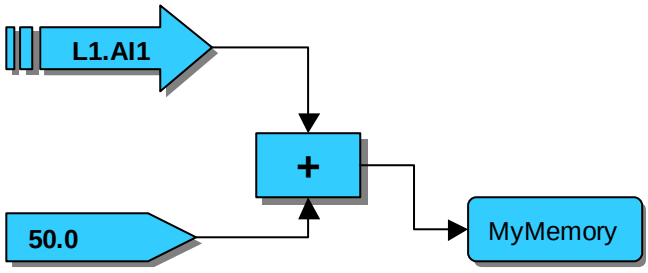
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

Function: This function calculates the sum of the two analogue signals In1 and In2 and delivers the result to output ***Out***.

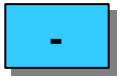
Example:



The value 50.0 will be added to the current value of analogue input L1.AI1. The result will be saved to MyMemory.

Analogue operator: Subtraction

Symbol:

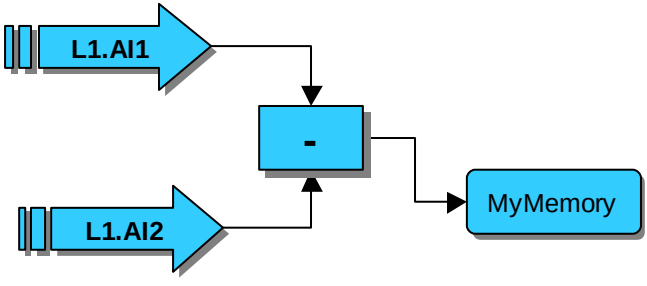


Data type: In1,In2 Analogue

Out Analogue

Function: This function subtracts the value of one analogue input from another analogue output and saves the result to output Out.

Example:



Analogue value L1.AI2 is subtracted from analogue value L1.AI1. The result will be saved to MyMemory.

Analogue operator: Multiplication

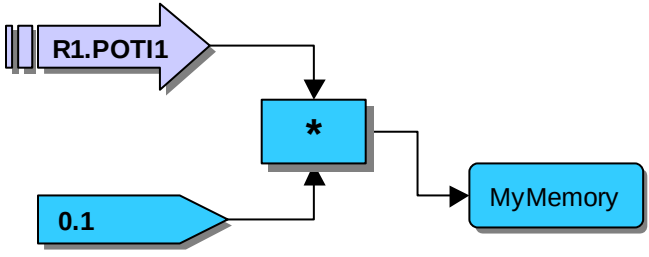
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

Function: This function multiplies the two analogue signals In1 and In2 and delivers the result to output Out.

Example:



The current potentiometer value R1.POTI1 is multiplied by the factor 0.1. The result will be saved to MyMemory. In this way you can get a potentiometer value between 0 and 10.

Analogue operator: Division

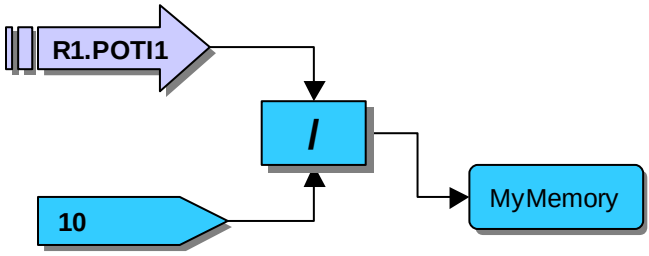
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

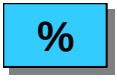
Function: This function divides analogue signal In1 by In2 and delivers the result to output ***Out***.

Example:



The current potentiometer value R1.POTI1 is divided by 10. The result will be saved to MyMemory. In this way you can get a potentiometer value between 0 and 10.

Analogue operator: Modulo (read part of a value)

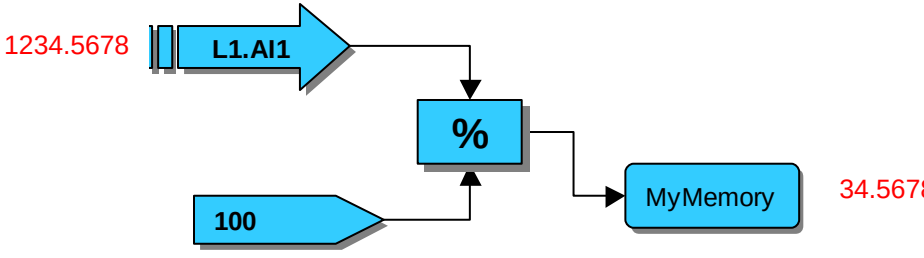
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

Function: This function transfers part of the analogue value (In1 divided by In2) to output MyMemory.

Example:



The current analogue value of analogue input L1.AI1 is calculated with modulo 100. The result will be delivered to MyMemory.

Analogue operator: Shift left

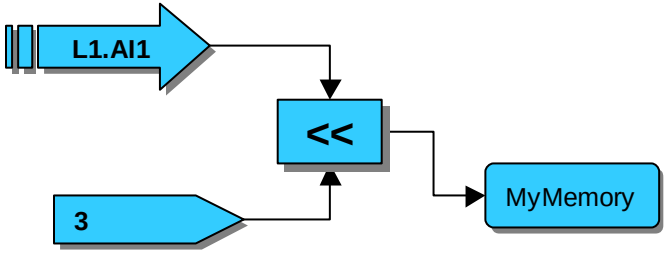
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

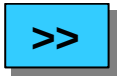
Function: This function shifts the bits of input In1 to the left by In2 bits and delivers the result to output Out.

Example:



The current analogue value of analogue input L1.AI1 will be shifted by 3 bits to the left. In this way the current value will be multiplied by 8. The result will be saved to MyMemory.

Analogue operator: Shift right

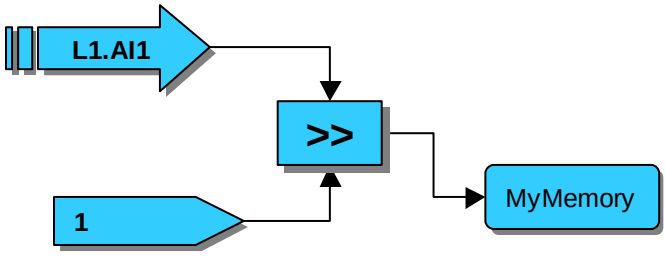
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

Function: This function shifts the bits of input In1 to the right by In2 bits and delivers the result to output Out.

Example:



The current analogue value of analogue input L1.AI1 would be shifted by 1 bit to the right. In this way the current value will be divided by two. The result will be saved to MyMemory.

Analogue operator: Greater than

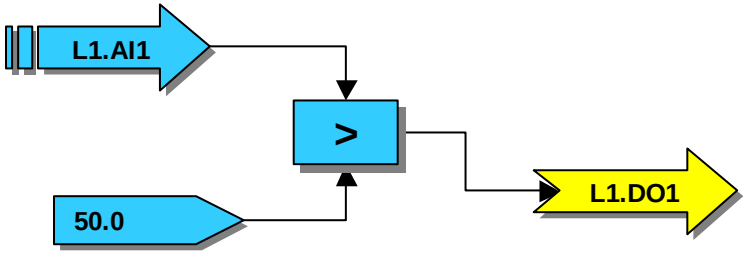
Symbol: 

Data type: In1,In2 Analogue

Out Bit

Function: This function compares the two analogue input signals In1 and In2. If In1 is greater than In2, the output will deliver a binary 1, otherwise a 0 will be transmitted.

Example:



If analogue input L1.AI1 is greater than 50.0, digital output L1.DO1 is activated.

Analogue operator: Greater or equal

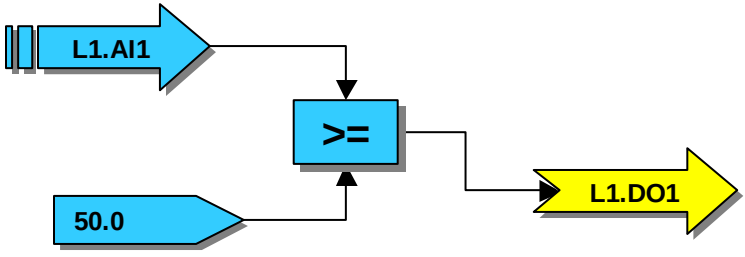
Symbol: 

Data type: In1,In2 Analogue

Out Bit

Function: This function compares the analogue input signals In1 and In2. If In1 is greater than or equal to In2, the output will deliver a binary 1, otherwise a 0 will be transmitted.

Example:



If analogue input L1.AI1 is greater than or equal to 50.0, digital output L1.DO1 will be active.

Analogue operator: Equal

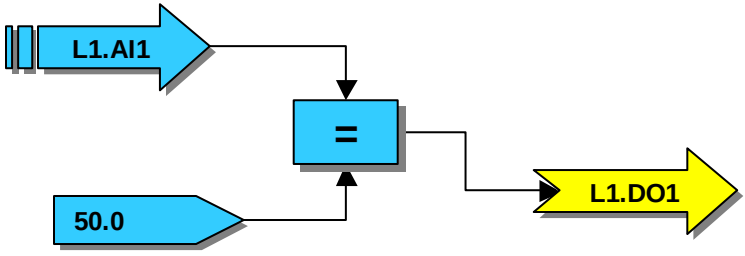
Symbol: 

Data type: In1,In2 Analogue

Out Bit

Function: This function compares the analogue input signals In1 and In2. If In1 is equal to In2, the output will deliver a binary 1, otherwise a 0 will be transmitted.

Example:



If analogue input L1.AI1 has the value 50.000, the analogue output L1.DO1 will be activated.

Analogue operator: Not equal

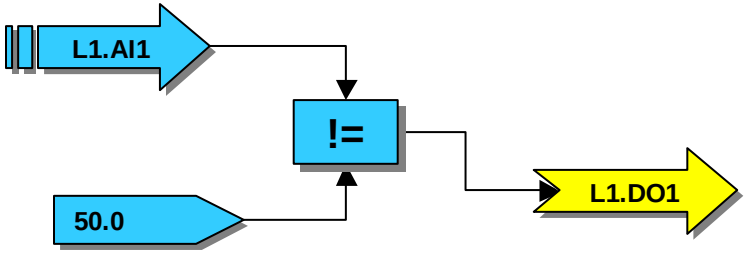
Symbol: 

Data type: In1,In2 Analogue

Out Bit

Function: This function compares the analogue input signals In1 and In2. If In1 is not equal to In2, the output delivers a binary 1; otherwise a 0 will be transmitted.

Example:



If analogue input L1.AI1 does not have the value 50.000, digital output L1.DO1 will be activated.

Analogue operator: Less or equal

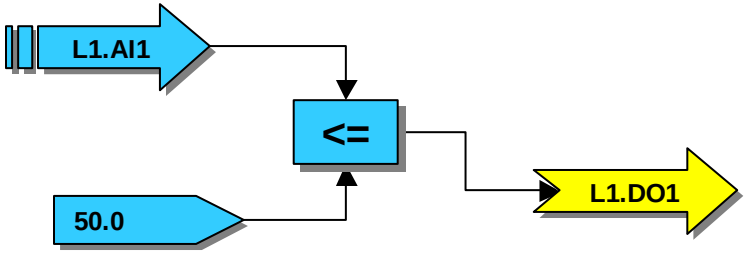
Symbol: 

Data type: In1,In2 Analogue

Out Bit

Function: This function compares the analogue input signals In1 and In2. If In1 is less than or equal to In2, the output delivers a binary 1, otherwise a 0 will be transmitted.

Example:



If analogue input L1.AI1 has the value less than or equal to 50.000, digital output L1.DO1 will be activated.

Analogue operator: Less

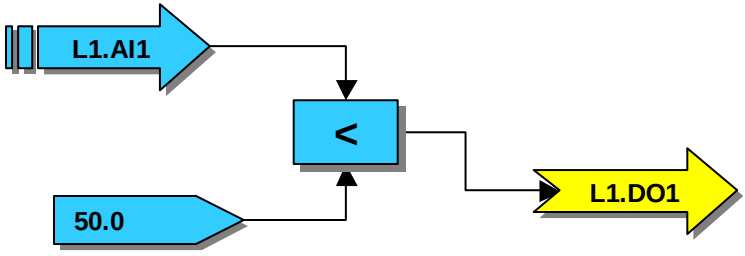
Symbol: 

Data type: In1,In2 Analogue

Out Bit

Function: This function compares the analogue input signals In1 and In2. If In1 is less than In2, the output delivers a binary 1; otherwise a 0 will be transmitted.

Example:



If analogue input L1.AI1 has a value less than 50.000, digital output L1.DO1 will be activated.

Analogue operator: Logical AND

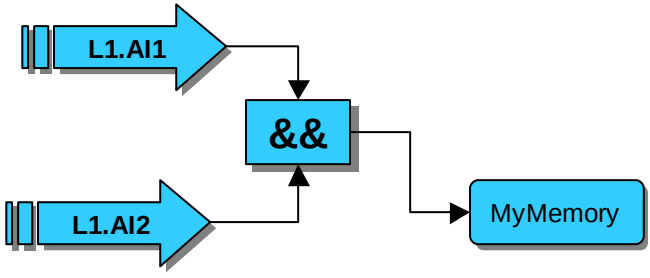
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

Function: This function compares the analogue input signals In1 and In2. If In1 is not equal to 0 and In2 is not equal to 0, the output ***Out*** delivers a value that is unequal to 0 too. Otherwise the value 0 will be returned.

Example:



If analogue inputs L1.AI1 *and* L1.AI2 are not equal to 0, the variable MyMemory will be unequal to 0 too.

Analogue operator: Logical OR

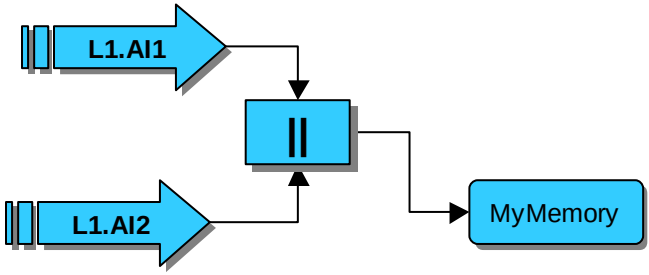
Symbol: 

Data type: In1,In2 Analogue

Out Analogue

Function: This function compares the analogue input signals In1 and In2. If In1 is not equal to 0 or In2 is not equal to 0, the output ***Out*** delivers a value that is unequal 0 too. Otherwise the value 0 will be returned.

Example:



Only if at least one of the two analogue inputs L1.AI1 and L1.AI2 is unequal 0, the variable MyMemory will be unequal 0 too.

Analogue operator: Logical NOT

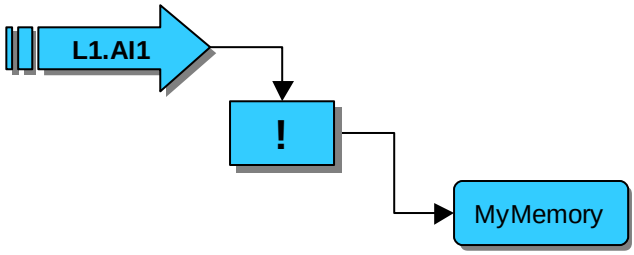
Symbol: 

Data type: In Analogue

Out Analogue

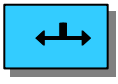
Function: This function measures the analogue input signal ***In***. If the input ***In*** has value 0, at output ***Out*** a value unequal 0 will be returned. If the input is unequal to 0, the value 0 will be returned.

Example:



If analogue input L1.AI1 has exactly the value 0, the variable MyMemory will be unequal 0.

Analogue operator: Split

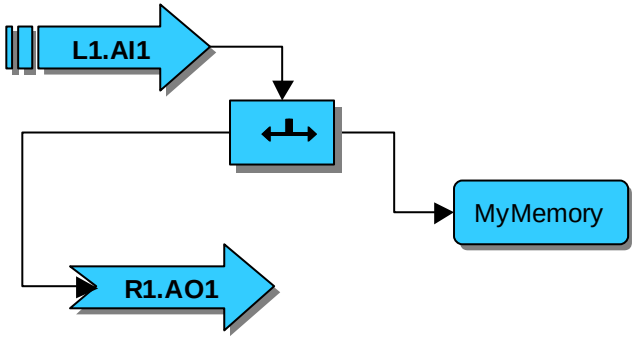
Symbol: 

Data type: In Analogue

Out1,Out2 Analogue

Function: This function splits the input data into two paths. Both of the outputs will have the same signal as the input.

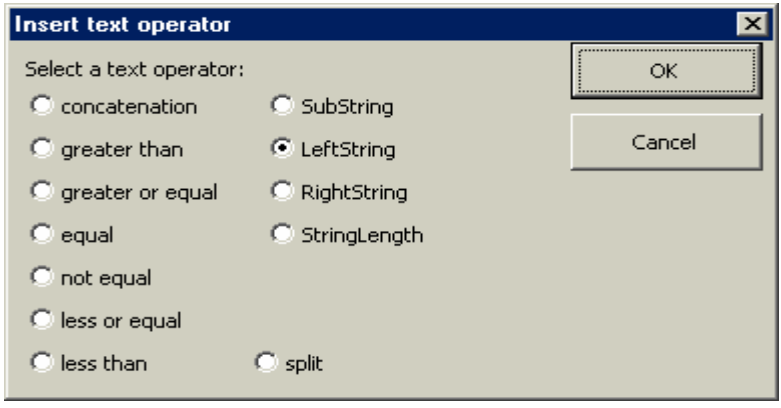
Example:



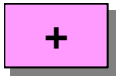
The input signal L1.AI1 will be simultaneously transmitted to analogue output L1.AO1 and to MyMemory.

Text operators

The following operators are available for processing texts. Choose Flow/Text handling from the menu to get to the following dialogue:



Text operator: Combine text

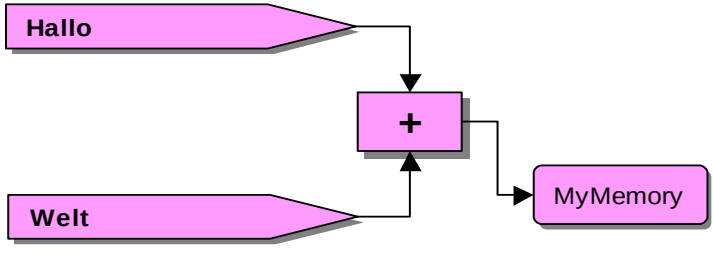
Symbol: 

Data type: In1,In2 Text

Out Text

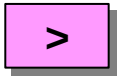
Function: This function combines the texts In1 and In2 to a new text and delivers it to output ***Out***.

Example:



Both text parts „Hallo“ and „Welt“ will be assembled and saved to MyMemory as Hallo Welt (Hello world)

Text operator: Greater

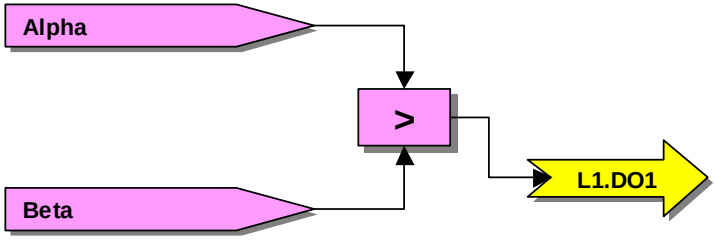
Symbol: 

Data type: In1,In2 Text

Out Bit

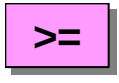
Function: This function compares the texts In1 and In2. If In1 is greater than In2, a binary 1 will be delivered to the output. Otherwise a 0 will be transmitted.

Example:



As Alpha is not greater than Beta, digital output L1.DO1 is not active.

Text operator: Greater or equal

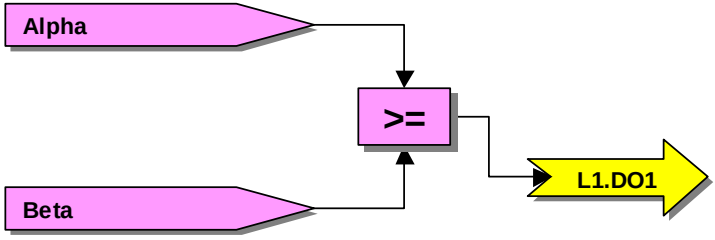
Symbol: 

Data type: In1,In2 Text

Out Bit

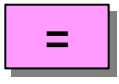
Function: This function compares the texts In1 and In2. If In1 is greater than or equal that In2, a binary 1 will be delivered to the output. Otherwise a 0 will be transmitted.

Example:



As Alpha is not greater than or equal to Beta, digital output L1.DO1 is not active.

Text operator: Equal

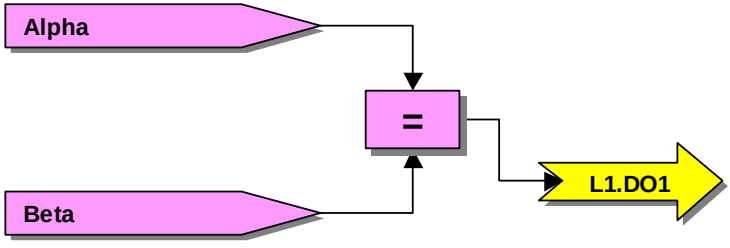
Symbol: 

Data type: In1,In2 Text

Out Bit

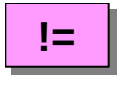
Function: This function compares the texts In1 and In2. If In1 is equal to In2, a binary 1 will be delivered to the output. Otherwise a 0 will be transmitted.

Example:



As Alpha is not equal to Beta, digital output L1.DO1 is not active.

Text operator: Not equal

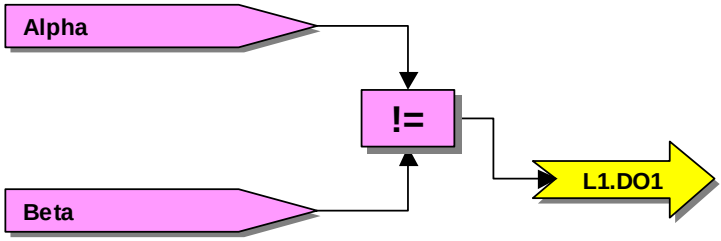
Symbol: 

Data type: In1,In2 Text

Out Bit

Function: This function compares the texts In1 and In2. If In1 is not equal to In2, a binary 1 will be delivered to the output. Otherwise a 0 will be transmitted.

Example:



As Alpha is not equal to Beta, digital output L1.DO1 is active.

Text operator: Less or equal

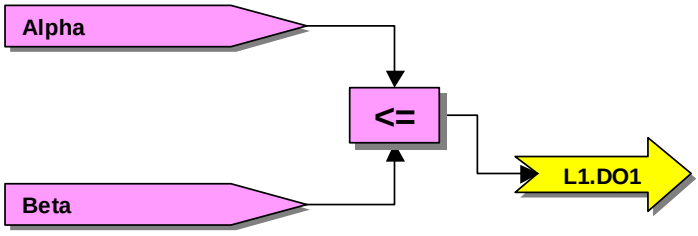
Symbol: 

Data type: In1,In2 Text

Out Bit

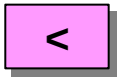
Function: This function compares the texts In1 and In2. If In1 is less than or equal to In2, a binary 1 will be delivered to the output. Otherwise a 0 will be transmitted.

Example:



As Alpha is less than (or equal to) Beta, digital output L1.DO1 is active.

Text operator: Less

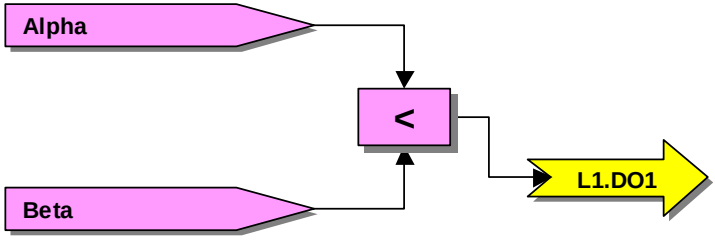
Symbol: 

Data type: In1,In2 Text

Out Bit

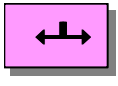
Function: This function compares the texts In1 and In2. If In1 is less than In2, a binary 1 will be delivered to the output. Otherwise a 0 will be transmitted.

Example:



As Alpha is less than Beta, digital output L1.DO1 is active.

Text operator: Split

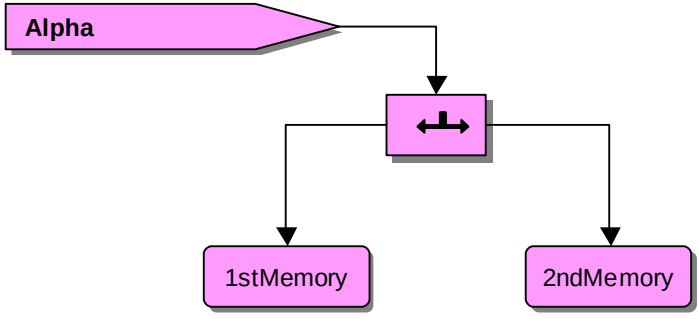
Symbol: 

Data type: In Text

Out1,Out2 Text

Function: This function splits the text into two paths. Both of the outputs have the same signal as the input.

