

SBSx Codesys Library with Funtionblock

This application note gives a step by step description of how to establish communication between SBSx Vision Sensor with a Festo Codesys V3 controller.

SBSI-Q
SBSI-B
SBSC-U
SBSC-Q
SBSC-B

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1 **Components/Software used**

Type/Name	Version Software/Firmware	Date of manufacture
SBSI	2930236	
Vision Sensor Configuration-software	1.23.2.2	
Codesys	V3.5 SP 12	
Manual SBSx EN	8097682	

Table 1.1: 1 Components/Software used

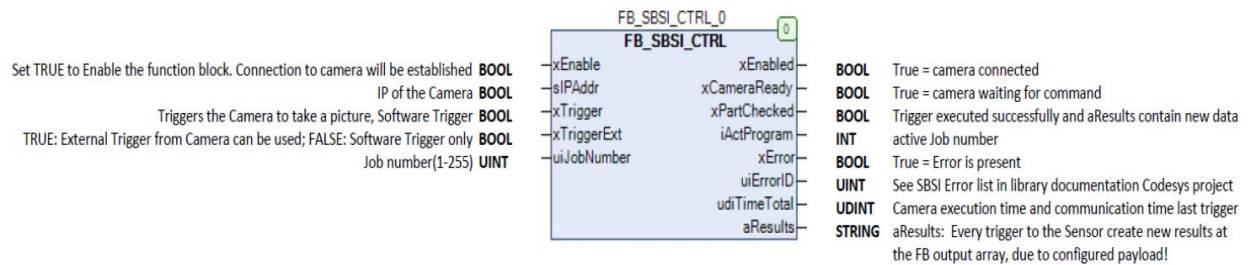
2 Description of the Application note

This short introduction explain how to configure a Festo vision sensor to communicate result data to a Codesys controller.

The example show to transfer the results of a barcode. The results are the x-,y-coordinates, angle and the string of the barcode.

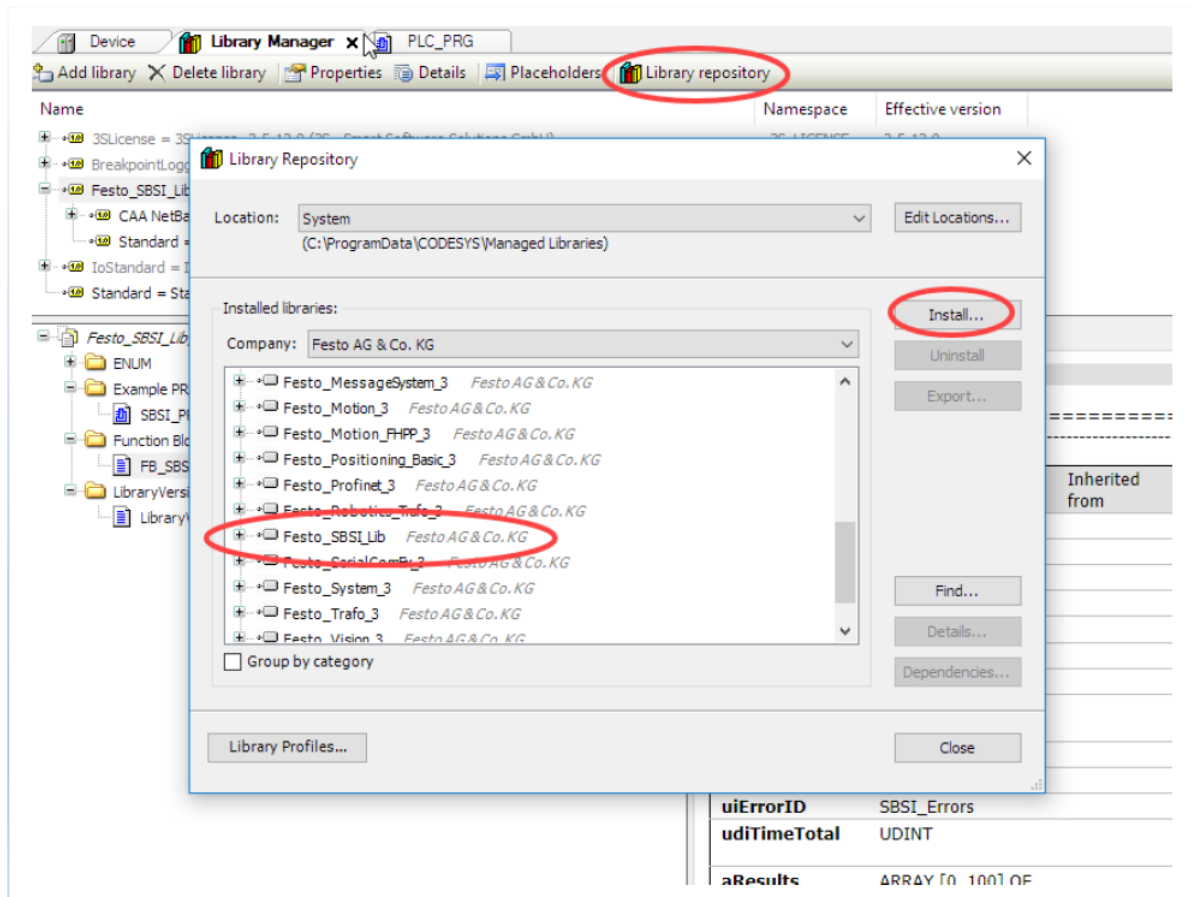
3 Description of the Function block in the SBSI-library