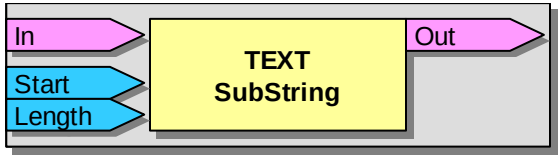
Example:



The input signal L1.AI1 will be simultaneously delivered to analogue output L1.AO1 and to MyMemory.

Text operator: Sub String

Symbol:

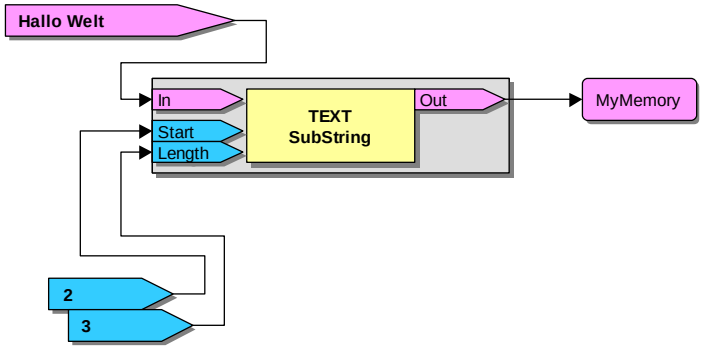


Data type:

In	Text
Out	Text
Start	Analogue
Length	Analogue

Function: This function delivers to output ***Out*** parts of character strings. The first letter of the string is defined in ***start*** and the number of characters is defined in ***length***. The ***Start*** index starts counting with 0 therefore the first character of a full string is character 0.

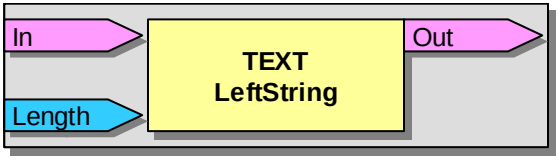
Example:



The text string llo will be saved to MyMemory!

Text operator: Left String

Symbol:

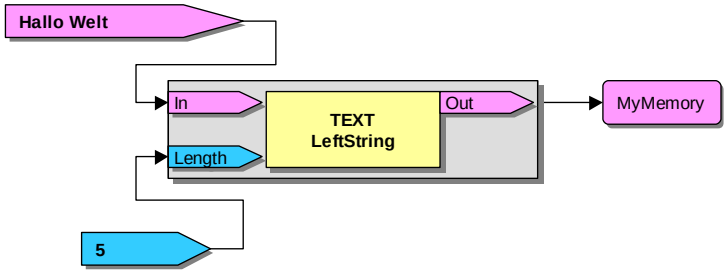


Data type:

	In	Text
	Out	Text
	Length	Analogue

Function: This function delivers to output ***Out*** only the first X ***Length*** character of input ***In*.**

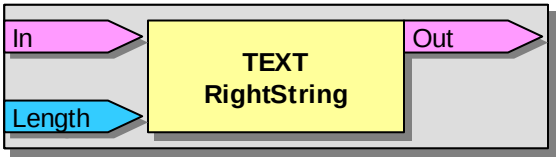
Example:



The text string Hallo will be saved to the variable MyMemory!

Text operator: Right String

Symbol:

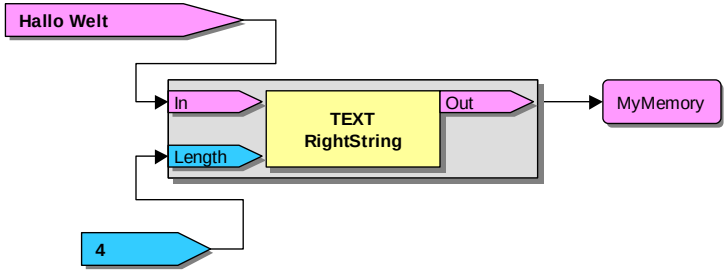


Data type:

	In	Text
	Out	Text
	Length	Analogue

Function: This function delivers to output ***out*** only X ***Length*** characters of input **In** counting from the last character of the string.

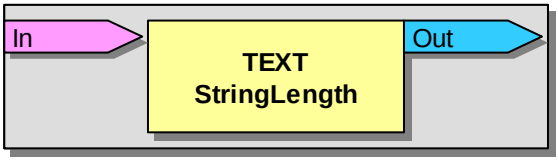
Example:



The text string Welt will be saved to MyMemory!

Text operator: String Length

Symbol:

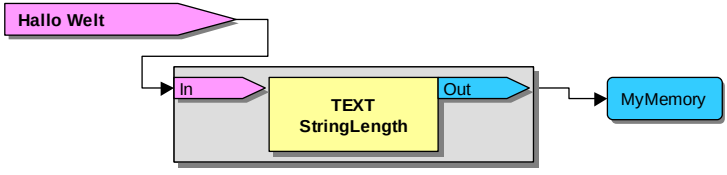


Data type: In Text

Out Analogue

Function: This function delivers the number of characters included in the text string of input ***In*** to output ***Out***.

Example:



The length of the text string Hallo Welt will be saved to MyMemory. These are exactly 10 characters!

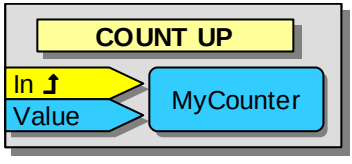
Counter

This chapter deals with the integrated counters.

To insert a counter choose Flow/Counter. The following dialogue will appear:

Counter: Count Up

Symbol:

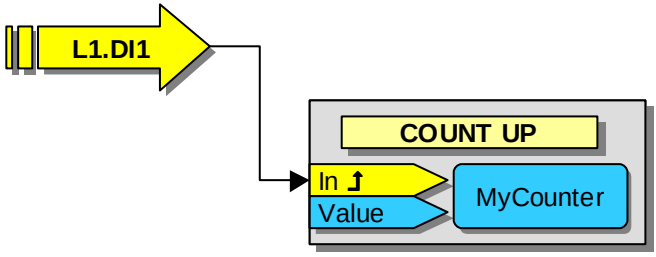


Data type: In Bit

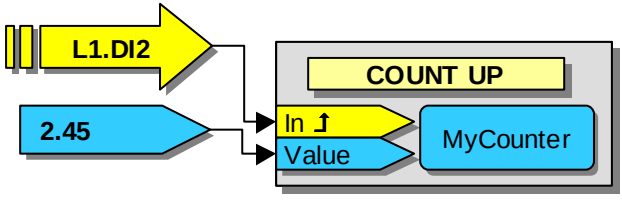
Value Analogue

Function: When input ***In*** reads a rising edge, this function adds the value ***Value*** to the value of the analogue memory MyCounter. The use of Input ***Value*** is optional. If the input ***value*** remains unused, the value 1.000 will be added.

Example:



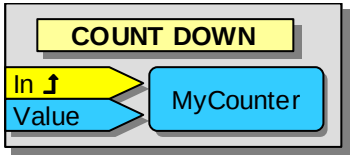
Every time digital input L1.DI1 detects a rising edge, the analogue memory MyCounter will be increased by one.



Every time digital input L1.DI2 detects a rising edge, the value 2.45 will be added to MyCounter.

Counter: Count Down

Symbol:

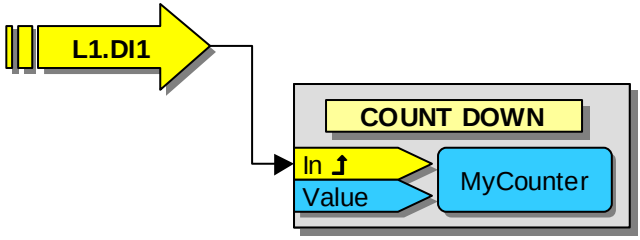


Data type: In Bit

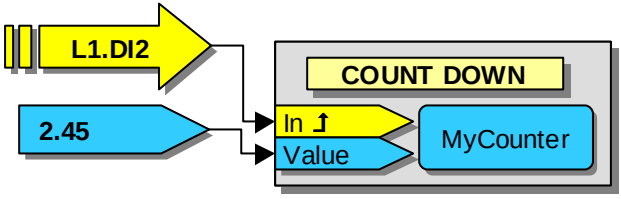
Value Analogue

Function: When input ***In*** reads a rising edge, this function subtracts the value ***Value*** from the value of the analogue memory MyCounter. The use of Input ***Value*** is optional. If the input ***value*** remains unused, the value 1.000 will be subtracted.

Example:



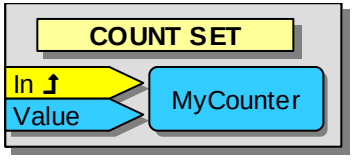
Every time digital input L1.DI1 detects a rising edge, the analogue memory MyCounter will be reduced by one.



Every time digital input L1.DI2 detects a rising edge, the value 2.45 will be subtracted from MyCounter.

Counter: Count Set

Symbol:

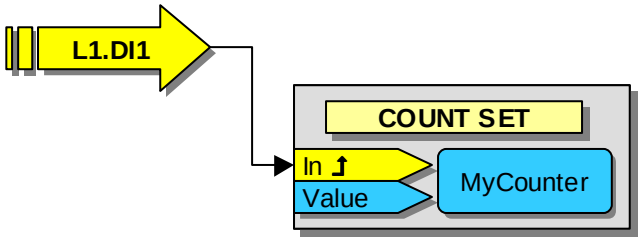


Data type: In Bit

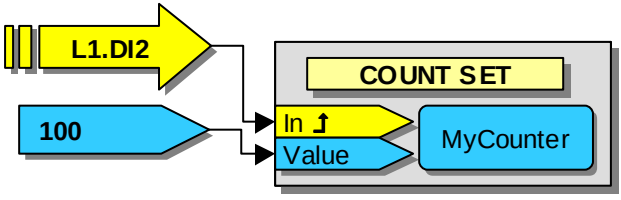
Value Analogue

Function: If input ***In*** detects a rising edge, the analogue memory MyCounter will be set to value ***Value***. Input ***Value*** is optional. If it stays unused the value 0.000 will be set.

Example:



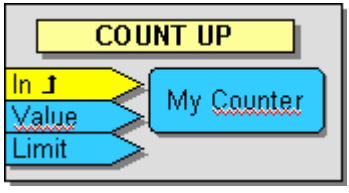
Every time digital input L1.DI1 detects a rising edge, the analogue memory MyCounter will be reset to 0.



Every time digital input L1.DI2 detects a rising edge, the analogue memory MyCounter will be set to 100.000.

Counter: Count up with limit

Symbol:

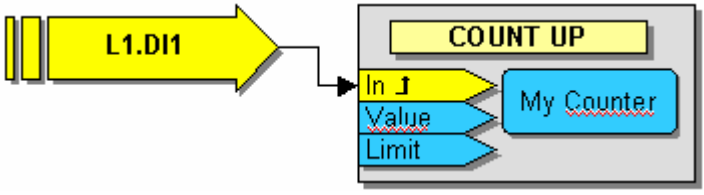


Data type:	In	Bit
	Value	Analogue
	Limit	Analogue

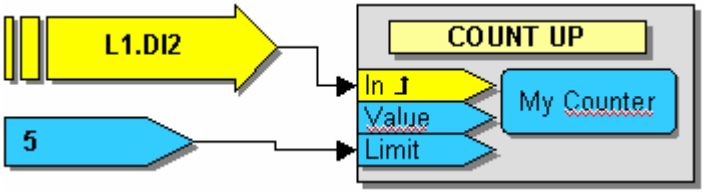
Function: If input ***In*** detects a rising edge, the value ***Value*** will be add to the analogue memory My Counter. Input ***Value*** is optional. If it stays unused the value 1.000 will be added.

The process can be repeated as long as the ***Limit*** for the analogue input is reached. If the ***Limit*** stays unused, no limit will be set.

Example:



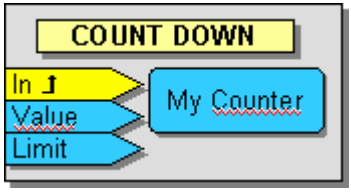
Every time a rising edge is detected at digital input L1.DI1 the analogue memory MyCounter will be increased by one.



With every rising edge at digital input L1.DI2 the value 1 will be added to MyCounter, as long as MyCounter reaches the value 5.

Counter: Count down with limit

Symbol:

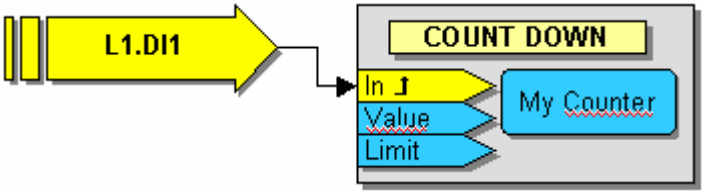


Data type:		
	In	Bit
	Value	Analogue
	Limit	Analogue

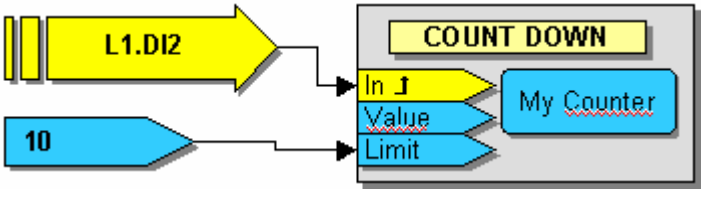
Function: With every rising edge at input ***In*** the value ***Value*** will be subtracted from MyCounter. The input ***Value*** is optional.

If it stays unused the value 1.000 will be subtracted. The process can be repeated as long as the Limit for the analogue input is reached. If the Limit stays unused, no limit will be set.

Example:



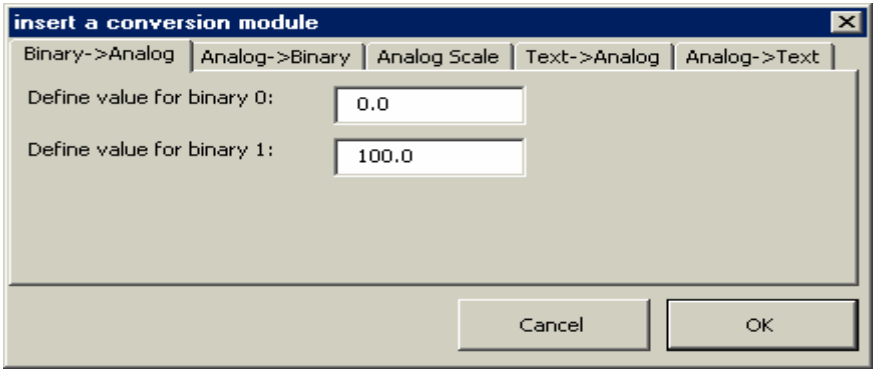
Every time a rising edge is detected at digital input L1.DI1 the analogue memory MyCounter will be lowered by 1.



With every rising edge at digital input L1.DI2 the value 1 will be subtracted from MyCounter as long as MyCounter reaches the value 10.

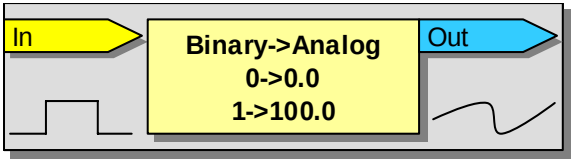
Conversion

This chapter deals with commands, which can be used for the conversion of data. Choose Flow/Conversion from the menu. The following dialogue will occur:



Conversion: Binary->Analogue

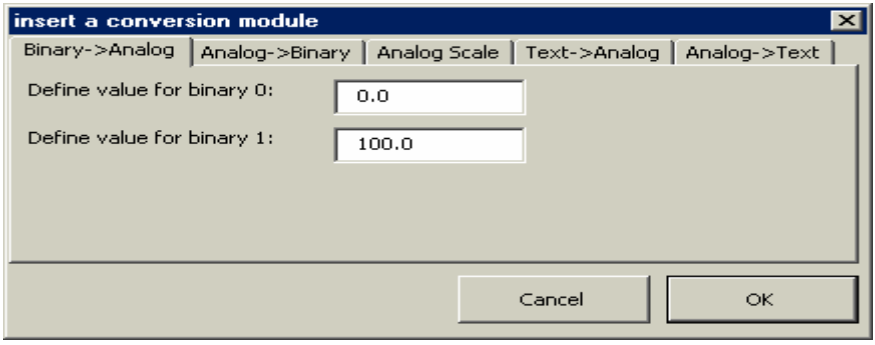
Symbol:



Data type: In Bit

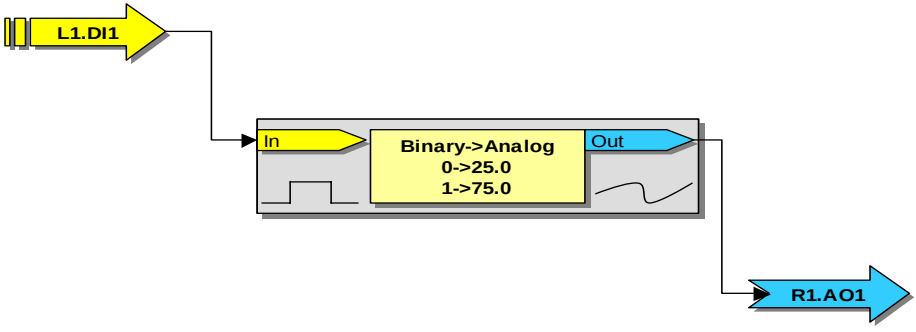
Out Analogue

Dialogue:



Function: This function converts a binary value to an analogue value. For this you can select the analogue values, which represent binary status 0 and 1.

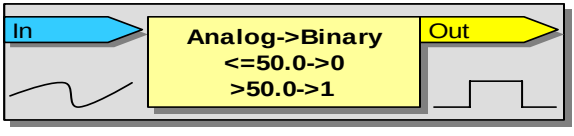
Example:



If digital input L1.DI1 receives no signal, analogue output R1.AO1 is at 25%. If the digital input receives a signal, the analogue output will be at 75%.

Conversion: Analogue->Binary

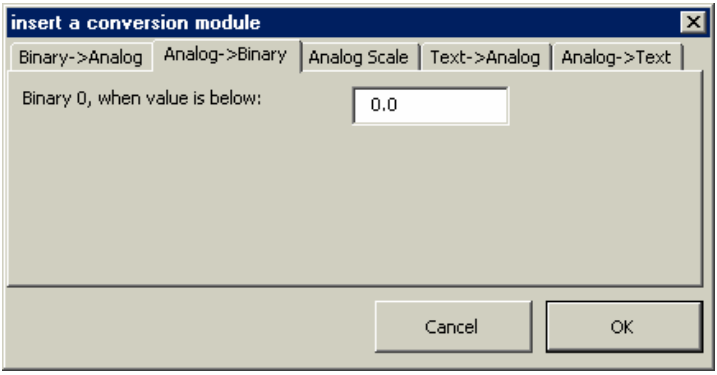
Symbol:



Data type: In Analogue

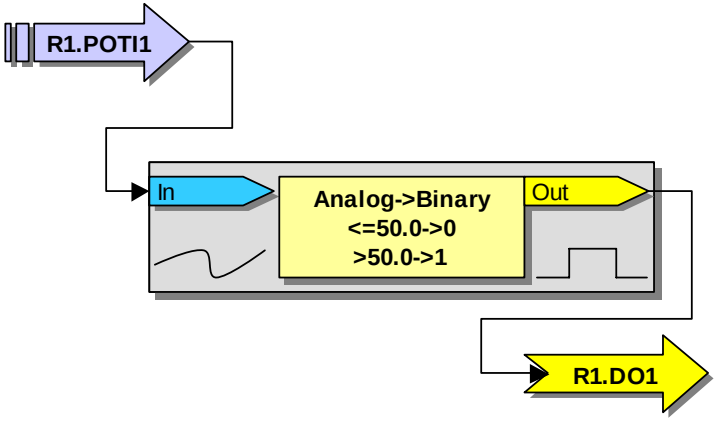
Out Bit

Dialogue:



Function: This function converts an analogue value to a binary value. For this the analogue value will function by using a threshold. If the existing analogue value at input ***In*** is below the threshold or exactly on the threshold value (for example 50.0), output ***Out*** will deliver the binary value 0. If the input value is above the threshold, the binary value 1 will be delivered.

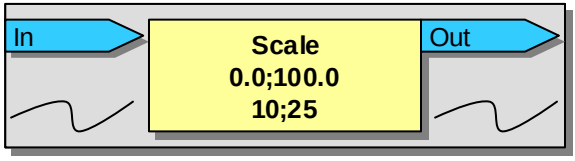
Example:



If the value set at potentiometer R1.POTI1 is below or equal 50.0, digital output R1.DO1 will be switched off. If the value is higher than 50%, the digital output will be switched on.

Conversion: Analogue Scale

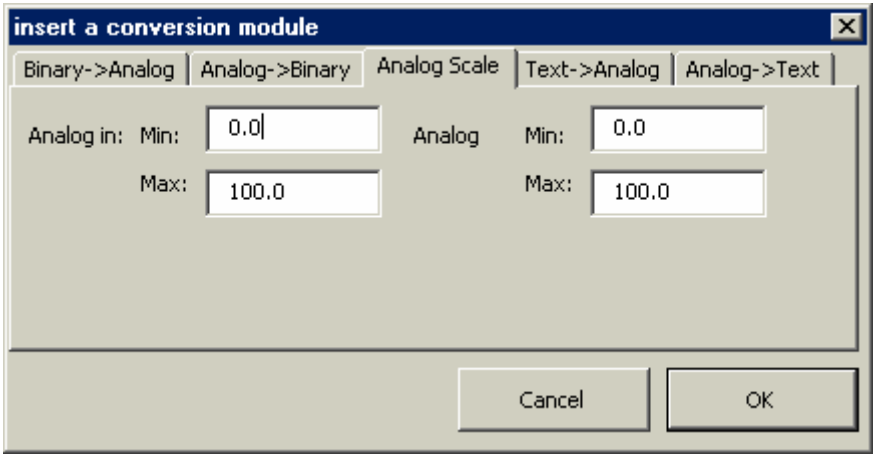
Symbol:



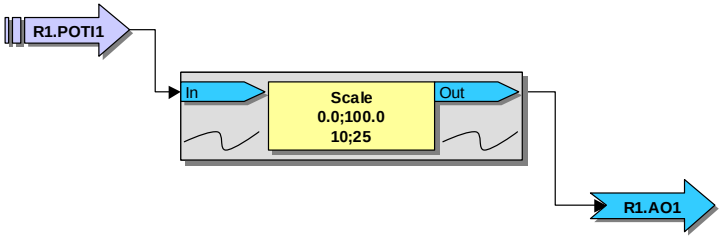
Data type: In Analogue

Out Analogue

Dialogue:



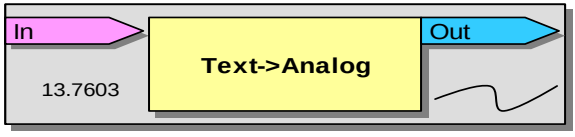
Function: This function converts the analogue input signal that is within the input range (0.0-100.0) to the analogue output signal with a different output range (10.0-25.0).



If potentiometer R1.POTI1 has the value 0%, the value 10% will be transmitted by analogue output R1.AO1. If the potentiometer has the value 100%, the value 25% will be transmitted by the analogue output.

Conversion: Text->Analogue

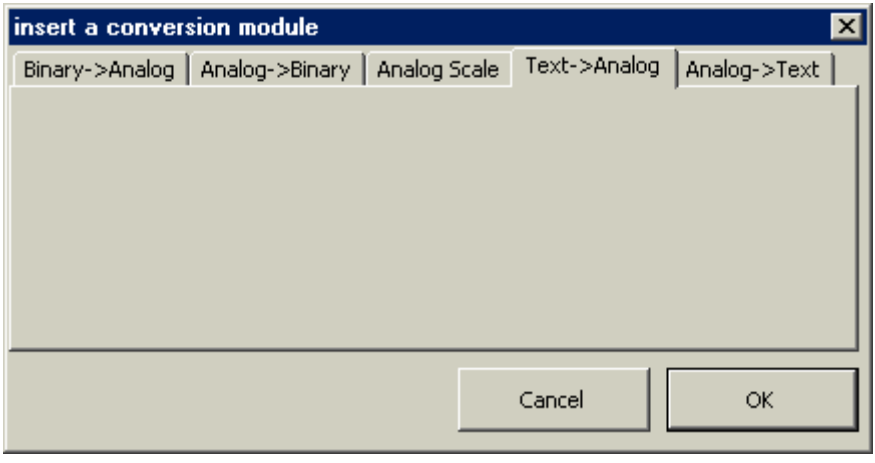
Symbol:



Data type: In Text

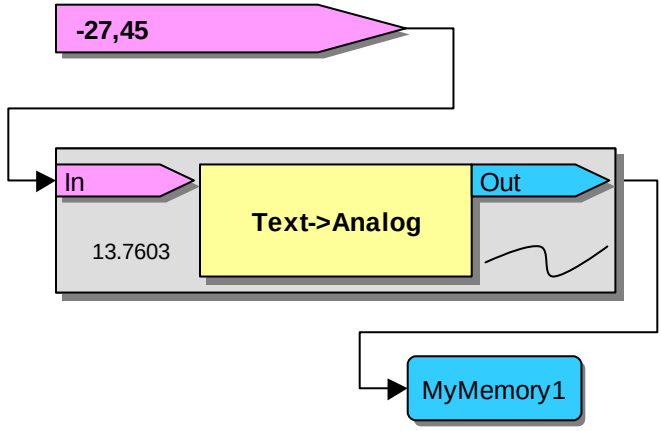
Out Analogue

Dialogue:

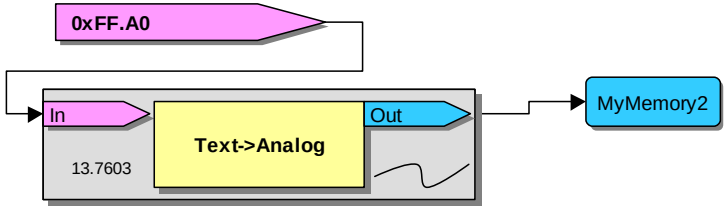


Function: This function converts a text string at input ***In*** to a corresponding analogue value at output ***Out***.

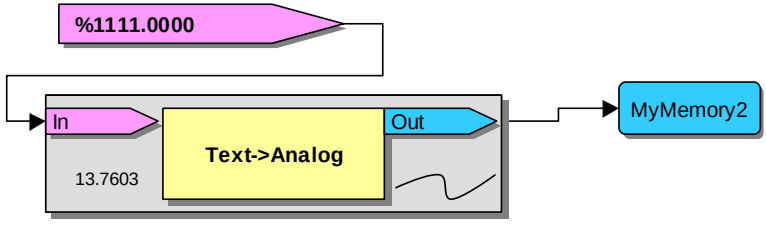
Example:



Here, the constant –27,45 will be converted to a corresponding analogue value.



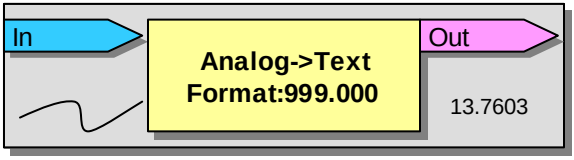
This function supports hexadecimal numbers (as the analogue constants). Take a look at the example above. The spelling of the numbers corresponds to the terms set with the analogue constants.



Binary numbers will be changed as well. The spelling of the numbers corresponds to the terms set with the analogue constants.

Conversion: Analogue->Text

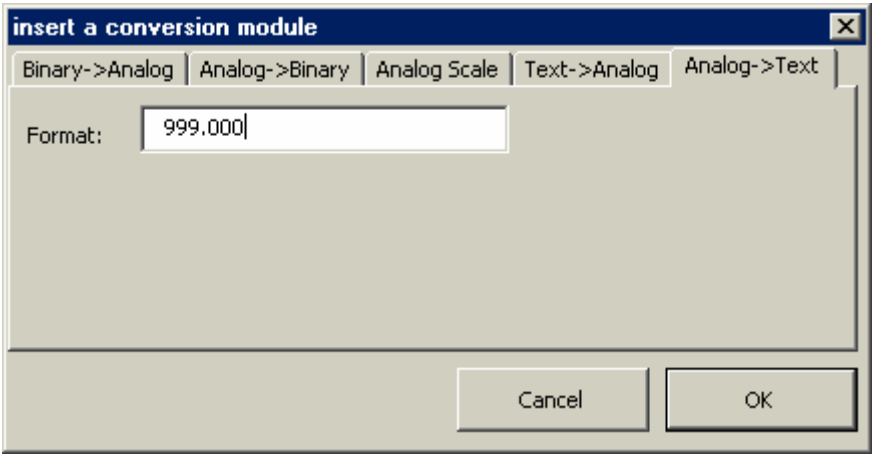
Symbol:



Data type: In Analogue

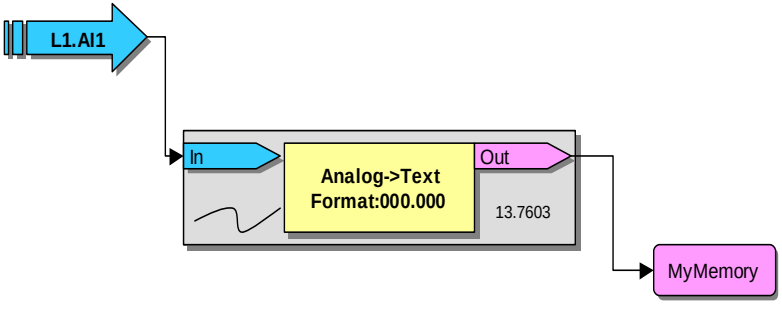
Out Text:

Dialogue:



Function: This function changes the analogue input signal into a formatted text value. For this the adjusted format will be used. Also refer to chapter format characters.

Example:



The current value of analogue input L1.AI1 would be converted to a text string by using the format 000.000. The string will be saved to MyMemory.

For an explanation of formatting of characters see next page

Format characters

Many functions of SLS-500-Configurator use format characters for the display of analogue values. The following characters are available:

0 Signals a place of the decimal number or a leading 0

9 Signals a place of the decimal number or a leading blank space

. Signals the decimal point

_ Signals a place of the decimal number or a leading underscore character

Examples Look at the results of the analogue number 123.456 by using the following formats:

999.000 -> „123.456“

999.999 -> „123.456“

9999.99 -> „1234.56“

00000.000 -> „00123.456“

99999.000 -> „ 123.456“

_____.000 -> „__123.456“

Formats for analogue input return the following results:

#D for the date with the format TT.MM.YY

#T for the time with the format HH:MM:SS

#t for the time with the short format HH:MM

#W for the weekday with the format WWW

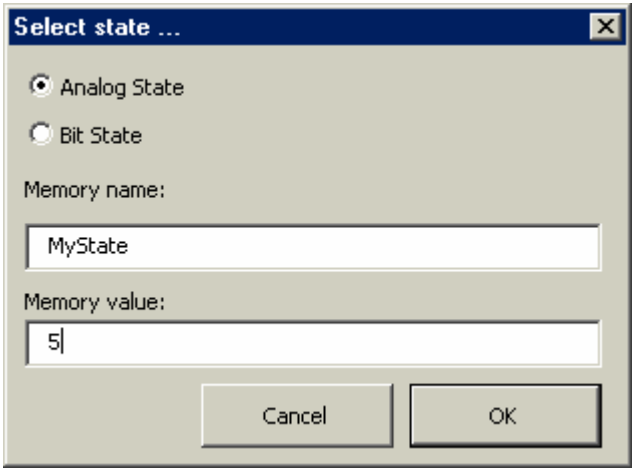
#w for the weekday with the format WW

#A for ASCII format

States

This chapter deals with states and its use with the software. To add a new state choose Flow/State. The following dialogue will open up:

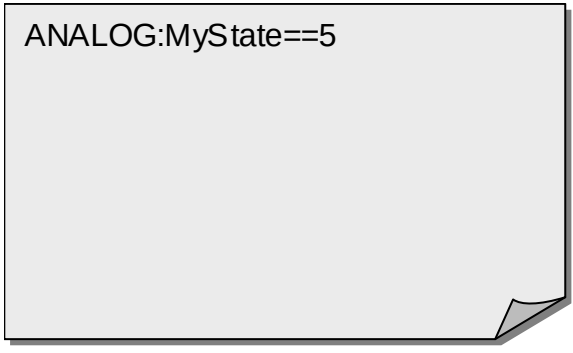
State: Select alternative function state



You can set an analogue or digital memory name and define a constant value. Additionally you can choose whether you refer to an analogue or to a binary memory. Click OK and a frame will be imported into the current page:

Analogue state frame

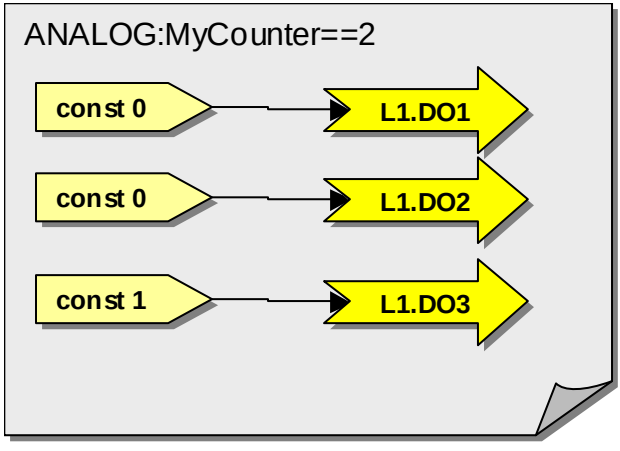
Symbol:



Data type: Analogue

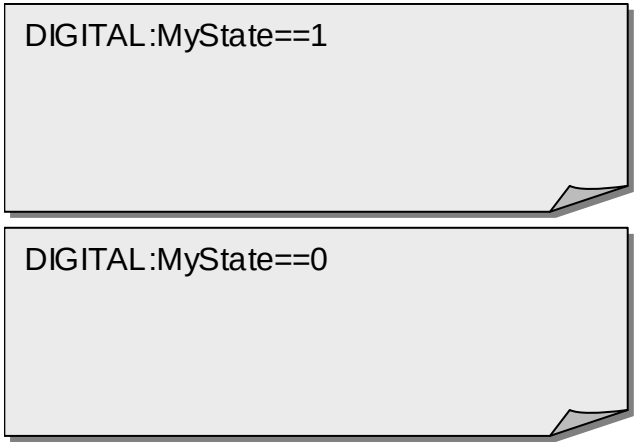
Function: Only objects, which are within this state frame, will be executed when required if the analogue memory MyState has the value 5. The effect within SLS500 is that the program parts, which are not required at this time, will be bypassed. As a result the speed of the SLS500 program can be significantly increased!

Example:



If the analogue memory My Counter has the value 2, digital outputs L1.DO1, L1.DO2 and L1.DO3 will be set to the values 0,0,1. If MyCounter is unequal 2, no command will be executed.

Binary state

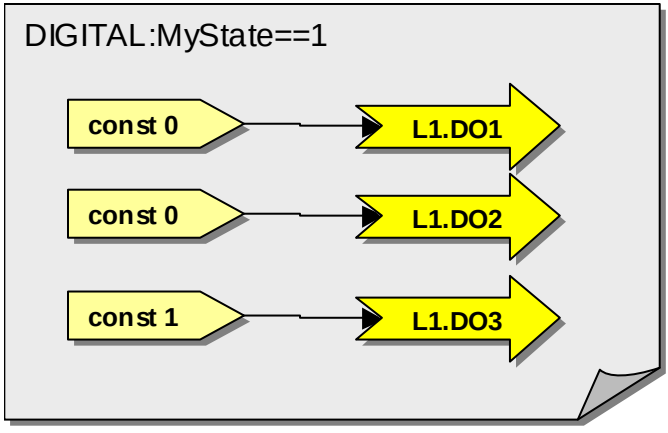


Symbol:

Data type: Bit

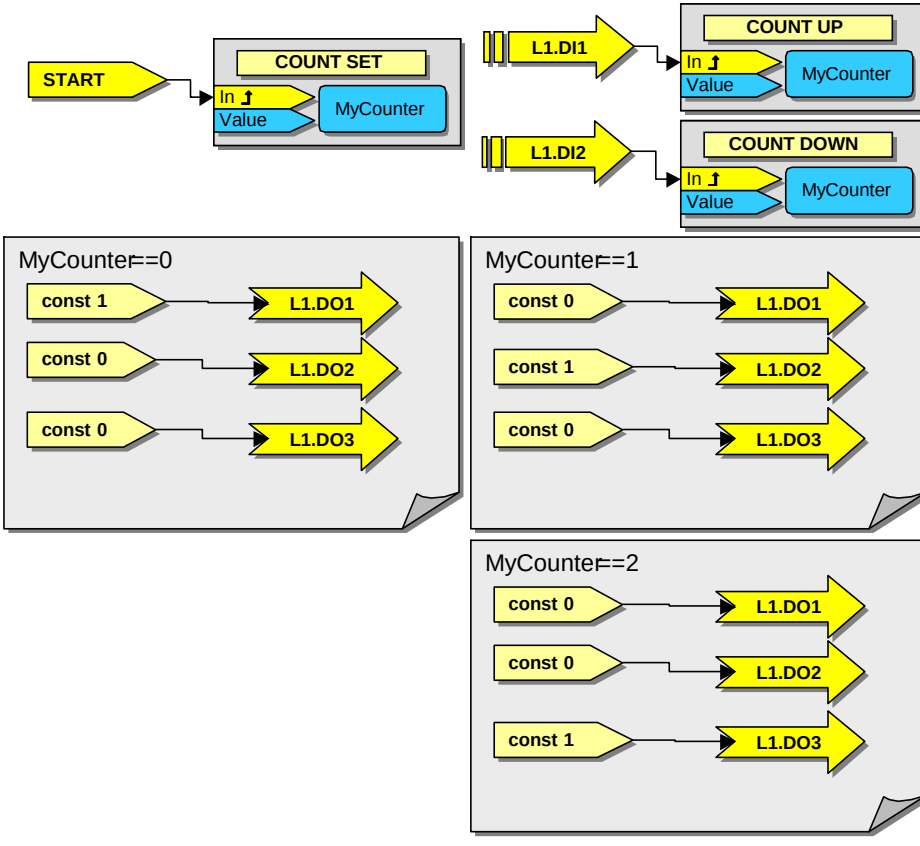
Function: Only objects, which are within the state frame, will be executed if the binary memory MyState has the value 0 or 1. The effect within SLS500 is that the parts of the program that are nor required will be bypassed. As a result the speed of the SLS500 program can be significantly increased!

Example:



If the binary memory MyState has the value 1, digital outputs L1.DO1, L1.DO2 and L1.DO3 will be set to the values 0,0,1. If MyState is equal 0, no command will be executed.

Example: STATE - Select alternative function



Process: If digital input L1.DI1 has a rising edge the analogue memory MyCounter will be increased be 1. If digital input L1.DI2 has a rising edge the analogue memory MyCounter will be reduced by 1.

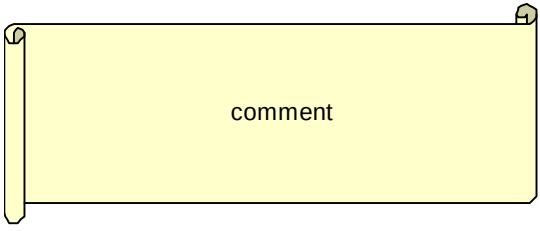
If MyCounter has the value 0, only output L1.DO1 will be energised. If MyCounter==1, the output L1.DO2 will be energised. If MyCounter==3, the output L1.DO3 will be energised. For all other values there will be no action.

Comments

While compiling the program, SLS-500-Configurator ignores any PowerPoint objects, which were not added by using the SLS-500-Configurator menu bar. However the SLS-500-Configurator bar also offers a comment object: Choose Flow/Comment from the menu

Insert comment

Symbol:



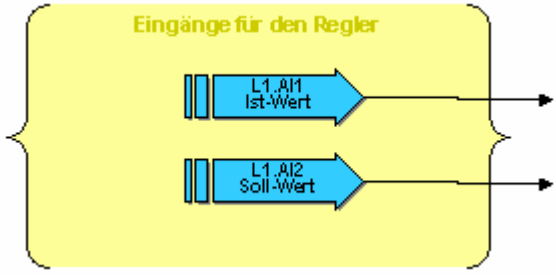
Function: Adds a comment to the current program page. Click on the text, and type in a desired comment! You can insert as many comments as desired. The comments will be ignored at program creation.

Symbolic groups

Basically SLS-500-Configurator ignores all PowerPoint objects, which have not been put in by the SLS-500-Configurator menu bar, while translating the program. The object for group creation is also available in the SLS-500-Configurator bar: Choose Symbolic group from the menu.

Create symbolic groups

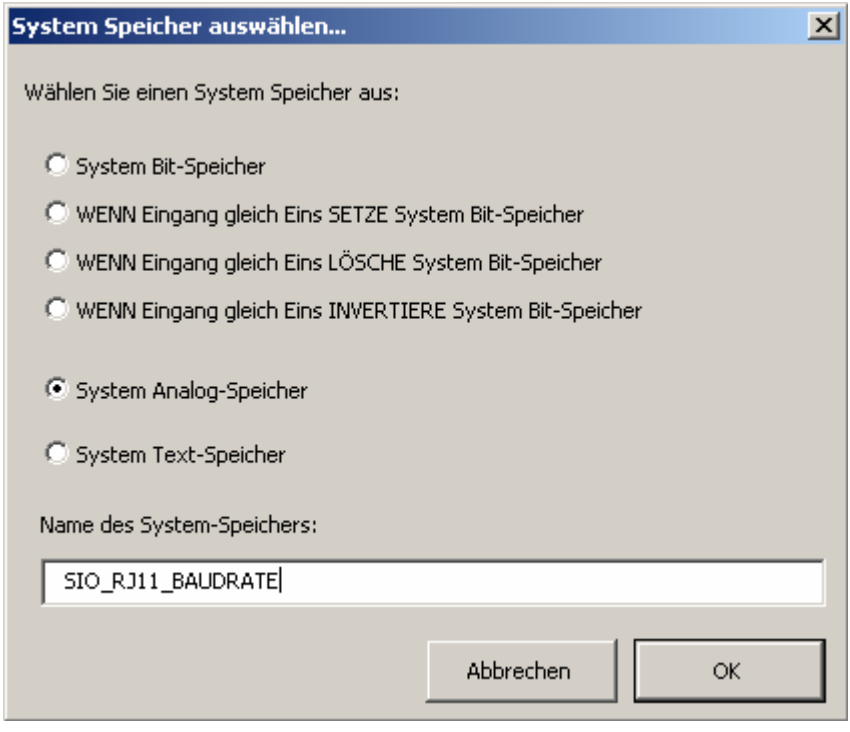
Symbol:



Function: Inserts a background to the current program page. Click on the text and type in the desired title for the group! Now drag and drop those objects, which should build one group into the field. You can create as many symbolic groups as you want on one page. Nothing will change in the program creation.

System memory

This chapter deals with the system memory and its use in your software. The system memory can store values of the three data types. Every memory has an own name and is for a certain setting. To insert a system memory, select System from the menu. The following mask will appear:



Type in a memory name corresponding to the system memory name list here to insert the memory into the program. Additionally you can choose whether to refer to an analogue-, binary- or text-memory. To insert the memory click the OK button.

System: Binary memory

Symbol:

Data type: Bit

Function: The binary system memory can store one Bit.

Example:

The constant value 1 will be moved to the system memory SYS_START.

System: IF input is One SET binary memory

Symbol:

Data type: Bit

Function: Memory SYS_START will be reset to 1 if the input of the binary system memory is 1.

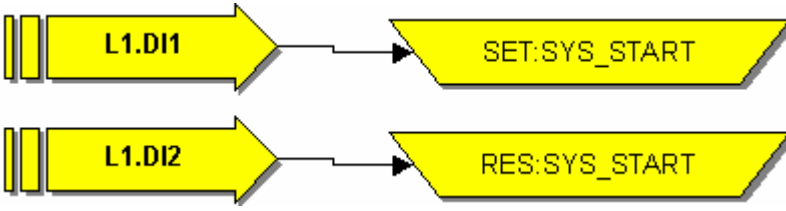
System: IF input is One DELETE binary memory

Symbol:

Data type: Bit

Function: Memory SYS_START will be reset to 0 if the input of the binary system memory is 1.

Example:



If digital input L1.DI1 is operated, the binary system memory SYS_START will be set to 1. This state of SYS_START stays active as long as input L1.DI2 will be activated momentary. SYS_START will then reset to 0.

System: IF input is One INVERT binary memory

Symbol:

Data type: Bit

Function: The current content of SYS_START will be inverted if the input of the binary system memory is 1.

Example:

The value of SYS_START will be inverted every minute.

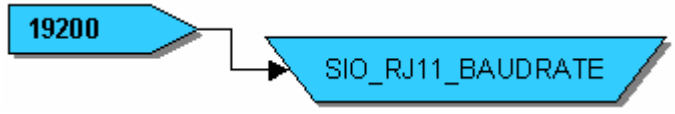
System: Analogue memory

Symbol: 

Data type: Analogue

Function: The analogue memory can store an analogue value.

Example:



The constant value 19200 will be moved to the analogue system memory SIO_RJ11_BAUDRATE.

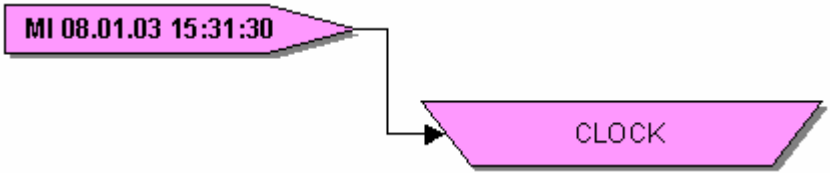
System: Text memory

Symbol: 

Data type: Text

Function: The text memory can store a text value.

Example:



The constant value „MI 08.01.03 15:31:30“ will be moved to text memory CLOCK.

!Important!: Mind the character string and the character length when entering the characters! Also blank character will be considered.

System: System variable table

All names of the system memory have to by used with the same format as in the table for programming. That means that all characters have to type in with block capitals. Mind the gap and the underlines!

Data type	Name	Example	String-length
binary	ENCODER_XY	1 or 0	1
binary	PWM	1 or 0	1
binary	ENCODER	1 or 0	1
analogue	SYS_CYCLETIME		
analogue	SYS_SYSTIME		
analogue	SYS_CYCLEMAX		
analogue	SYS_SYSMAX		
analogue	SIO_RJ11_BAUDRATE	19200	max. 5
analogue	ENCODER_X		
analogue	ENCODER_Y		
analogue	PWM_DO1		
analogue	PWM_DO2		
analogue	PWM_DO3		
analogue	PWM_DO4		
analogue	PWM_DO5		
analogue	PWM_DO6		
analogue	ENCODER		
analogue	COUNTER_A		
analogue	COUNTER_B		
analogue	SPEED_A		
analogue	SPEED_B		
text	CLOCK	WE 08.01.03 15:31:30	20

Incremental Encoder

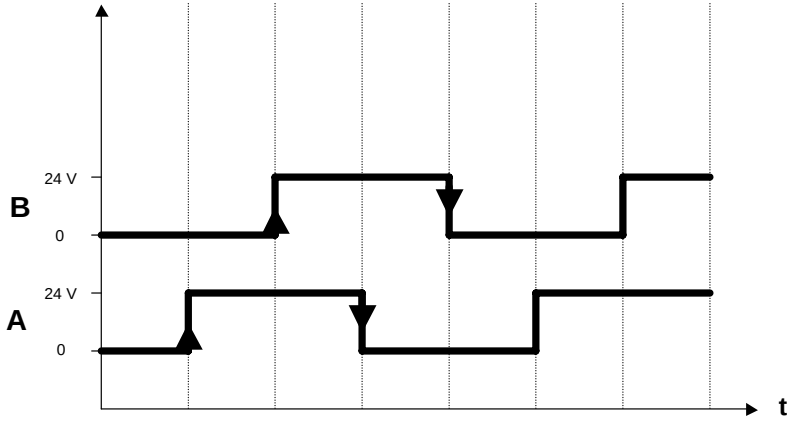
The Models HIQUEL-SLS500-R-24V and HIQUEL-SLS500-S-24V use digital inputs Di5-Di8 to receive the signal from the incremental encoder/s The models HIQUEL-SLS500-R-24V and HIQUEL-SLS500-S-24V can each have two incremental encoders connected (Di5/6 – Di7/8).

The Incremental Encoder

An Incremental Encoder transmits signals over two wires. These are called channel A and channel B. The speed of the incremental encoder in which the impulses are sent, is called “Line”.

To process quires a procedure, which transforms the impulses to a position.

This procedure is called „4-times evaluation“, or “quadrature control”.



In the diagram A and B represent the two channel inputs from an Encoder. The „quadrature control“ gives information about the direction and the actual position of the encoder.

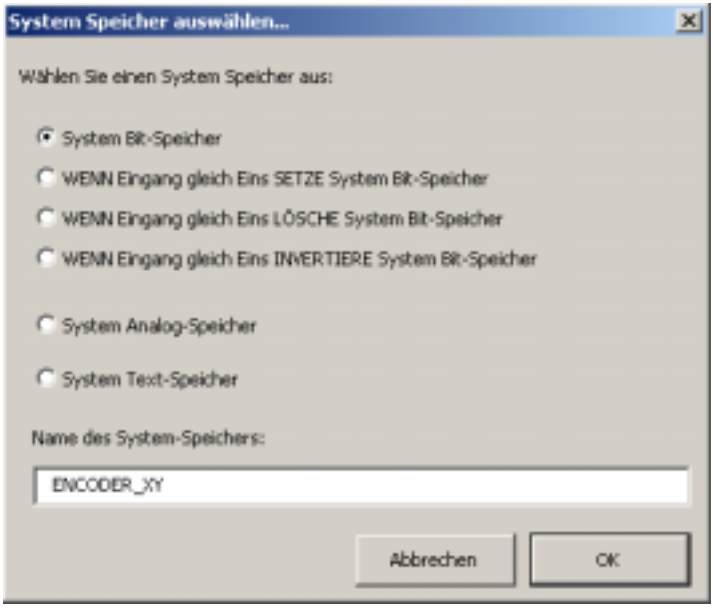
e. g. The encoder has a resolution of 1000 lines, then it is sending 1000 A impulses and 1000 B impulses per revolution. The SLS-500 is converting this into 4000 impulse internally, A and B rising edge and A and B falling edge impulses. Therefore SLS-500 processes 1 encoder revolution into 4000 impulses

NOTE The HIQUEL-SLS-500-Base controller can process 5000 edges per second maximum, combined Di´s 5-8 (2 encoders)

Programming an incremental encoder

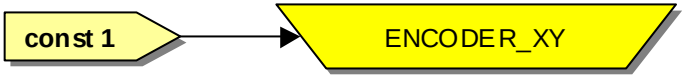
In SLS-500-Configurator, encoders are initialised on a binary system variable which is set to 1 using a bit-constant. This binary system-variable must only have the name „ENCODER_XY“ This is case sensitive.

Select System from the menu “Flow > System. The following box will appear:



From the list select „System binary Memory“ and in the box type „ENCODER_XY“ then click OK.

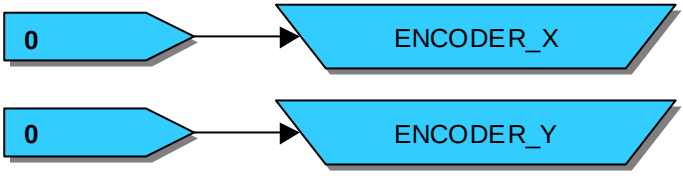
Symbol:



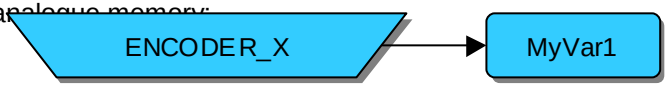
Data type: Bit

When the binary-system-variable is initialised, you must set the analogue-system-variable „ENCODER_X“ and „ENCODER_Y“ to 0 to delete them. In contrast to „ENCODER_XY“ this is not a binary-system-variable but an analogue-system-variable. The input is case sensitive. (ENCODER_X, ENCODER_Y)

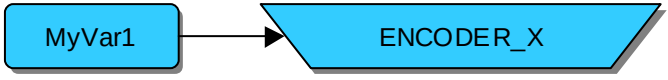
Here they are set to 0:



The value of a incremental encoder could also be stored in an analogue memory:



An incremental-encoder could also be set to a certain value:

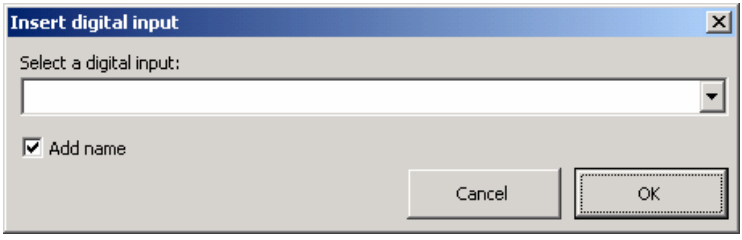


I/O

Group I/O contains all functions, which deal with the pasting of digital or analogue inputs or outputs. The following chapter will explain the use of inputs and outputs of SLS-500-Configurator.

I/O: Digital Inputs

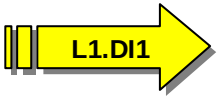
Choose I/O/Digital inputs from the menu. The following dialogue will be opened:



Choose a digital input by using the drop down menu and confirm by clicking OK. Activate ***Add name*** to add the variable name to the symbol. If ***Add name*** is not active, just the digital input symbol with its address (L1 DI1) will be displayed.

IMPORTANT Before you can choose a digital input, you have to create a regular system configuration in page CONFIG first!

Symbol without ***Add name***:



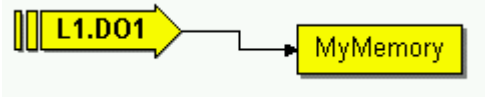
Symbol, ***Add name*** is active:

Data type: Bit

Function: This function adds a digital input. Digital inputs can be a starting point of connections. You will also find all digital outputs in the list to process the current status of the outputs.

Examples:

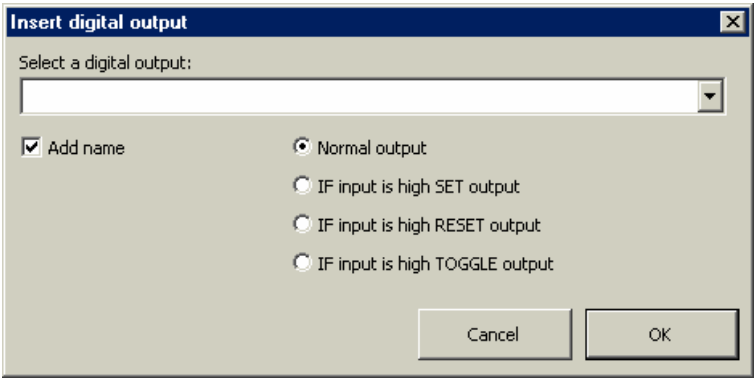
The current state of digital input L1.DI1 will be transmitted to the output.



The current state of digital output L1.DO1 will be transmitted to MyMemory.

I/O: Digital Outputs

Choose I/O/Digital outputs to get to the following dialogue:



Choose a digital output by using the drop down menu and confirm by clicking OK. Activate ***Add name*** to add the variable name to the symbol. If ***Add name*** is not active, only the digital output symbol with its address (L1 DO1) will be displayed.

Additionally you can choose one of four functions of the output:

Normal output: The output always takes the value of the incoming connection.

SET output: When the connection is 1, the output will be set to High. When the connection returns to 0, the value of the output stays unchanged.

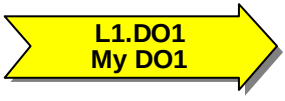
RESET output: When the connection is 1, the output will be set to Low. If the connection is 0, the value of the output stays unchanged.

TOGGLE output: When the connection is 1 for the first time, the output will energise. When the connection becomes 0, the output remains energised. When the connection is 1 for the second time the output de-energises. When the connection becomes 0 for the second time the output remains de-energised, and so on…… (Can be used as a bi-stable function)

IMPORTANT Before you can choose a digital input, you have to create a regular system configuration in page CONFIG first!

Symbol without Add name:

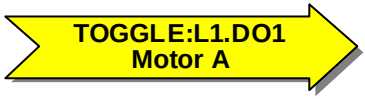
Symbol, Add name is active:



Symbol for function SET:

Symbol for function RESET:

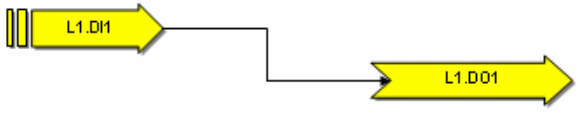
Symbol for function TOGGLE:



Data type: Bit

Function: This function adds a digital output. Digital outputs always display the end point of a connection. To get the current state of a digital output you have to choose the output from the list of the digital inputs.

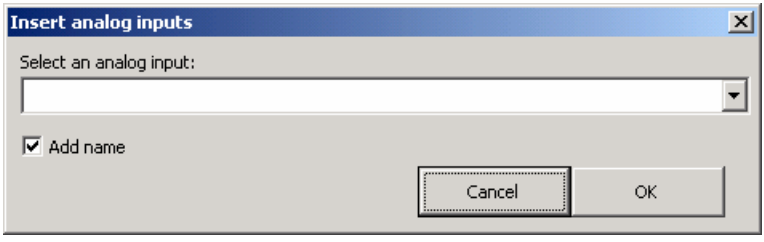
Example



The current state of the input is delivered to digital output L1.DO1.

I/O: Analogue Inputs

Choose I/O/Analogue inputs to get to the following dialogue:

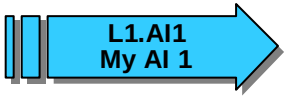


Choose an analogue input by using the drop down menu and confirm by clicking OK. Activate ***Add name*** to add the variable name to the symbol. If ***Add name*** is not active, just the analogue input symbol with its address (L1.AI1) will be displayed.

IMPORTANT Before you can choose an analogue input, you have to create a regular system configuration in page CONFIG first!

Symbol without ***Add name***:

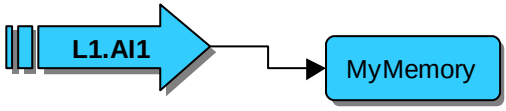
Symbol, ***Add name*** is active:



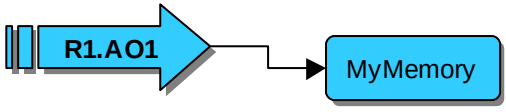
Data type: Analogue

Function: This function adds an analogue input. Analogue inputs are always the beginning of a connection. All analogue outputs are available as analogue inputs as well. All analogue signals are displayed between 0.000 and 100.000. As a result they display percentage value between 0% and 100%, independent of the true output value (0-10v/4-20mA) for example

Examples:



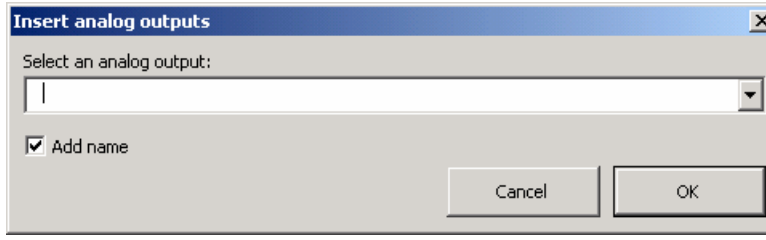
The current state of analogue input L1.AI1 will be delivered to the analogue memory MyMemory.



The current state of analogue output R1.AO1 will be delivered to the analogue memory MyMemory.

I/O: Analogue Outputs

Choose I/O/Analogue outputs from the menu to get to the following dialogue:

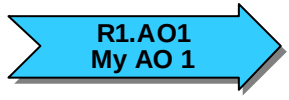


Choose an analogue output by using the drop down menu and confirm by clicking OK. Activate ***Add name*** to add the variable name to the symbol. If ***Add name*** is not active, just the analogue output symbol with its address (R1.AO1) will be displayed.

IMPORTANT Before you can choose an analogue output, you have to create a regular system configuration in page CONFIG first!

Symbol without ***Add name***:

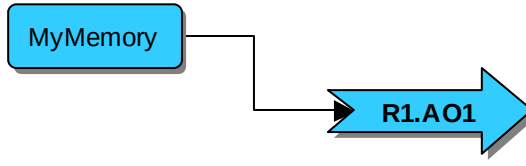
Symbol, **Add name** is active:



Data type: Analogue

Function: This function adds an analogue output. Analogue outputs always represent the end of a connection. All analogue outputs are available as analogue inputs as well. All analogue signals are displayed between 0.000 and 100.000. As a result they display the percentage between 0% and 100%, independent of the true output value (0-10v/4-20mA) for example

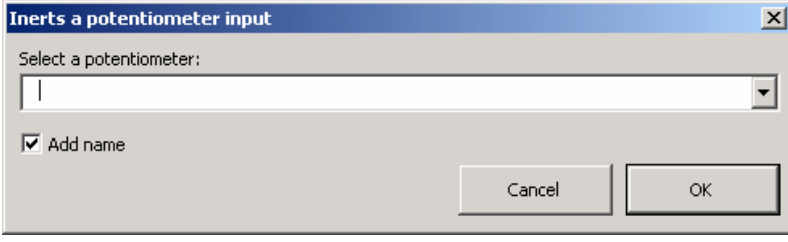
Example:



The current value of the analogue memory MyMemory will be delivered to analogue output R1.AO1.

I/O: Potentiometer

Choose I/O/Potentiometer from the menu to get to the following dialogue:



Choose a potentiometer by using the drop down menu and confirm by clicking OK. Activate ***Add name*** to add the variable name to the symbol. If ***Add name*** is not active, just the ***Poti*** symbol will be displayed together with its address (R1.POTI1).

IMPORTANT Before you can choose a potentiometer, you have to create a regular system configuration in page CONFIG first!

Symbol without ***Add name***:

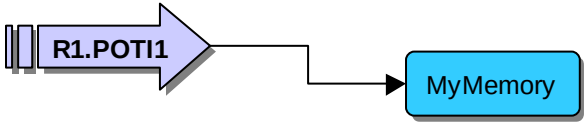
Symbol, **Add name** is active:

Data type: Analogue

Function: This function adds a potentiometer. Potentiometers always represent the beginning of a connection. All analogue signals

are displayed between 0.000 and 100.000. As a result they display the percentage between 0% and 100%.

Example:



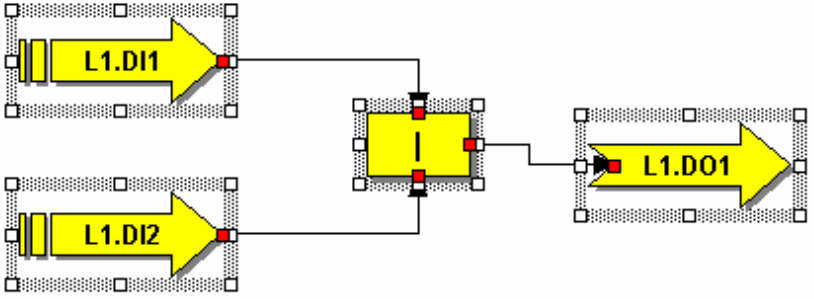
The current potentiometer value R1.POTI1 will be saved to MyMemory.

Groups

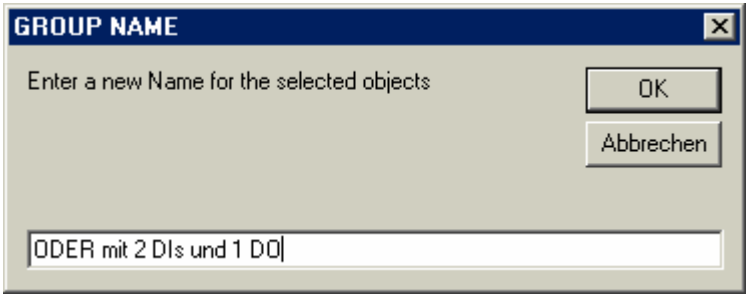
Groups are frequently used SLS-500-Configurator object and connection combinations that perform a commonly used control function. You can define a name for every group. You can add groups to the current page by using this name at any time. Groups are only available within the same project. You cannot take transmit the groups of one project to another!

Export groups

Mark one or several objects that you want to save as a group:



Next choose Group/Export from the menu to get to the following window:

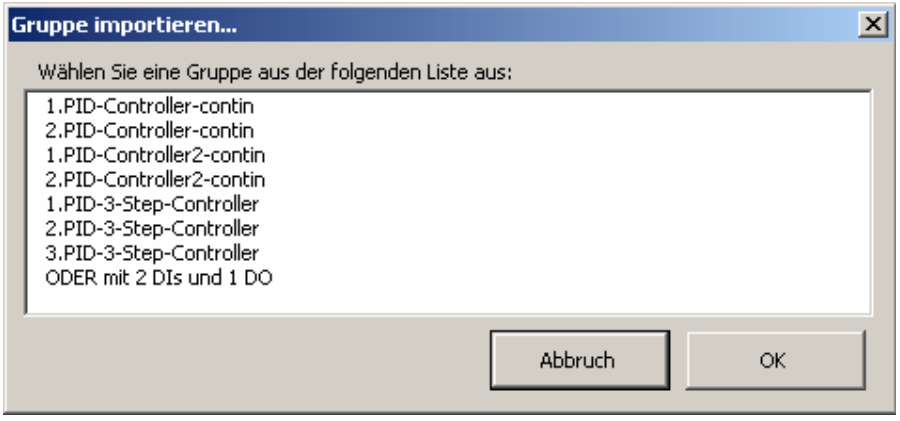


Now type in a new name for the group and press OK. The objects will be exported as a group.

Import groups

To import a previously saved group proceed as follows:

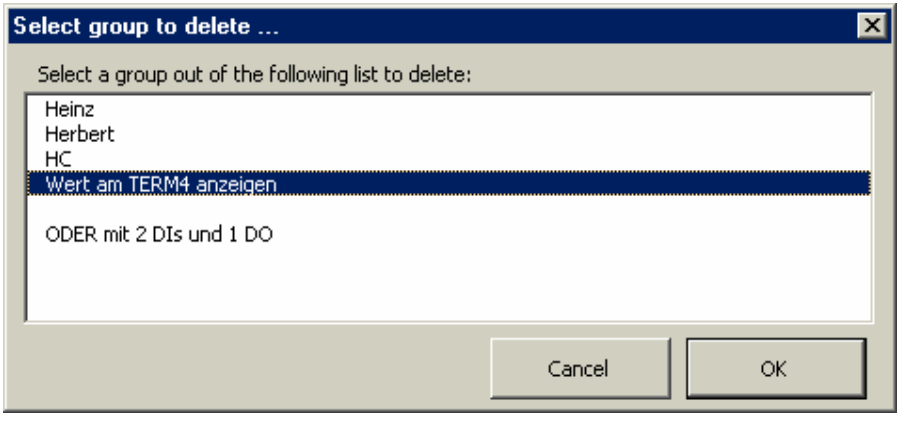
Choose Group/Import from the menu to get to the following list:



From the list choose which group you want to import and press OK. All objects of the group will be added to the current page and are available again available as single objects!

Delete groups

In order to delete a group choose Group/Delete from the menu to get to a list containing the available groups:

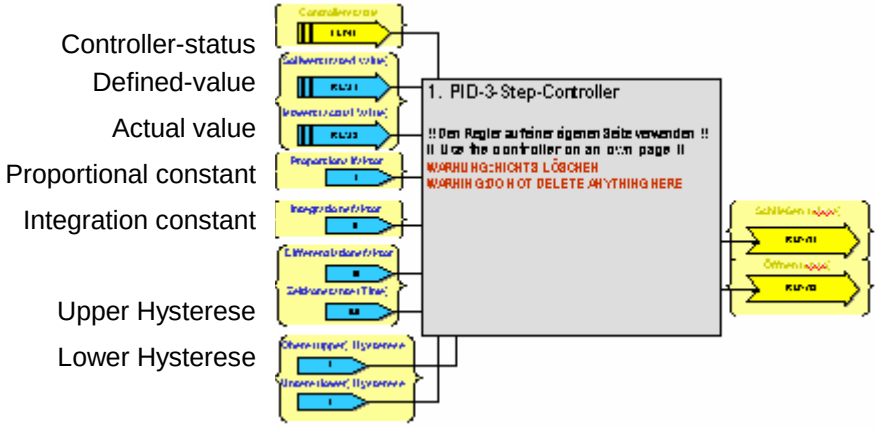


Choose the group you want to delete and confirm by clicking OK.

Adjust controller

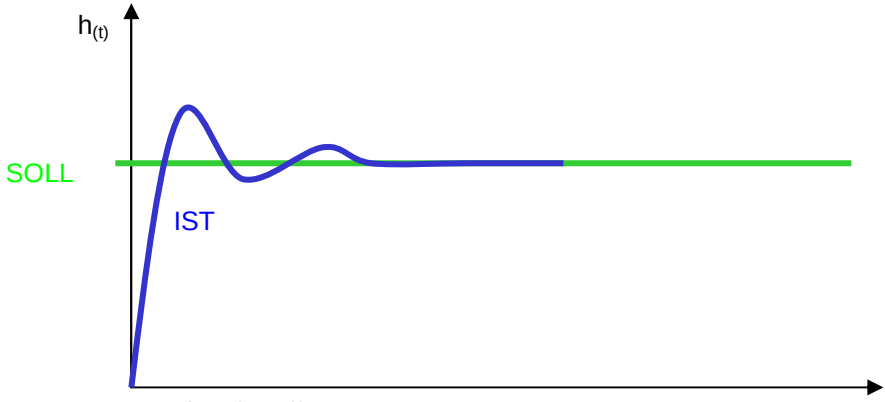
From the list choose which controller you want to import and press OK. All objects of the group will be added to the current page and are available again available as single objects!

!IMPORTANT!: All controllers from the list must be used on an own page. All inputs and outputs of the controller are variable.



The PID – Controller

This is DDC-Regulation (direct digital control) for performing the regulation-function mathematically in the SLS-500-Controller.
The function of a PID-Controller is to compare an actual value with a predefined value or with a value that is required to change according to time. If there is a difference between these two values, a proportional signal is generated which is used to reduce or eliminate the difference



Proportional – effect

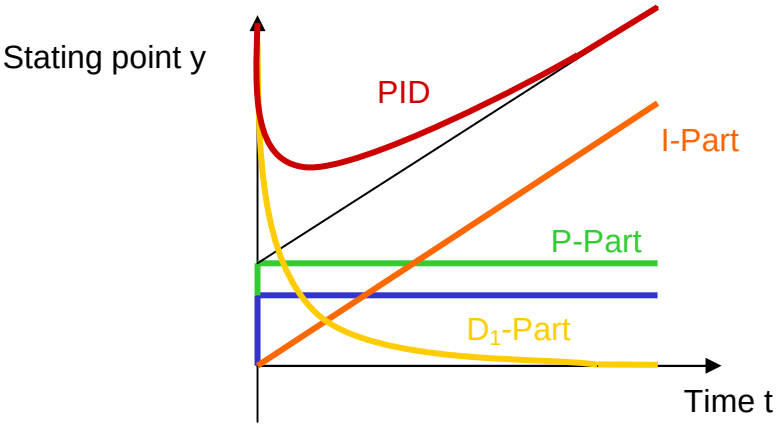
Integral – effect

Differential – effect

Transmission-function of a PID – controller

Different controlled materials react at different rates to heat change, this is why the controller should not change the proportional effect suddenly.

Therefore this controller would be realized with so called 2. term control. Using this 2. term regulation the function could be controlled through a adjustment of the proportional-factor to suit many controlled materials.



Each „Black-Box“ controller can only used once in a program. Therefore more than one controller of the same type are implemented in SLS-500-Configurator:

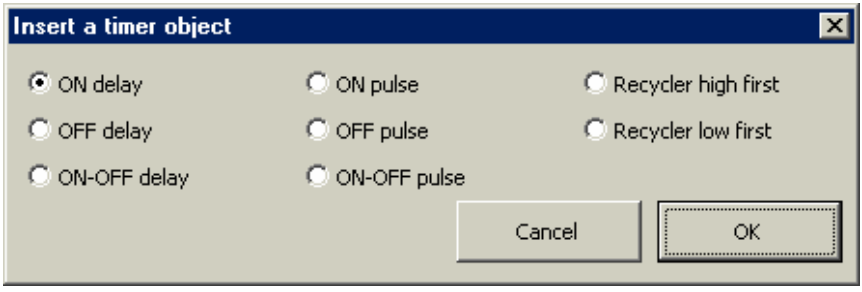
- 2 x PID-continuous-output
- 2 x PID2-continuous-output
- 3 x PID-3-Step-Controller

Objects

In the menu item Objects you can find a series of extra functions that can be used with SLS-500-Configurator.

Objects: Timer

Choose Timer from the menu to get to the following dialogue:

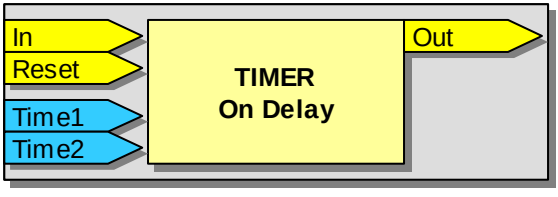


Now choose the desired timer module:

- ON delay: switch-on delay
- OFF delay: switch-off delay
- ON-OFF delay: switch-on/off delay
- ON pulse: pulse switch-on
- OFF pulse: pulse switch-off
- ON-OFF pulse: pulse switch-on/off
- Recycler high first: Flash with state 1 first
- Recycler low first: Flash with state 0 first

After confirming with OK you will get the following symbol:

Symbol:



Data type:	In	Bit
	Reset	Bit
	Out	Bit
	Time1	Analogue
	Time2	Analogue

Inputs: In: The chosen time function will be started if this input is active.

Reset: As soon as this input is high, the output will be reset to 0.

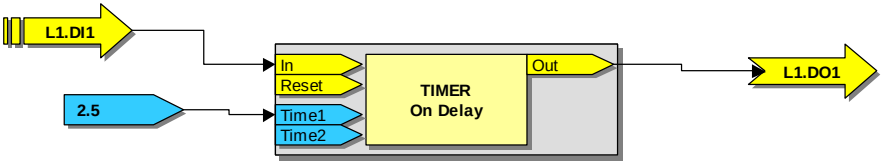
Out: The output of the time function. The output will change state in accordance with the time function

Time1: The first time of the timer in seconds.

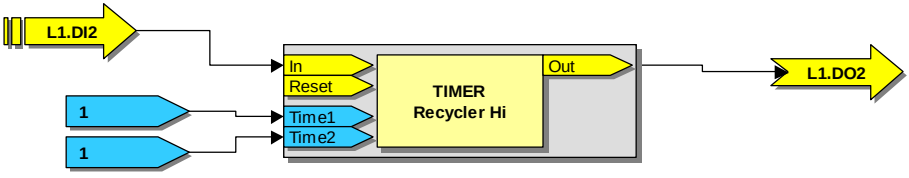
Time2: The second time of the timer in seconds. This time function is only required with Recycler high first and Recycler low first.

Time base: The time base of all timing functions is 100mS.

Example:

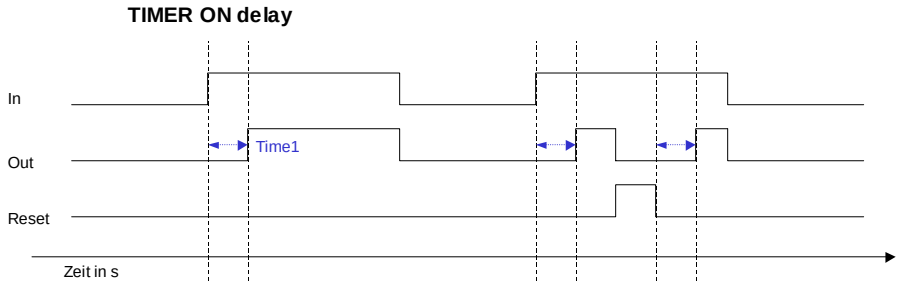


2.5s after activation of digital input L1.DI1, digital output L1.DO1 will become active too.

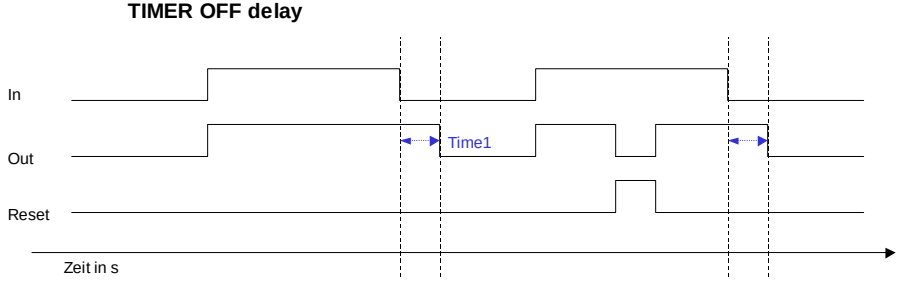


Digital output L1.DO2 will flash every second, as long as digital input L1.DI2 is active.

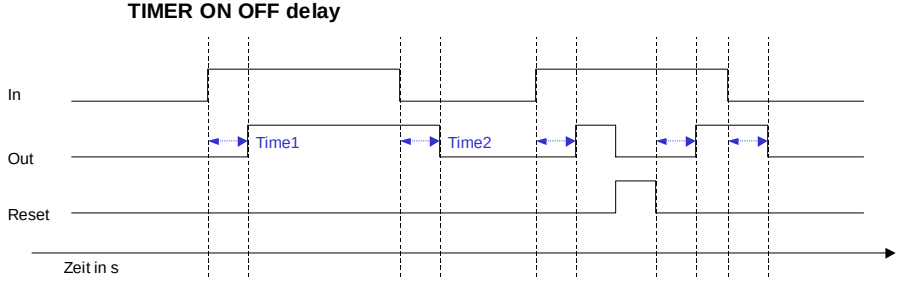
Objects: Timer: ON delay



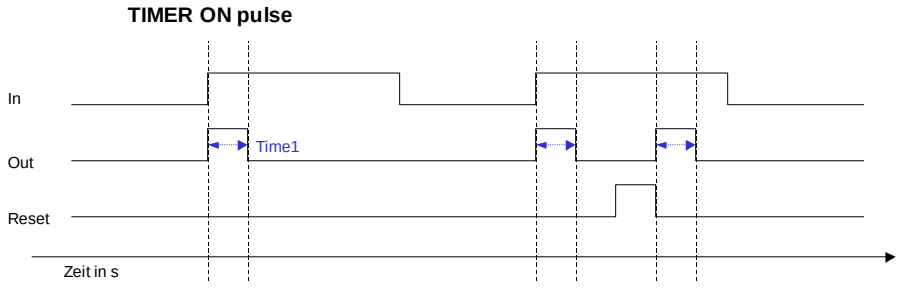
Objects: Timer: OFF delay



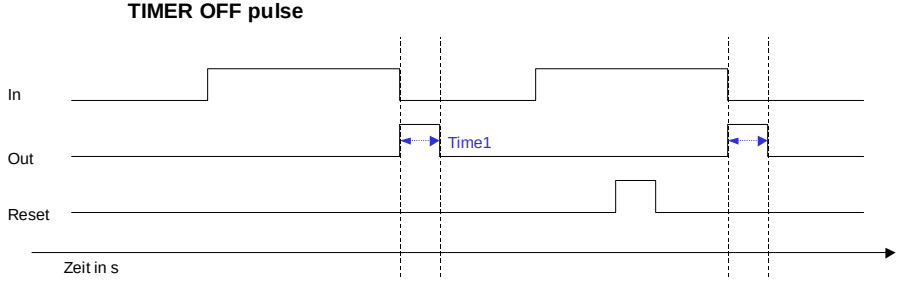
Objects: Timer: ON OFF delay



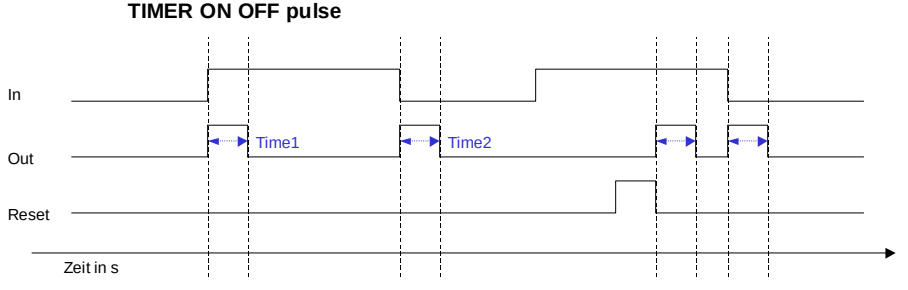
Objects: Timer: ON pulse



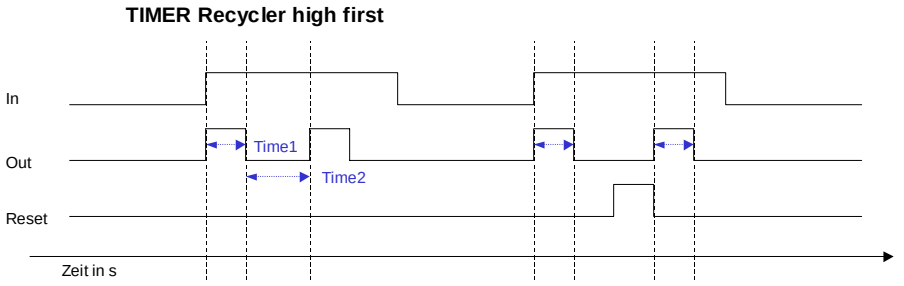
Objects: Timer: OFF pulse



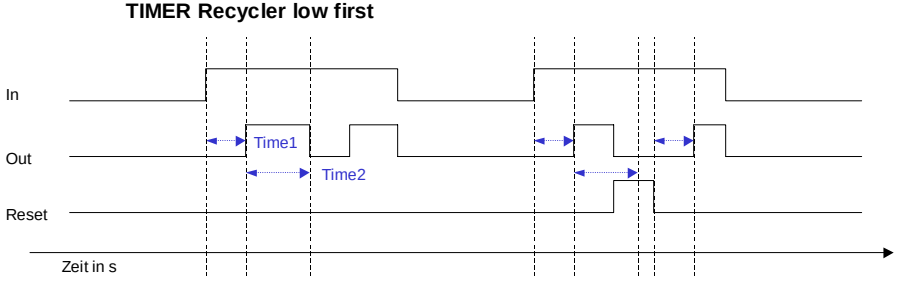
Objects: Timer: ON OFF pulse



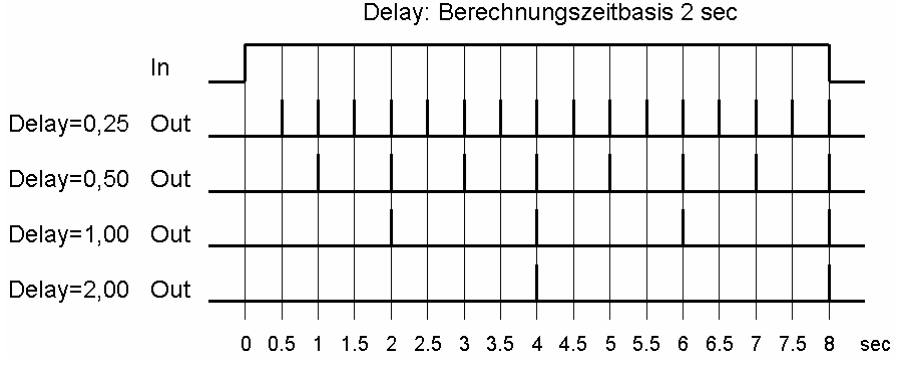
Objects: Timer: Recycler high first



Objects: Timer: Recycler low first



Objects: Timer: Delay

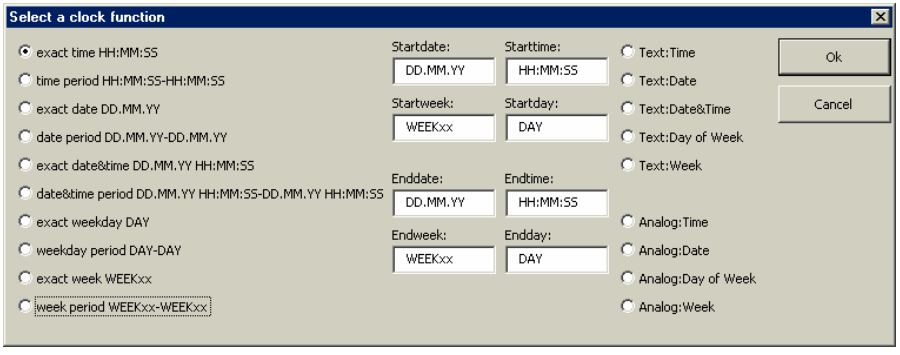


Real time clock

The following chapter deals with the functions of the integrated real time clock.

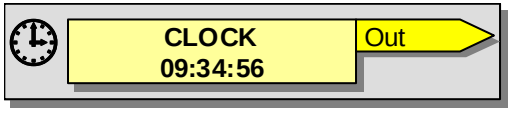
ADVICE: The real time clock is not available with all modules. Please take a look at the allocation dialogue of the controller to see if the RTC is supported or not!

Choose Objects/Real time clock to add the clock. You will get to the following window:



Objects: clock: Exact time

Symbol:



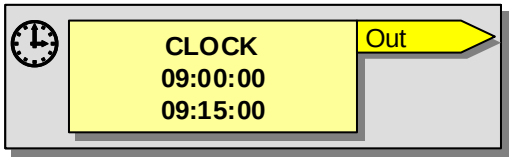
Data type: Out Bit

Input field: Start time 24h Format HH:MM:SS

Function: This function compares the current time of the module with the selected time. When the set time is true, output ***Out*** will be activated.

Objects: clock: Time period

Symbol:



Data type: Out Bit

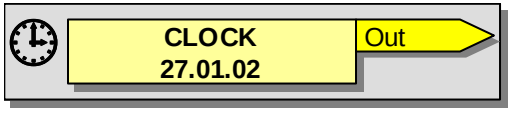
Input field: Start time 24h format HH:MM:SS

End time 24h format HH:MM:SS

Function: This function compares the current time of the module with the selected time range. If the current time is between start time and end time, the output ***Out*** will be active. Otherwise it will stay 0.

Objects: clock: Exact date

Symbol:



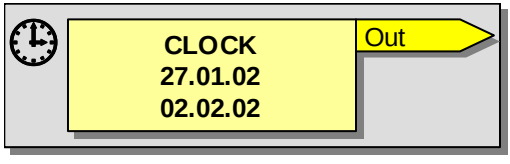
Data type: Out Bit

Input field: Start date day format DD.MM.YY

Function: This function compares the current date of the module with the selected date. As long as the dates are equal, output ***Out*** will be active.

Objects: clock: Date period

Symbol:



Data type: Out Bit

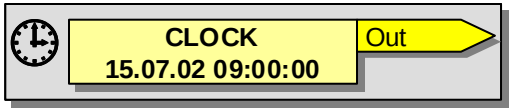
Input field: Start date format DD.MM.YY

End date format DD.MM.YY

Function: This function compares the current date of the module with the selected date range. As long as the current date is within the adjusted range, output **Out** will be active.

Objects: clock: Exact date&time

Symbol:



Data type: Out Bit

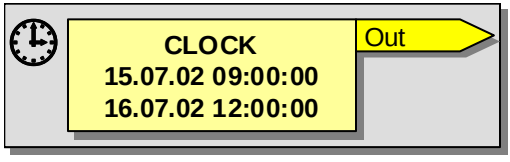
Input field: Start date format DD.MM.YY

Start time 24h-format HH:MM:SS

Function: This function compares the current date and the current time of the module with the selected date and time. If both agree, output ***Out*** will be activated.

Objects: clock: Date&time period

Symbol:



Data type: Out Bit

Input field: Start date format DD.MM.YY

Start time 24h-format HH:MM:SS

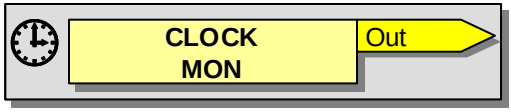
End date format DD.MM.YY

End time 24h-format HH:MM:SS

Function: This function compares the current time and the current date of the module with the selected time range. Only if the current time and date is within the specified time range, output ***Out*** will be activated.

Objects: clock: Exact Weekday

Symbol:



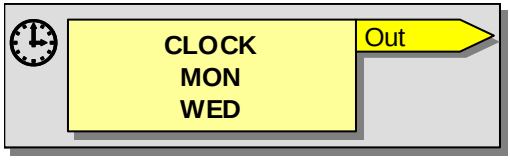
Data type: Out Bit

Input field: Start day weekday, English spelling:
MON,TUE,WED,THU,FRI,SAT,SUN

Function: This function compares the current weekday of the module with the selected weekday. If the weekdays match, output **Out** will be activated.

Objects: clock: Weekday period

Symbol:



Data type: Out Bit

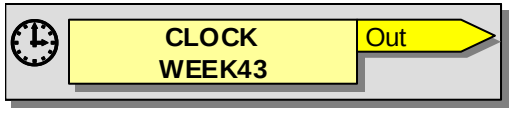
Input field: Start day weekday, English spelling:
MON,TUE,WED,THU,FRI,SAT,SUN

End day weekday, English spelling:
MON,TUE,WED,THU,FRI,SAT,SUN

Function: This function compares the current weekday of the module with the selected weekday range. If the current day is within the specified range, the output ***Out*** will be active.

Objects: clock: Exact Week

Symbol:



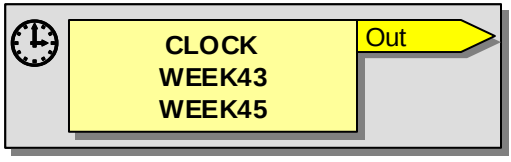
Data type: Out Bit

Input field: Start week calendar week, format WEEKXX

Function: This function compares the current calendar week of the module with the selected calendar week. If the weeks match, output ***Out*** will be active.

Objects: clock: Week Period

Symbol:



Data type: Out Bit

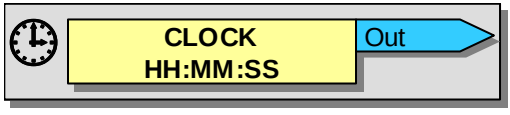
Input field: Start week calendar week, format WEEKXX

End week calendar week, format WEEKXX

Function: This function compares the current calendar week of the module with the selected calendar week range. If the current week is within the adjusted range, output ***Out*** will be active.

Objects: clock: Analogue: Time

Symbol:



Data type: Out Analogue

Function: This function delivers the current time of the module as an analogue value:

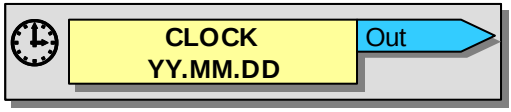
0x00HHMMSS describes a 24 Bit hexadecimal number.

The coding of the groups HH,MM,SS is a decimal number.

Example: The time 14:57:36 delivers the analogue value 0x000E3924

Objects: clock: Analogue: Date

Symbol:



Data type: Out Analogue

Function: This function delivers the current date of the module as an analogue value:

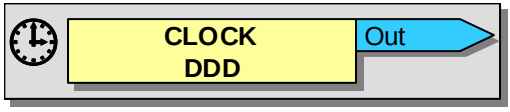
0x00YYMMDD describes a 24 Bit hexadecimal number.

The coding of the groups YY,MM,DD is a decimal number.

Example: The date 16.05.02 delivers the analogue value 0x00020510

Objects: clock: Analogue: Day of Week

Symbol:



Data type: Out Analogue

Function: This function delivers the current weekday of the module as an analogue value:

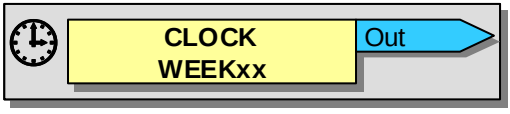
0x0000000D describes a 4 Bit hexadecimal number.

The coding of the group D is a decimal number. Monday has the value 0, Tuesday has the value 1, and so forth.

Example: Weekday Thursday (THU) delivers 0x00000003 as a result.

Objects: clock: Analogue: Week of year

Symbol:



Data type: Out Analogue

Function: This function delivers the current calendar week of the module as an analogue value:

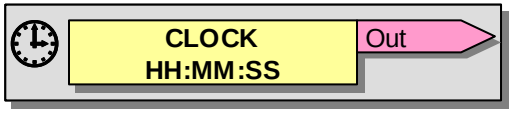
0x000000WW describes a 8 bit hexadecimal number.

The coding of the group WW is a decimal number.

Example: Calendar week 17 delivers 0x00000011 as a result.

Objects: clock: Text: Time

Symbol:

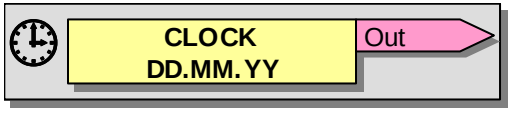


Data type: Out Text

Function: This function delivers the current time as a 8 character text with a 24h format HH:MM:SS.

Objects: clock: Text: Date

Symbol:

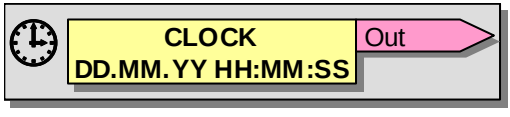


Data type: Out Text

Function: This function delivers the current date as an 8-character text with a DD.MM.YY format.

Objects: clock: Text: Date&Time

Symbol:

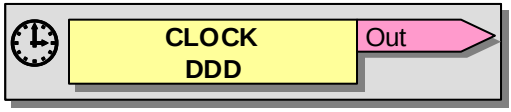


Data type: Out Text

Function: This function delivers the current date and the current time as a 17-character text with a DD.MM.YY HH:MM:SS format.

Objects: clock: Text: Day of Week

Symbol:

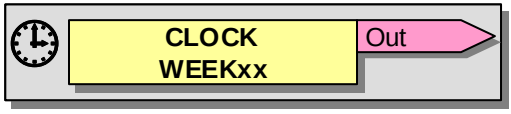


Data type: Out Text

Function: This function delivers the current weekday as a 3-character text. The weekdays have the English day abbreviation: MON, TUE, WED, THU, FRI, SAT, SUN.

Objects: clock: Text: Week of year

Symbol:



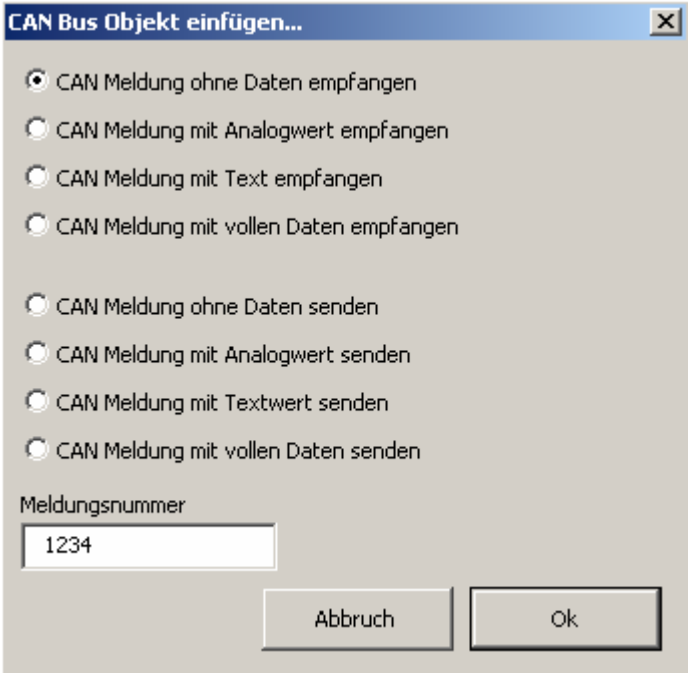
Data type: Out Text

Function: This function delivers the current calendar week as a 6-character text with a WEEKXX format.

CAN Objects (CANBUS)

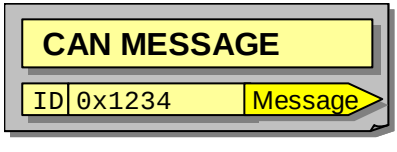
This chapter deals with the CAN functions, which are available with some devices.

To add CAN objects choose Objects/CAN bus from the menu. The following dialogue will be opened:



Objects: CAN Message In

Symbol:

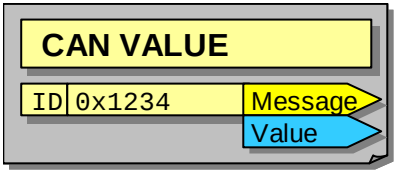


Data type: Message Bit

Function: If CAN Bus receives the message 0x1234, output ***Message*** will be activated for one cycle.

Objects: CAN Value In

Symbol:



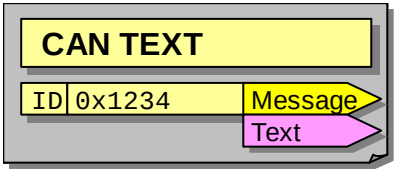
Data type: Message Bit

Value Analogue

Function: If CAN Bus receives the message 0x1234, output ***Message*** will be activated for one cycle and the received analogue value will be available at output ***Value.***

Objects: CAN Text In

Symbol:



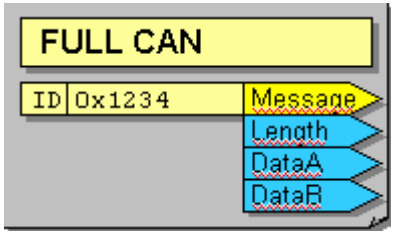
Data type: Message Bit

Text Text

Function: If CAN Bus receives the message 0x1234, output ***Message*** will be activated for one cycle and the received text value will be available at output ***Text***.

Objects: Receive FULL CAN Message

Symbol:



Data type: Message Bit

Length Analogue

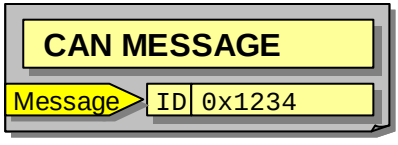
DataA Analogue

DataB Analogue

Function: If CAN Bus receive the message 0x1234 output **Message** will be activated for one cycle and the received analogue values will be available at output **Length**, **DataA** and **DataB**.

Objects: CAN Message Out

Symbol:

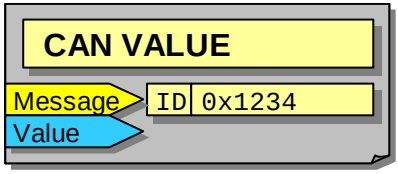


Data type: Message Bit

Function: If input ***Message*** has a rising edge, CAN module will send the message 0x1234 via the CAN Bus.

Objects: CAN Value Out

Symbol:



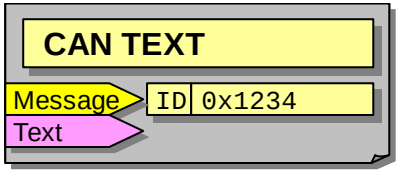
Data type: Message Bit

Value Analogue

Function: If input ***Message*** has a rising edge, CAN module will send the message 0x1234 via the CAN Bus. The analogue value will be sent simultaneously via the data range CAN Frames.

Objects: CAN Text Out

Symbol:



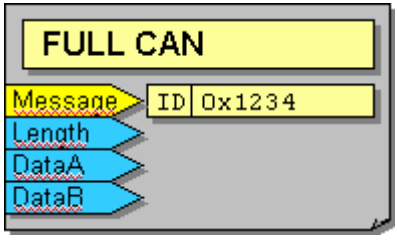
Data type: Message Bit

Text Text

Function: If input ***Message*** has a rising edge, CAN module will send the message 0x1234 via the CAN Bus. The text value will be sent simultaneously via the data range CAN Frames.

Objects: Send FULL CAN message

Symbol:

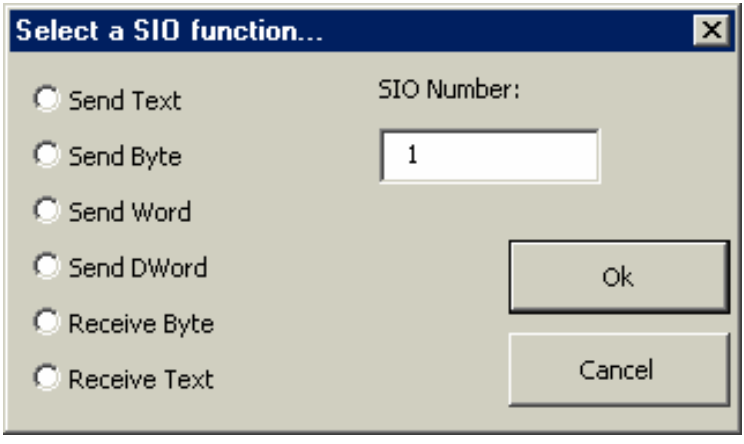


Data type:	Message	Bit
	Length	Analogue
	DataA	Analogue
	DataB	Analogue

Function: If input **Message** detects a rising edge the CAN module will send the message 0x1234 via the CAN Bus. The analogue values **Length**, **DataA** and **DataB** will be send within the data range of CAN Frames.

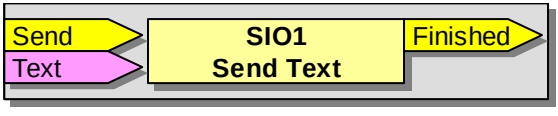
SIO functions (Serial input/output)

Some modules have a free serial port. You can address them with the following functions. Choose Objects/Serial device from the menu to get to the following window:



Objects: SIO: Send Text

Symbol:

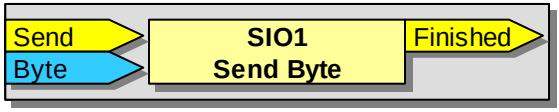


Data type:	Send	Bit
	Text	Text
	Finished	Bit

Function: If a rising edge is detected at input ***Send***, this function will send the text string of input ***Text***. When the transfer is finished, output ***Finished*** will be active.

Objects: SIO: Send Byte

Symbol:



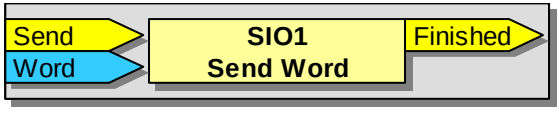
Data type:

Send	Bit
Byte	Analogue
Finished	Bit

Function: If a rising edge is detected at input ***send***, this function will send the lowest 8 bits of the analogue value of input ***Byte*** as one character. When the transfer is finished, output ***Finished*** will be active.

Objects: SIO: Send Word

Symbol:



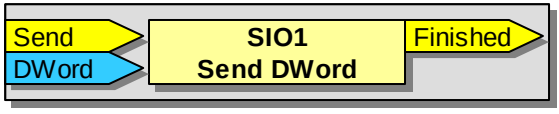
Data type:

Send	Bit
Word	Analogue
Finished	Bit

Function: If a rising edge is detected at input ***Send***, this function will send the lowest 16 bits of the analogue value of input ***Word*** as two consecutive characters. First the lowest 8 bits will be sent as one character. Then bits 8 to 15 will be sent as a second character. When the transfer is finished, output ***Finished*** will be active.

Objects: SIO: Send DWord

Symbol:



Data type: Send Bit

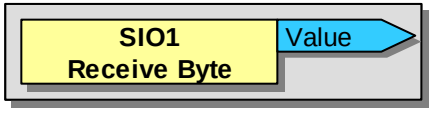
DWord Analogue

Finished Bit

Function: If a rising edge is detected at input ***Send***, this function will send all 32 bits of the analogue value of input ***Word*** as four consecutive characters. First the lowest 8 bits will be sent as one character. Then bits 8 to 15 will be sent as a second. After that bits 16 to 24 will follow up as a third. Finally the last 8 bits will be sent as a fourth character. When the transfer is finished, output ***Finished*** will be active.

Objects: SIO: Receive Byte

Symbol:

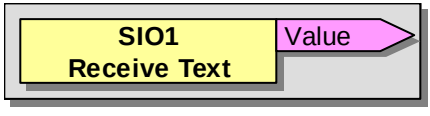


Data type: Value Analogue

Function: This function detects whether a character has been received at the serial port. If so, ***Value*** returns the lowest 8 code bits of the received character. If no character is received the analogue value 9999.000 will be returned.

Objects: SIO: Receive Text

Symbol:

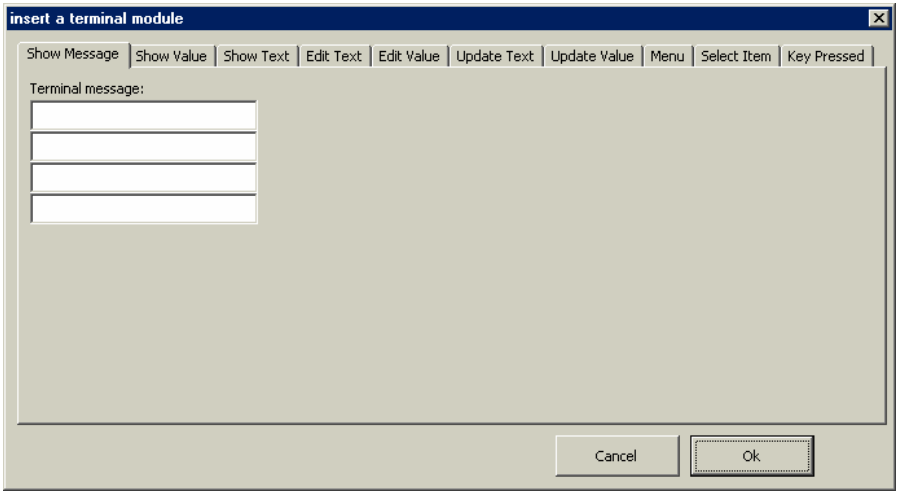


Data type: Value Text

Function: This function detects whether a character has been received at the serial port. If so, a 1-character text message containing the received character will be returned in the output ***Value***. If no text is received, a blank text will be returned.

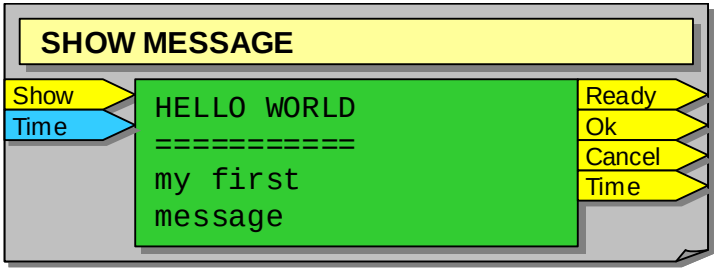
Terminal functions (MMI)

SLS-500-Configurator supports HIQUEL-TERM4. The terminal is addressed to suit SLS500. Choose Objects/Terminal from the menu to get to the following dialogue:

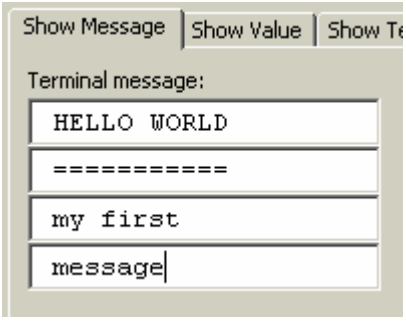


Objects: Terminal: Show Message

Symbol:



Input: Define the text, which should be delivered from the terminal. 4x20 character lines are available!

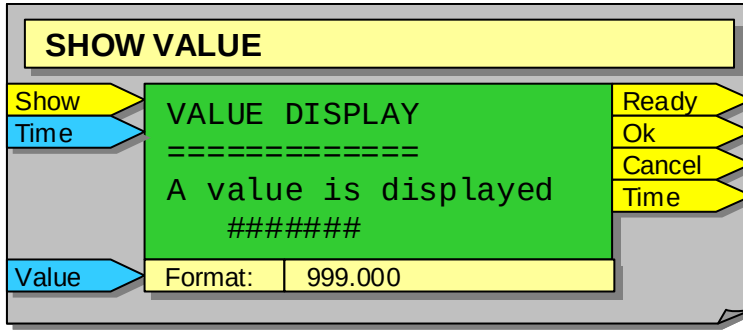


Data type:		
	Show	Bit
	Time	Analogue
	Ready	Bit
	Ok	Bit
	Cancel	Bit
	Time	Bit

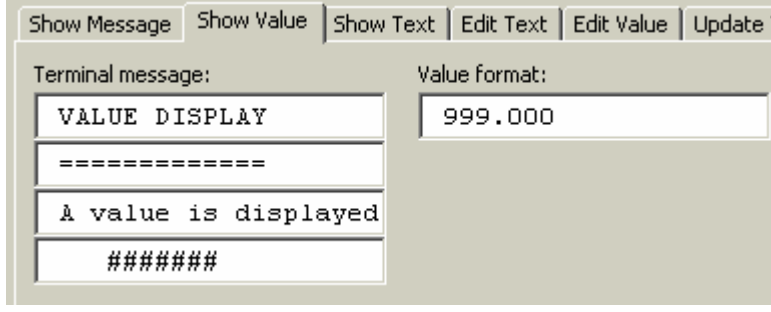
Function: With this function, if input ***Show*** has a rising edge the stored text will be displayed on the terminal. Additionally you can set a display time in seconds at input ***Time***. If this time runs out, output ***Time*** will be activated. If the input stays unconnected, the time function will be ignored. Output ***Ready*** will be active, when the complete screen set-up is finished. If the user presses the OK button, output ***OK*** will be activated. If the user presses the Cancel button, output ***Cancel*** will be activated.

Objects: Terminal: Show Value

Symbol:



Input: Define the text, which should be delivered from the terminal. 4x20 characters are available. By entering # characters within the text, you can mark the place for the displayed number. Set the number format for the display in field Value.



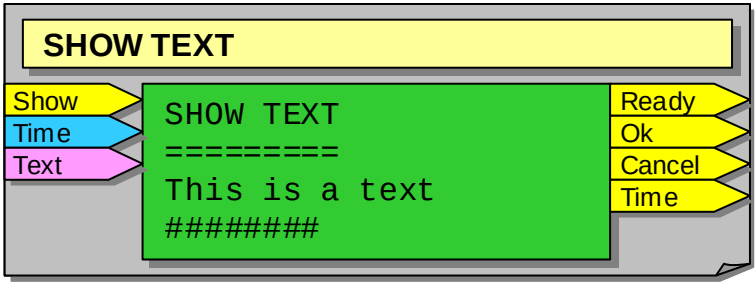
Data Type:

Show	Bit
Time	Analogue
Value	Analogue
Ready	Bit
Ok	Bit
Cancel	Bit
Time	Bit

Function: With this function, if input ***Show*** has a rising edge the stored text will be displayed on the terminal. Additionally you can set a display time in seconds at input ***Time***. If this time runs out, output **Time** will be activated. If the input stays unconnected, the time function will be ignored. Output ***Ready*** will be active when the complete screen set-up is finished. If the user presses the OK button, output ***OK*** will be activated. If the user presses the Cancel button, output ***Cancel*** will be activated. Input ***Value*** has the value which is displayed instead of the # characters.

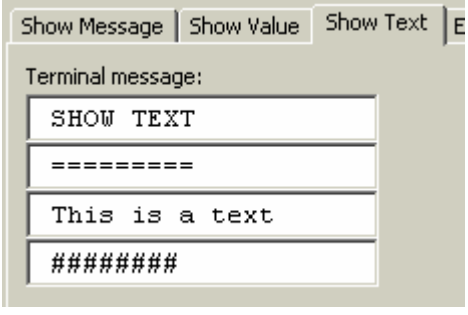
Objects: Terminal: Show Text

Symbol:



Input: Define the text, which should be delivered from the terminal. 4x20 characters are available. By entering # characters within the text you can mark the place for the display of the text.

.



Data type: Show Bit

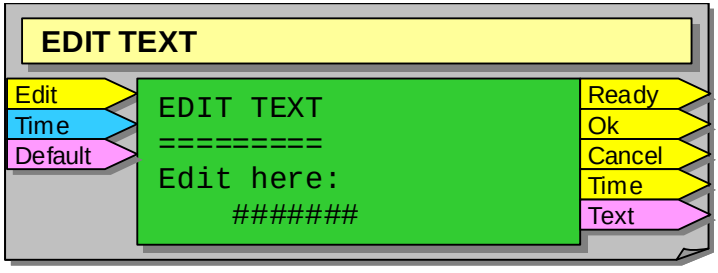
Time Analogue

Text	Text
Ready	Bit
Ok	Bit
Cancel	Bit
Time	Bit

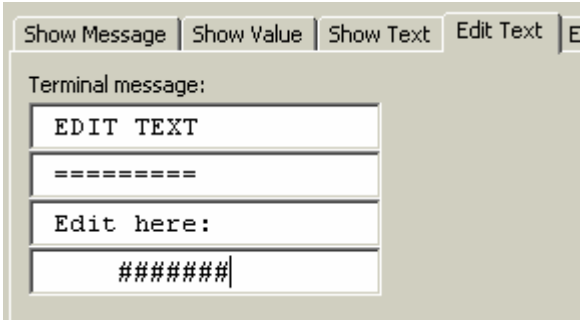
Function: With this function, if input ***Show*** has a rising edge the stored text will be displayed at the terminal. Additionally you can set a display time in seconds at input ***Time***. If this time runs out, output ***Time*** will be activated. If the input stays unconnected, the time function will be ignored. Output ***Ready*** will be active when the complete screen set-up is finished. If the user presses the OK button, output ***OK*** will be activated. If the user presses the Cancel button, output ***Cance***l will be activated. Input ***Value*** receives the character string which is displayed instead of the # characters.

Objects: Terminal: Edit Text

Symbol:



Input: Define the text, which should be delivered from the terminal. 4x20 characters are available. By entering # characters within the text, you can mark the place for the text input.



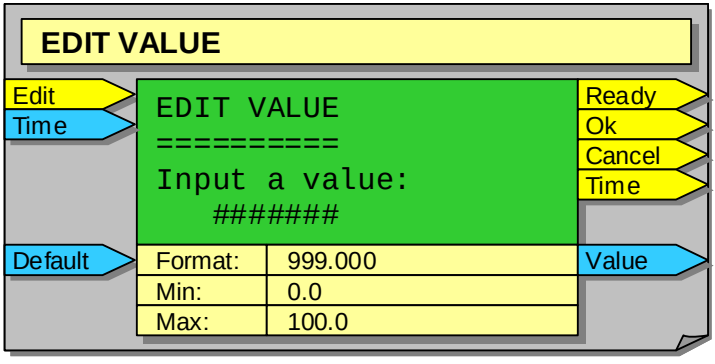
Data type:		
	Show	Bit
	Time	Analogue
	Default	Text
	Text	Text
	Ready	Bit
	Ok	Bit
	Cancel	Bit
	Time	Bit

Function: With this function, if input ***Show*** has a rising edge the stored text will be displayed at the terminal. Additionally you can set a display time in seconds at input ***Time***. If this time runs out, output ***Time*** will be activated. If the input stays unconnected, the time function will be ignored. Output ***Ready*** will be active when the complete screen set-up is finished. If the user presses the OK button, output ***OK*** will be activated. If the user presses the Cancel button, output ***Cancel*** will be activated.

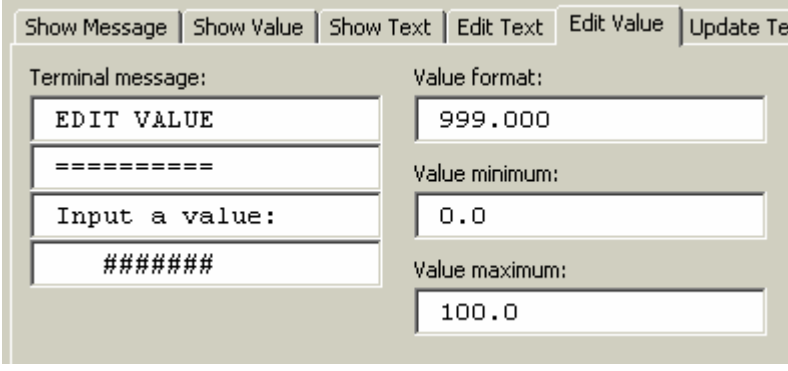
Input ***Default*** defines the character string that is displayed at start up of the input. This string can by edited by the user at start up too. If the user presses ***OK***, output ***Text*** will receive the newly defined text. If the user presses ***Cancel*** the current input will be cancelled and the text ***Default*** will be delivered to output ***Text***.

Objects: Terminal: Edit Value

Symbol:



Input: Define the text, which should be delivered from the terminal. 4x20 characters are available. By entering # characters within the text, you can mark the place for the number input. Set the format for the display of the value in the field Value format. The two fields 'Value minimum' and 'Value maximum' define a number range for a valid input.



Data type:

Show	Bit
Time	Analogue
Default	Analogue
Value	Analogue
Ready	Bit

Ok Bit

Cancel Bit

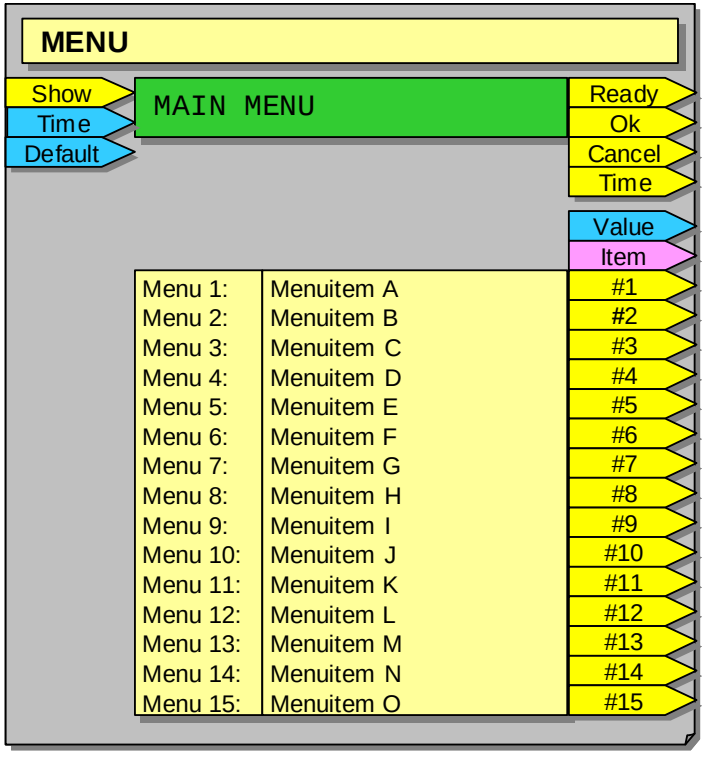
Time Bit

Function: With this function, if input Show has a rising edge the stored text will be displayed at the terminal. Additionally you can set a display time in seconds at input ***Time***. If this time runs out, output ***Time*** will be activated. If the input stays unconnected, the time function will be ignored. Output ***Ready*** will be active when the complete screen set-up is finished. If the user presses the OK button, output ***OK*** will be activated. If the user presses the Cancel button, output ***Cancel*** will be activated.

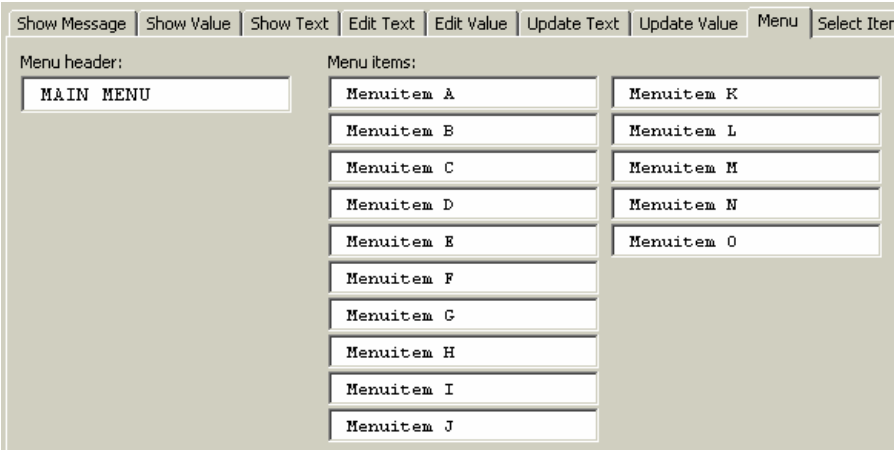
Input ***Default*** defines the number value that is displayed at start up of the number input. If the user presses OK after entering the number, the input will be converted and the analogue value will be checked for the two limits 'Value minimum' and 'Value maximum'. If the input value is within the range, output ***OK*** will be activated and the value will be delivered to output ***Value***. If the input value is outside the range, the input cannot be continued with ***OK***. By pressing CANCEL the value ***Default*** will be transmitted as a result of the input.

Objects: Terminal: Menu

Symbol:



Input: You can define the title of the menu in the field Menu header. Choose Menu items to define up to 15 menu items, which can then be chosen on the display.



Data type:	Show	Bit
	Time	Analogue
	Default	Analogue
	Value	Analogue
	Item	Text
	Ready	Bit
	Ok	Bit
	Cancel	Bit
	Time	Bit
	#1-#15	Bit

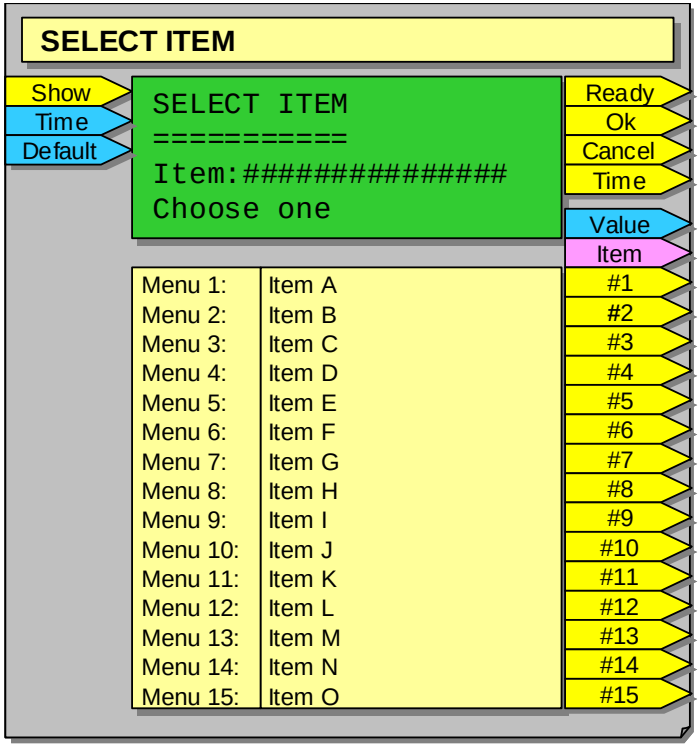
Function: With this function, if input ***Show*** has a rising edge the stored text will be displayed at the terminal. Additionally you can set a display time in seconds at input ***Time***. If this time runs out, output ***Time*** will be activated. If the input stays unconnected, the time function will be ignored. Output ***Ready*** will be active, if the complete screen set-up is finished. If the user presses the OK button, output ***OK*** will be activated. If the user presses the Cancel button, output ***Cancel*** will be activated.

A menu will be build up. The selected entry corresponds to the input ***Default***. If this entry is unconnected, the first menu entry will always be selected. If you choose a menu entry and press OK, the number of the chosen menu entry will be delivered to

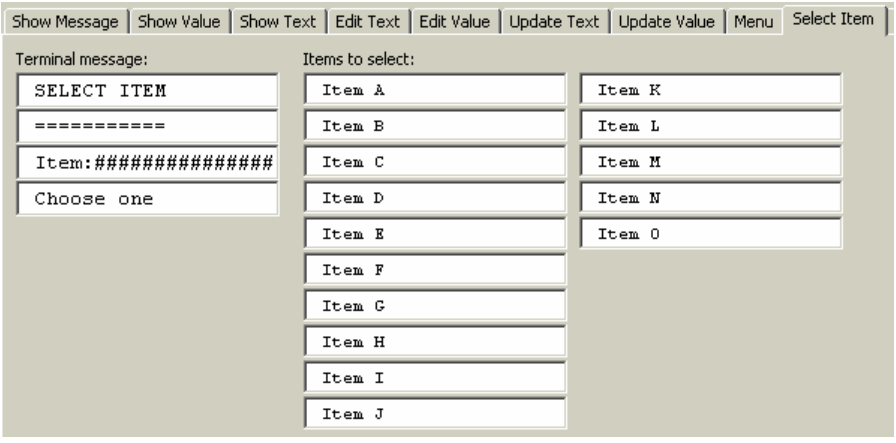
output ***Value***. The menu entry text will be delivered to output ***Item*** and the corresponding output #1 to #15 will be activated too. If you press CANCEL only output Cancel will be activated.

Objects: Terminal: Select item

Symbol:



Input: Enter the text for the display in field Terminal message. The position for the text entries has to be marked by #-characters. Choose Items to select to define up to 15 entries, which can then be chosen on the display.



Data type:	Show	Bit
	Time	Analogue
	Default	Analogue
	Value	Analogue
	Item	Text
	Ready	Bit
	Ok	Bit
	Cancel	Bit
	Time	Bit
	#1-#15	Bit

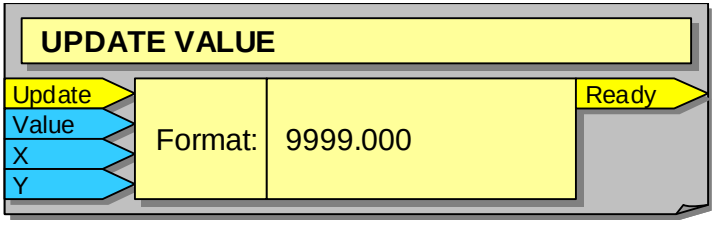
Function: with this function, if input Show has a rising edge the terminal will display the stored text. Additionally you can set a display time in seconds at input ***Time***. If this time runs out, output ***Time*** will be activated. If the input stays unconnected, the time function will be ignored. Output ***Ready*** will be active when the complete screen set-up is finished. If the user presses the OK button, output ***OK*** will be activated. If the user presses the Cancel button, output ***Cancel*** will be activated.

The entered message will be build up. The displayed entry corresponds to input ***Default***. If this input is unconnected, the first entry will always be displayed. If you choose an entry and press OK, output ***Value*** will output the number of the chosen entry. Output ***Item*** will output the entry text and the

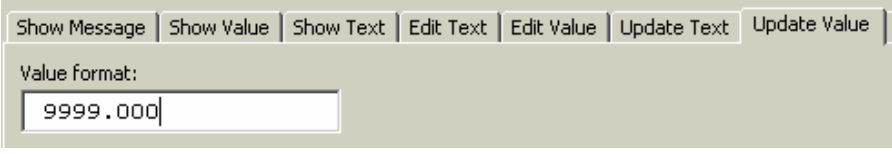
corresponding output #1 to #15 will be activated too. If you press CANCEL just output ***Cancel*** would be activated.

Objects: Terminal: Update Value

Symbol:



Input: Enter the format for the analogue number into the field ***Value***.

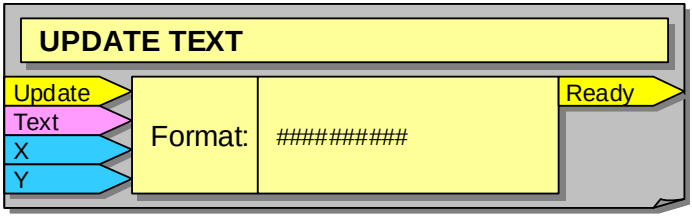


Data type:		
	Update	Bit
	Value	Analogue
	X	Analogue
	Y	Analogue
	Ready	Bit

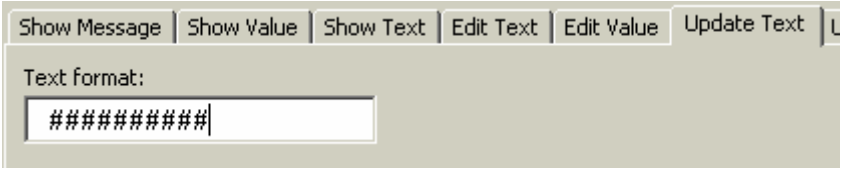
Function: The current value of input ***Value*** will be formatted with the specified format and will be displayed from position X and Y in the terminal content. The coordinates will be counted beginning with (0,0). This action will be executed with every rising edge at input ***Update***. Output ***Ready*** will be activated immediately after the display of the number.

Objects: Terminal: Update Text

Symbol:



Input: Enter the length of the output text with # characters into field Text format.

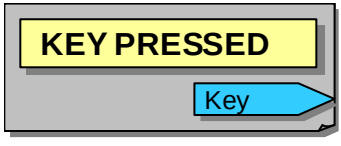


Data type:		
	Update	Bit
	Text	Text
	X	Analogue
	Y	Analogue
	Ready	Bit

Function: The current value of input ***Text*** with the specified length will be displayed from position X and Y in the terminal content. The coordinates will be counted beginning with (0,0). This action will be executed with every rising edge at input ***Update***. Output ***Ready*** will be activated immediately after the display of the number.

Objects: Terminal: Key pressed

Symbol:



Input: This command does not need parameters.

Data type: Key Analogue

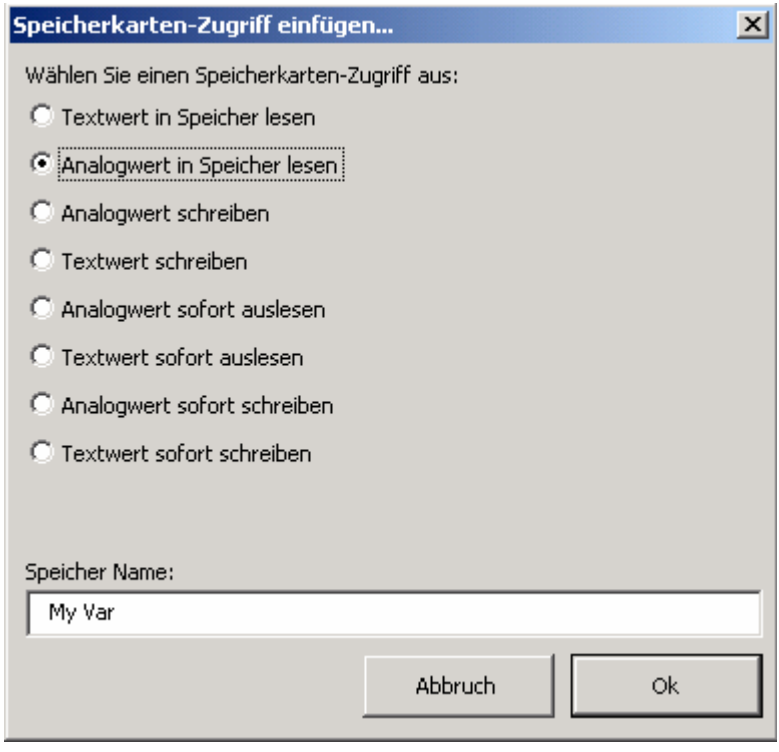
Function: The current value of the keys will be delivered from output ***Key***. If no key is pressed, the value 0 will be returned. Otherwise the following code will be returned (Total number between 1 and 9):

2.000	5.000	9.000
3.000	7.000	4.000
8.000	6.000	1.000

Memory Card

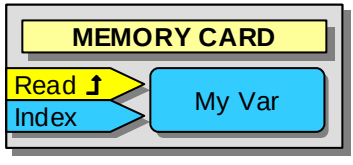
This chapter deals with all functions, which enable the saving of values to remnant memories like Memory Card.

Choose Objects/Memory Card from the menu to get to the following window:



Objects: MemoryCard: Read Value into SLS500 memory

Symbol:



Data type: Read Bit

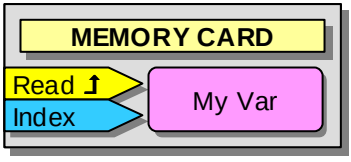
Index Analogue

Function: If a rising edge is detected at input ***Read***, the analogue value stored at position ***Index*** will be read from the Memory Card and saved to the variable MyVar.

ADVICE: If the addresses 100000 to 100002 are used, the saved analogue values will be taken from the real time clock.

Objects: MemoryCard: Read Text into SLS500 memory

Symbol:



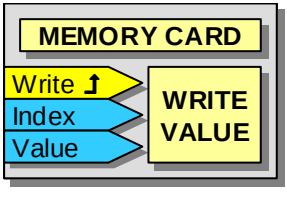
Data type: Read Bit

Index Analogue

Function: If a rising edge is detected at input ***Read*** the text value stored at position ***Index*** will be read from the Memory Card and saved to the variable MyVar.

Objects: MemoryCard: Write Value to card

Symbol:



Data type: Write Bit

Index Analogue

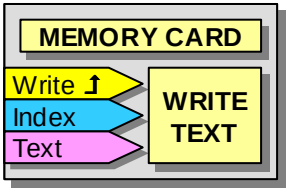
Value Analogue

Function: If a rising edge is detected at input ***Write***, the analogue value of input ***Value*** will be saved to the Memory Card to position ***Index***.

ADVICE: If the addresses 100000 to 100002 are used, the analogue values will be saved to the real time clock.

Objects: MemoryCard: Write Text to card

Symbol:



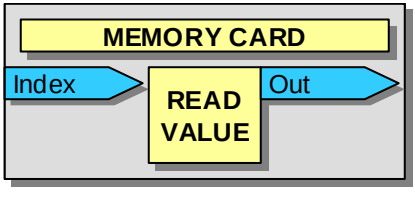
Data type:

Write	Bit
Index	Analogue
Text	Text

Function: If a rising edge is detected at input ***Write***, the value of input ***Text*** will be saved to the Memory Card to position ***Index***.

Objects: MemoryCard: Read Value from card

Symbol:



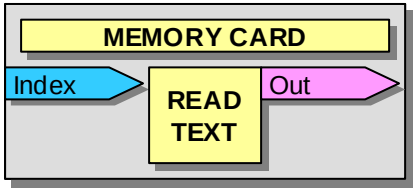
Data type:

Index	Analogue
Out	Analogue

Function: The current value of analogue input ***Index*** will be saved to analogue output ***Out*** as a analogue variable.

Objects: MemoryCard: Read Text from card

Symbol:



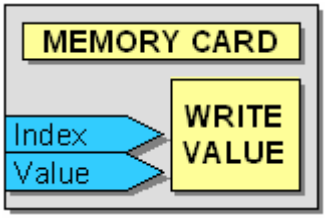
Data type: Index Analogue

Out Text

Function: The current value of analogue input ***Index*** will be saved to text output ***Text*** as a variable.

Objects: MemoryCard: Write Analogue Value

Symbol:



Data type: Index Analogue

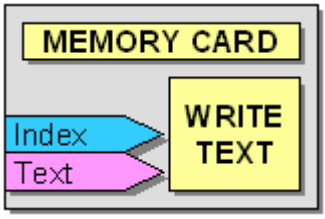
Value Analogue

Function: The current value of analogue input ***Value*** will be saved to the MemoryCard to position ***Index***.

ADVICE: If the addresses 100000 to 100002 are used, the analogue values will be saved to the real time clock.

Objects: MemoryCard: Write Text Value

Symbol:



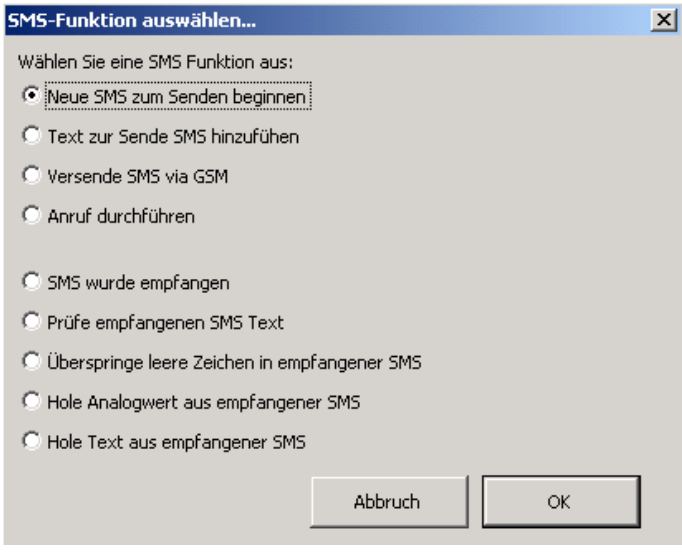
Data type:	Write	Bit
	Index	Analogue
	Text	Text

Function: The current text value of input ***Text*** will be saved to the MemoryCard to position ***Index***.

SMS

The following chapter deals with all functions which allow sending and receiving of messages via GSM modem.

Choose Objects/SMS from the menu. The following dialog will appear:



Objects: SMS: Start new short message

Symbol:

Data type: Start Bit

Ready Bit

Function: If input ***Start*** reads a rising edge a control character will be sent to the GSM modem to start the transmitting. If the transmission process is completed, output ***Ready*** will be active.

Objects: SMS: Add Text to short message

Symbol:

Data type:

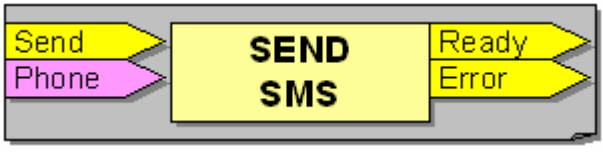
Add	Bit
Text	Text
Ready	Bit

Function: If input ***Add*** reads a rising edge, the current text value at input ***Text*** will be add to the message. If the process is completed, output ***Ready*** will be active.

ADVICE: A max. of 20 characters can be add to a message at once. The max. size of a message is 60 characters.

Objects: SMS: Send short message via GSM

Symbol:



Data type:

Send	Bit
Phone	Text
Ready	Bit
Error	Bit

Function: If input ***Send*** reads a rising edge, the previously assembled message will be sent to the phone number stored as text value at input ***Phone***. If the transmission process is completed, output ***Ready*** will be active. If the transmission to the GSM modem failed, output ***Error*** would be active.

Objects: SMS: Call Phone

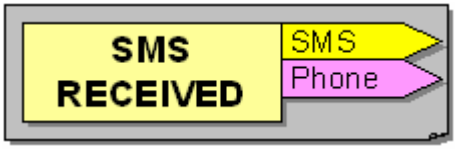
Symbol:

Data type:	Call	Bit
	Phone	Text
	Ready	Bit
	Error	Bit

Function: If input ***Call*** reads a 1, a call will be build up to the phone number stored as a text value at input ***Phone*** as long as input ***Call*** is null again. If the call is answered, output ***Ready*** will be active. If the call could not be completed, output ***Error*** will be active.

Objects: SMS: Short message received

Symbol:

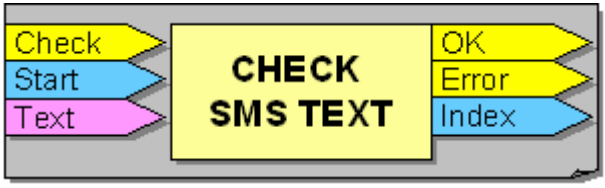


Data type:	Send	Bit
	Phone	Text
	Ready	Bit
	Error	Bit

Function: Use this function to check if a message is received via the GSM modem. If a message is received output ***SMS*** writes a rising edge and output ***Phone*** writes the sender phone number as a text.

Objects: SMS: Check short message Text

Symbol:

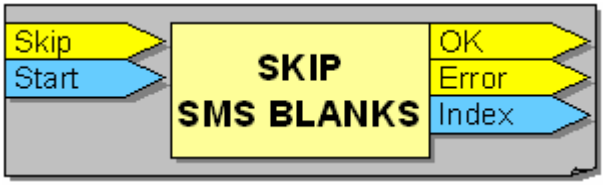


Data type:		
	Check	Bit
	Start	Analogue
	Text	Text
	OK	Bit
	Error	Bit
	Index	Analogue

Function: If input ***Check*** reads a rising edge, the received text starting from Start index ***Start*** will be compared to the text value at input ***Text***. ***Start*** counts starting with 0. If the text matches, output ***OK*** will be active. If the texts do not correspond, output ***Error*** will be active. Output ***Index*** puts out the analogue value of the compared characters.

Objects: SMS: Skip short message blanks

Symbol:



Data type:		
	Skip	Bit
	Start	Analogue
	OK	Bit
	Error	Bit
	Index	Analogue

Function: If input ***Skip*** reads a rising edge, the text of the received message starting with Start index ***Start*** will be checked for blanks. ***Start*** counts starting with 0. After the text is checked, output ***OK*** will be active. If the check fails, output ***Error*** will be active. Output ***Index*** puts out the analogue value of the detected blank characters.

Objects: SMS: Get short message Analogue Value

Symbol:

Data type:

Get	Bit
Start	Analogue
Length	Analogue
OK	Bit
Error	Bit
Index	Analogue
Value	Analogue

Function: If input ***Get*** reads a rising edge, the text of the received message starting with Start index ***Start*** will be read by using the length at analogue input ***Length*** as analogue value. ***Start*** counts starting with 0. If the analogue value is put out at output ***Value***, output ***OK*** will be active. If the output of the analogue value fails, output ***Error*** will be active. Output ***Index*** puts out the analogue value of the detected characters.

Objects: SMS: Get short message Text

Symbol:

Data type:	Get	Bit
	Start	Analogue
	Length	Analogue
	OK	Bit
	Error	Bit
	Index	Analogue
	Text	Text

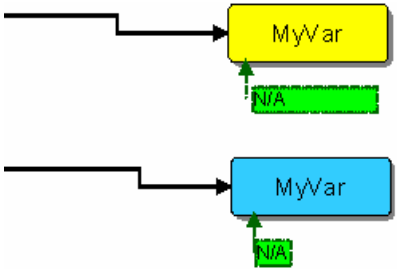
Function: If input ***Get*** reads a rising edge, the text of the received message starting with Start index ***Start*** will be read by using the length at analogue input ***Length*** as text value. ***Start*** counts starting with 0. If the text value is put out at output ***Text***, output ***OK*** will be active. If the output of the text value fails, output ***Error*** will be active. Output ***Index*** puts out the analogue value of the detected characters.

Debug

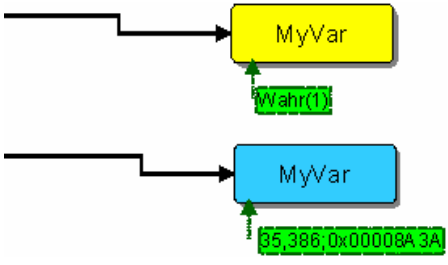
You can select from various functions for an online test with the hardware modules and the programming software. Choose Debug from the menu.

Debug: Add Symbols

By choosing Add Symbols from the menu, the following green Symbol will be added to the selected Memory:



Now choose Update Symbols from the menu to read the current state of the memory from the PC connected SLS-500 main module:

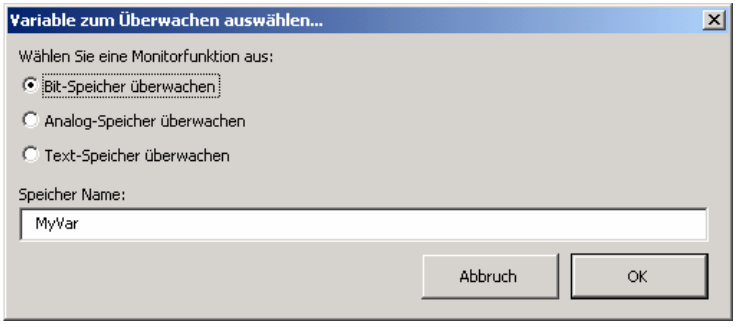


After the successful update the current states/values will be displayed within the green field.

To delete all Symbols, choose Delete All Symbols from the menu.

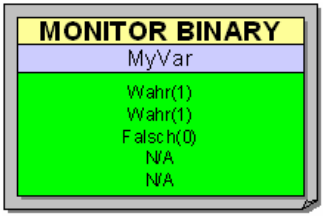
Debug: Add Monitor

Choose Monitor from the menu, the following dialog appears:



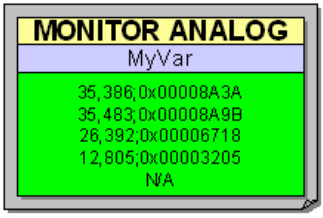
Now choose the memory type and the memory name of the SLS-500 main module, that you want to monitor on the PC.

Debug: Monitor Binary Memory



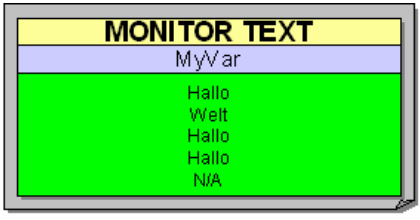
Now choose Update Symbols from the menu to read the current state of the binary memory from the PC connected SLS-500 main module. The first line shows the most current state.

Debug: Monitor Analogue Memory



Now choose Update Symbols from the menu to read the current state of the analogue memory from the PC connected SLS-500 main module. The first line shows the most current state.

Debug: Monitor Text Memory



Now choose Update Symbols from the menu to read the current state of the text memory from the PC connected SLS-500 main module. The first line shows the most current state.

Debug: Set Breakpoint

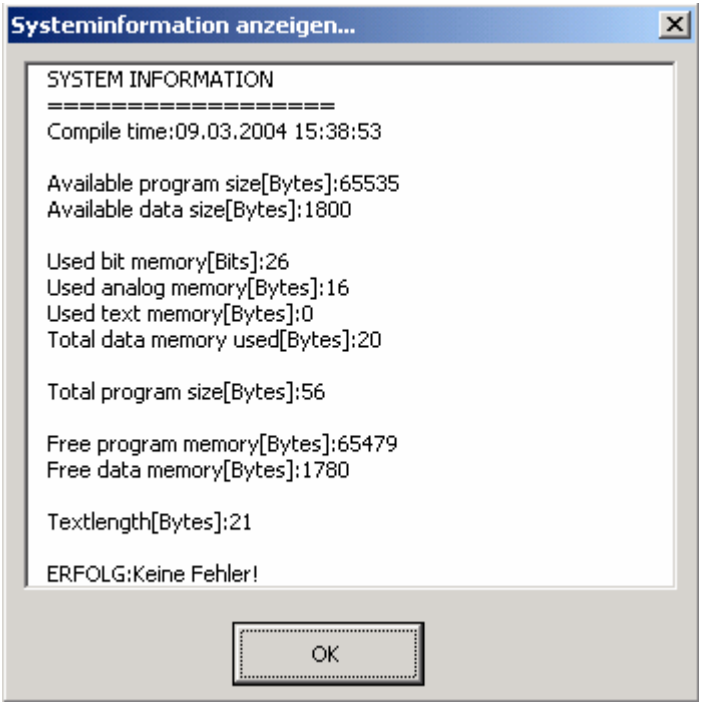
Choose Set Breakpoint from the menu to add a Breakpoint to the selected symbol. The program will now run only up to the Breakpoint.

Debug: Delete Breakpoint

To delete the Breakpoint, choose Delete Breakpoint from the menu.

Debug: Display System Information

Choose System Information from the menu to get to the following dialog:

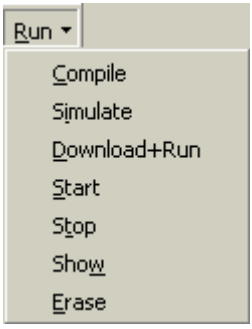


Depending on the main module, different memory capacities are available.

Run

This menu option contains all actions of the compilation, simulation and the execution of the program on the SLS500.

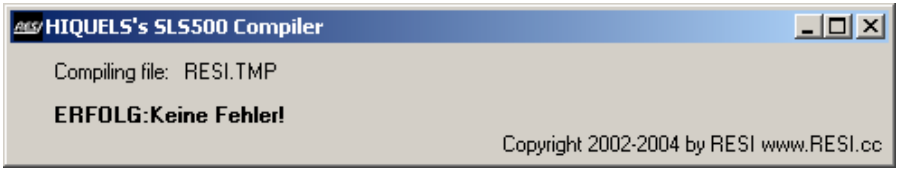
Choose Run from the menu:



Run: Compile

This menu item starts the integrated compiler. The compiler creates an executable program out of the current graphic. It also shows failures of the plan.

Status of the compiler:



Error during compilation

If errors occur, they will be displayed as follows:

The title of the page containing the error will be displayed. If possible the exact failure reason will be displayed too.

Click Close to finish the Compiler.

Compilation successful

If everything worked out fine, the compiler will disappear automatically and an executable program will be available.

Run: Simulate

You can simulate a SLS-500-Configurator program on the screen. If the program was compiled successfully the simulator will be started automatically.

Run: Download & Run

By choosing this menu item the program will be automatically compiled. If no failure occurs the program will be loaded to the connected SLS500. There the program will be started immediately.

Run: Start

Choose this menu item to restart the current SLS500program.

Run: Stop

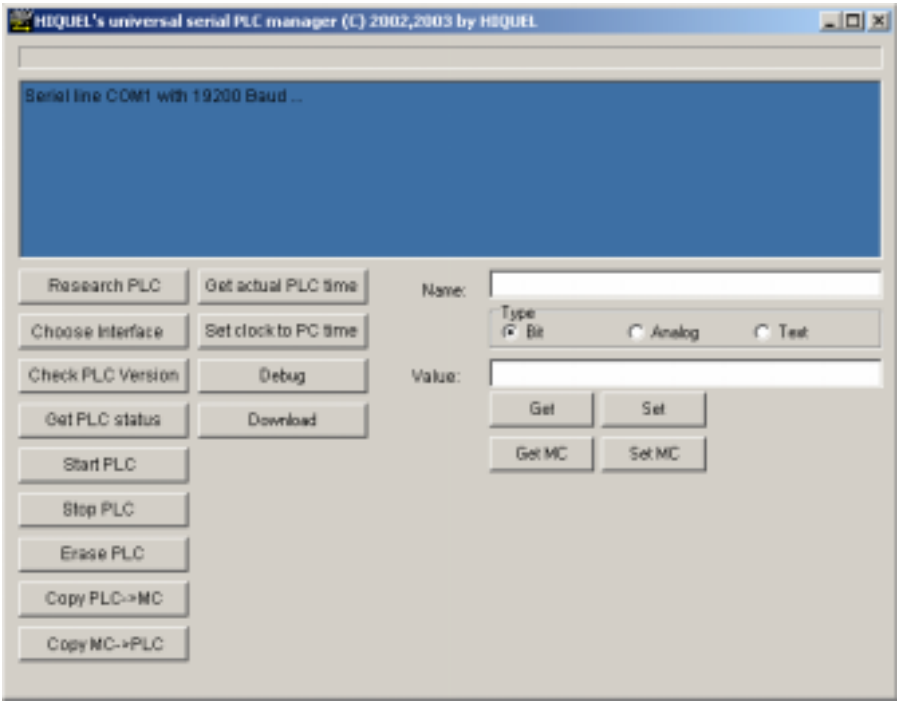
Choose this menu item to stop the current SLS500program.

Run: Erase

Choose this menu item to delete the current SLS500program.

Run: Show

Activating this menu item the **PLC manager** will be activated with a screen interface that allows special actions:



Button: Research PLC

Choose this button to scan through all ports for connected SLS500. Refer to chapter SLS500 not found.

Button: Choose PLC Interface

Choose this button to select the interface and the baud rate where the PLC is connected.

Button: Check PLC Version

Choose this button to check the software version of the connected PLC.

Button: Get PLC status

Choose this button to check the current status of SLS500. The current state of SLS500 (runs, does not run) and failures will be displayed. In addition you can see the current program length and the check sum of the current program.

Button: Start

You can start the program on the SLS500 by clicking Start.

Button: Stop

Stop the SLS500 program by clicking this button.

Button: Erase

You can completely delete the SLS500 program by clicking Erase.

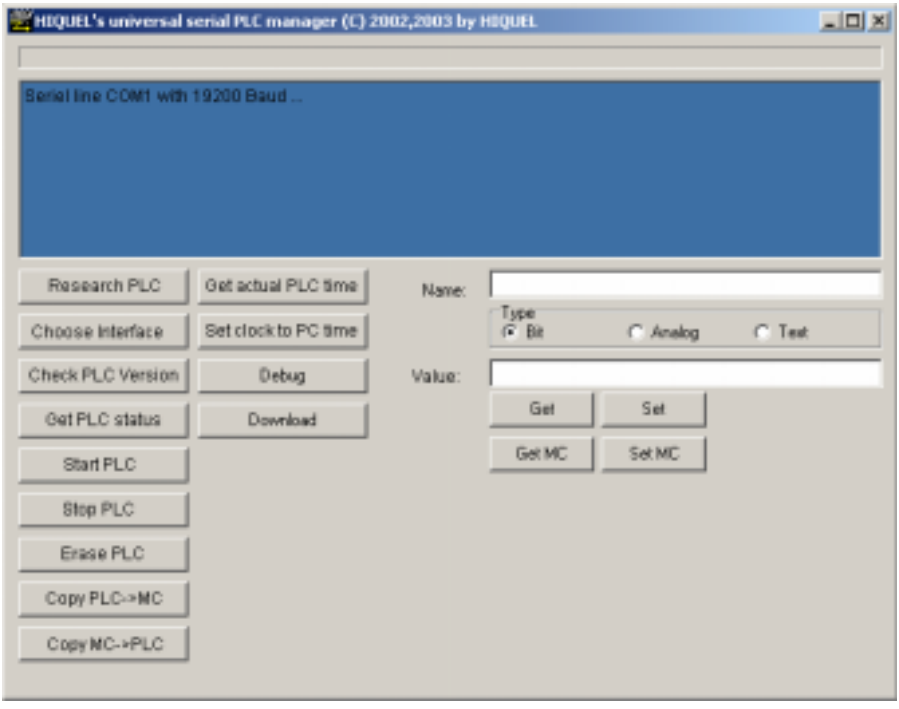
Button: Copy PLC->MC

Choose this button to save the current program, which is already saved in the SLS500, to the Memory Card.

Button: Copy MC->PLC

Choose this button to save the program stored on the Memory Card to the SLS500.

If the Memory Card contains a valid program and SLS500 is restarted, the program will be loaded to SLS500 automatically. After that you can remove the Memory Card.



Button: Get actual PLC time

Display the current time of SLS500 by clicking this button.

Button: Set clock to PC time

Click on this button to set the current time of the PC as new time for SLS500.

Button: Debug

Choose this button the **Test program** will be activated with a screen interface that allows data exchange for many memories at the same time.

Button: Download

Choose this button the program which was compiled will be loaded to the connected SLS500. There the program will be started immediately.

Read/write binary memory

You can read Bits from the current program and set new bits with the PLC Manager. Use the right area of the PLC Manager.

Choose ***Name*** to enter the name of the bit – the name corresponds to the names of the memory, which were set in SLS-500-Configurator – or to set a memory number. Do this by prefixing a # character before the number (for example #123).

Type must be Bit.

Click the button ***Get*** to query the current state of the Bit.

You can also set a new value by choosing Value (0 or 1) and pressing ***Set***.

Read/write analogue memory

Reading the analogue values is done in the same way as reading binary values. You just have to change the Type to Analogue. To preset an analogue value enter a valid value into the field ***Value***.

Read/write text memory

To read and write text memories you just have to change the Type to Text and enter a character string into the field ***Value***.

SPS not found

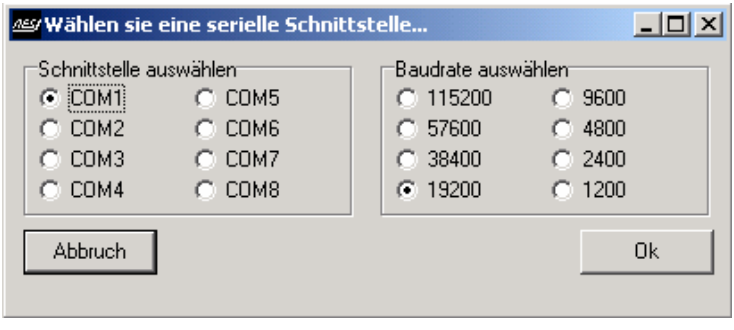
If the SPS is not found or not connected, the PLC Manager stops with the following message:

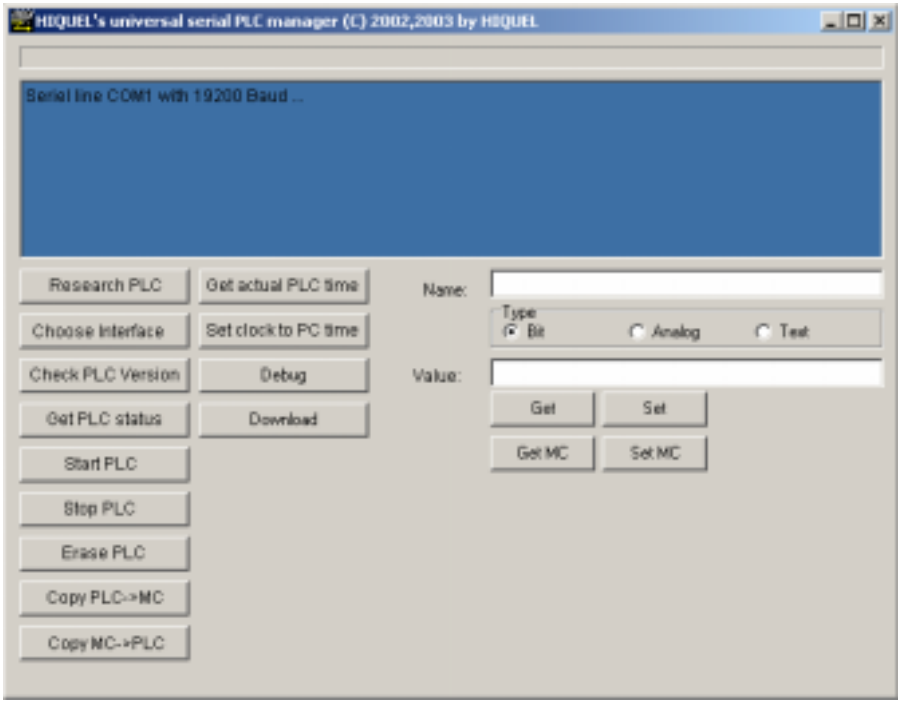
Click the X to close the manager. Check the wiring and the adjustments.

To change the serial port, proceed as follows:

Choose serial port

Choose Run/Show to get to the PLC Manager with the following screen interface:

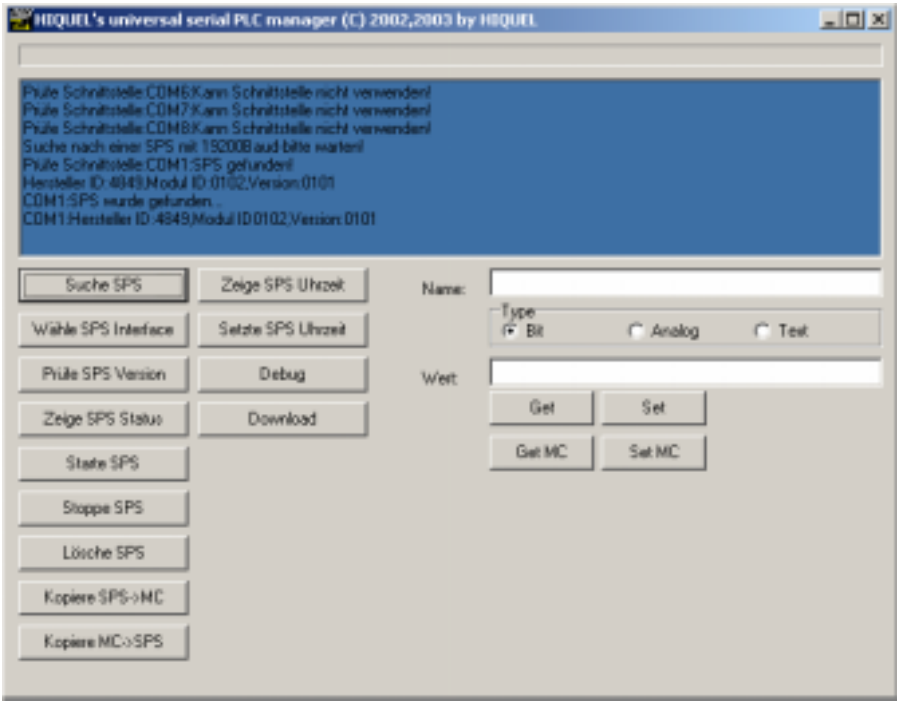




If you click the button Research PLC, the PLC Manager will scan all available ports of the system to find an SLS500. If it is successful the following message will be displayed and the current communication parameters will be stored.

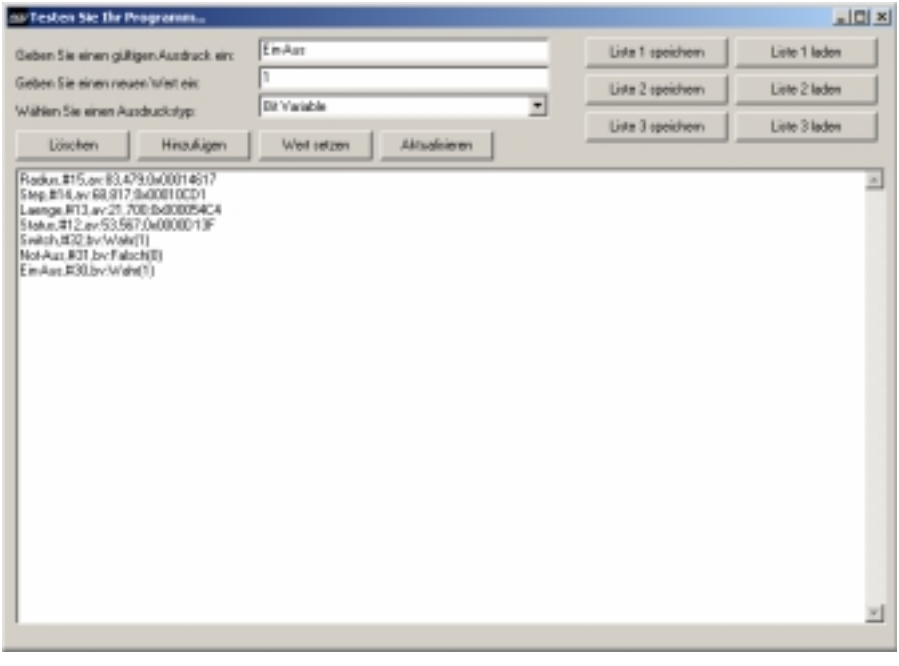
This happens in a file, which is stored in the temporary directory of Windows. The name of the file: RESISETTINGS.TMP

If you delete the file the PLC Manager will automatically scan for an SLS500 at the next start up.


HIQUEL's universal serial PLC manager (C) 2002,2003 by HIQUEL
Prüfe Schnittstelle COM6:Kann Schnittstelle nicht verwenden!
Prüfe Schnittstelle COM7:Kann Schnittstelle nicht verwenden!
Prüfe Schnittstelle COM8:Kann Schnittstelle nicht verwenden!
Suche nach einer SPS mit 19200Baud bitte warten!
Prüfe Schnittstelle COM1:SPS gefunden!
Hersteller ID:4849,Modul ID:0102,Version:0101
COM1:SPS wurde gefunden..
COM1:Hersteller ID:4849,Modul ID:0102,Version:0101
Suche SPS
Zeige SPS Uhrzeit
Name:
Wähle SPS Interface
Setzte SPS Uhrzeit
Type
Bit
Analog
Text
Prüfe SPS Version
Debug
Wert:
Zeige SPS Status
Download
Get
Set
Get MC
Set MC
Starte SPS
Stoppe SPS
Lösche SPS
Kopiere SPS->MC
Kopiere MC->SPS

Online Data exchange

Activating the button **Debug** at the PLC-Manager a test program will be activated with a screen interface that allows special actions:



Memory read/write

You can read many memories from the current program at the same time and set new values. Use the middle area of the test program.

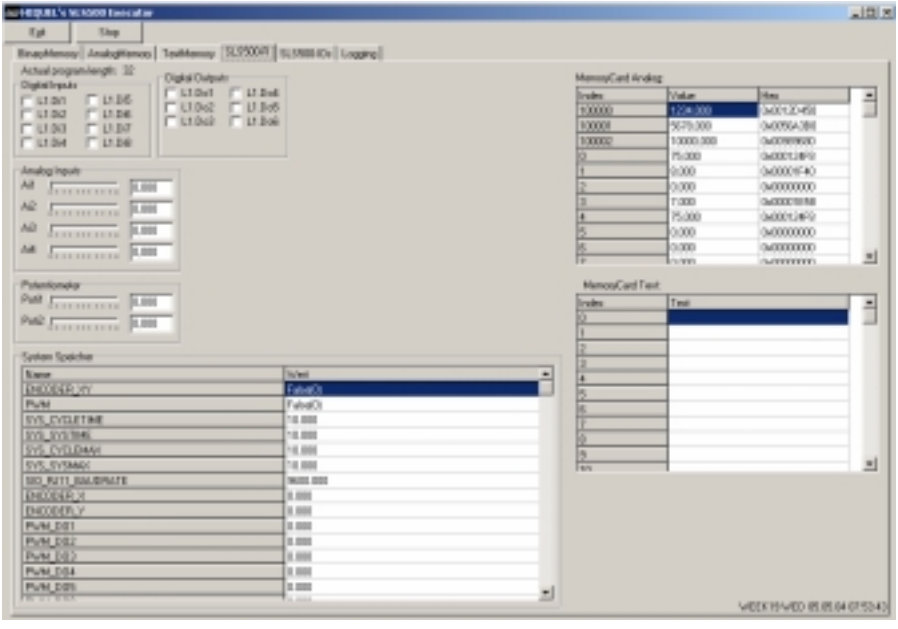
Click the button ***Get values*** to query the current state of the memories.

You can also set a new value by choosing a Value and pressing ***Set values***.

Simulator

The integrated executor of SLS-500-Configurator enables you to test a complete application without external elements being connected.

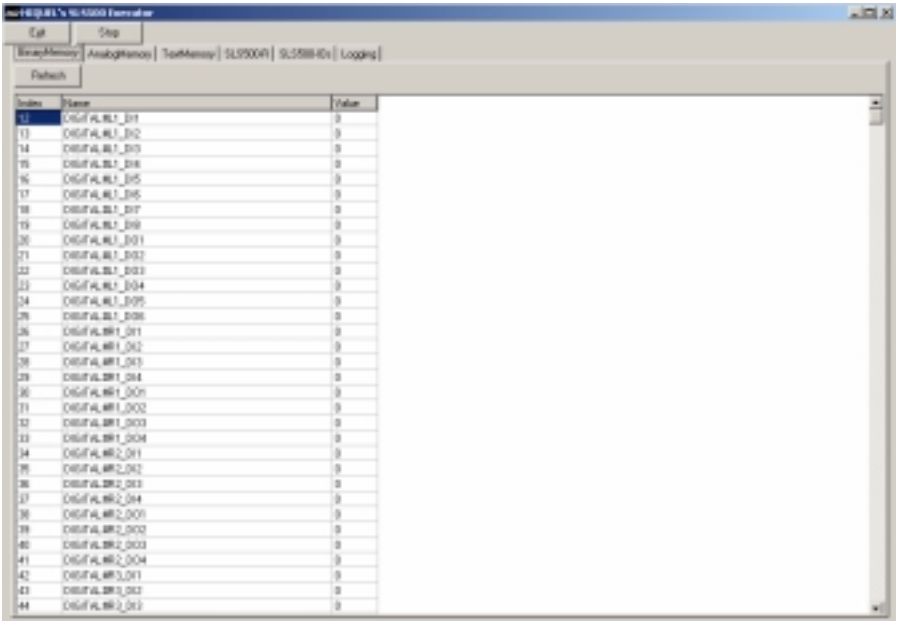
Start simulation



A simulation page will be displayed for this element.

Simulation: Binary Memory

All binary memories of SPS will be displayed here.

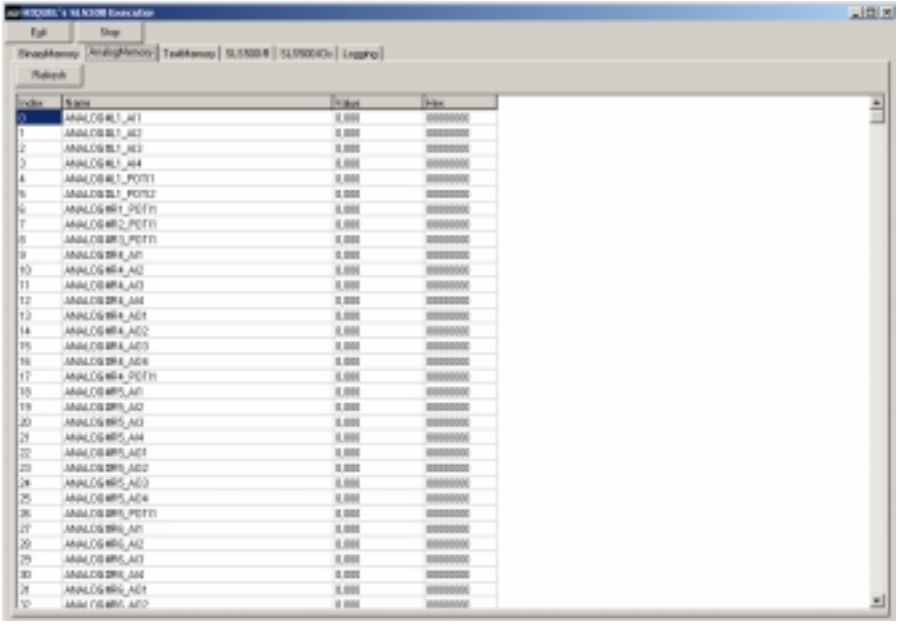


The column Index describes the internal memory space of the marker. Name describes the name and Value shows you the current value.

To change the value of a memory double-click the field Index and the value will be inverted!

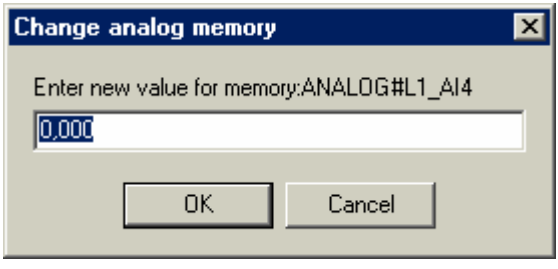
Simulation: Analogue Memory

All analogue values are displayed here:



All analogue values are displayed as analogue values in column ***Value*** and also as 32-Bit hexadecimal values in column ***Hex***.

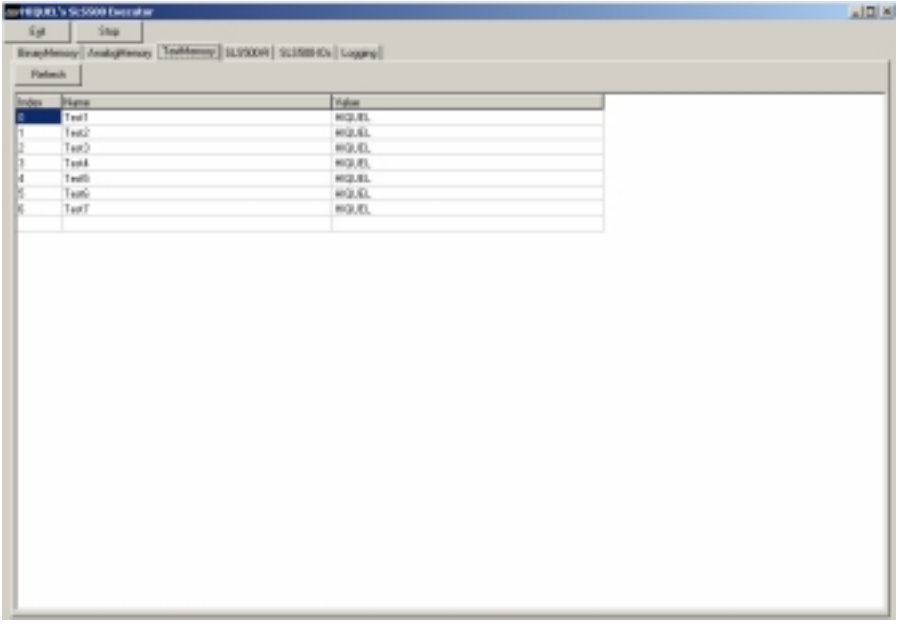
To change an analogue value, click on the corresponding Index field. The following entry form opens up:



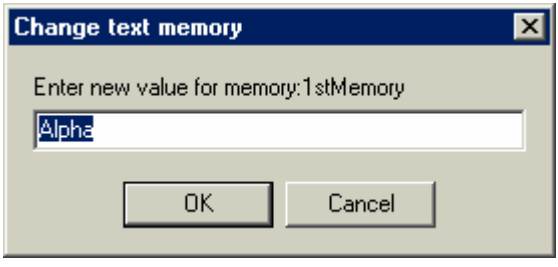
Enter the new analogue value and confirm by clicking OK.

Simulation: Text Memory

All text memories are displayed here:



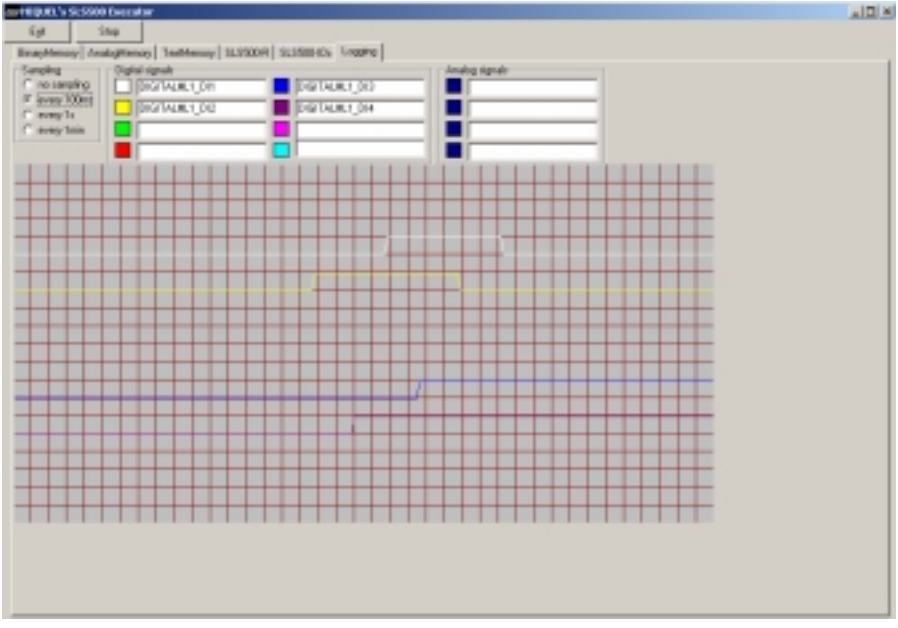
You can also change the text memory. Double-click the Index field and the following entry forms opens up:



Enter the new text and confirm by clicking OK.

Simulation: Logging

You can take a look at the rising and falling edges on this page:



You can set the update time of the edges here.

Command for the required digital and analogue signals:

DIGITAL#L1_DO1

ANALOGUE#L1_AO1

Close Simulator

To close the executor click Exit on the upper left.

Continue Simulator

To activate the Simulator click Run, upper left.

Exit Simulator

To exit the Simulator click Exit, upper left.

Contact

HIQUEL GmbH

Bairisch Kölldorf 266,

A-8344 Bad Gleichenberg

Tel: +43-(0) 3159-3001-0

Fax: +43-(0)3159-3001-4

e-mail: hiquel@hiquel.com

http://www.hiquel.com