The fb support to establish TCP/IP connection, change active job no., send a trigger signal and receive result string from SBS-vision sensors. Independent from the different available model. Based on firmware 1.23..

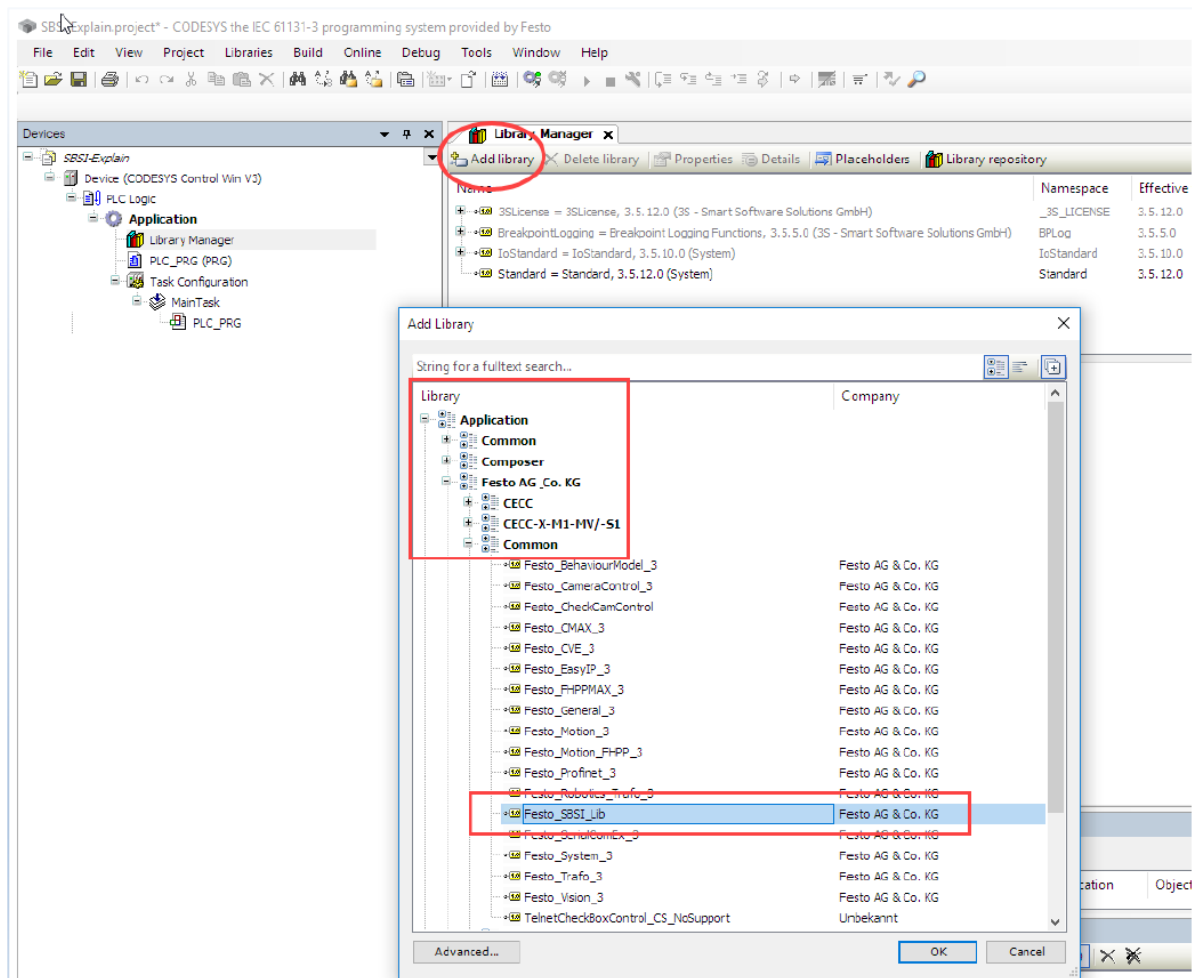


4 Prepare Codesys

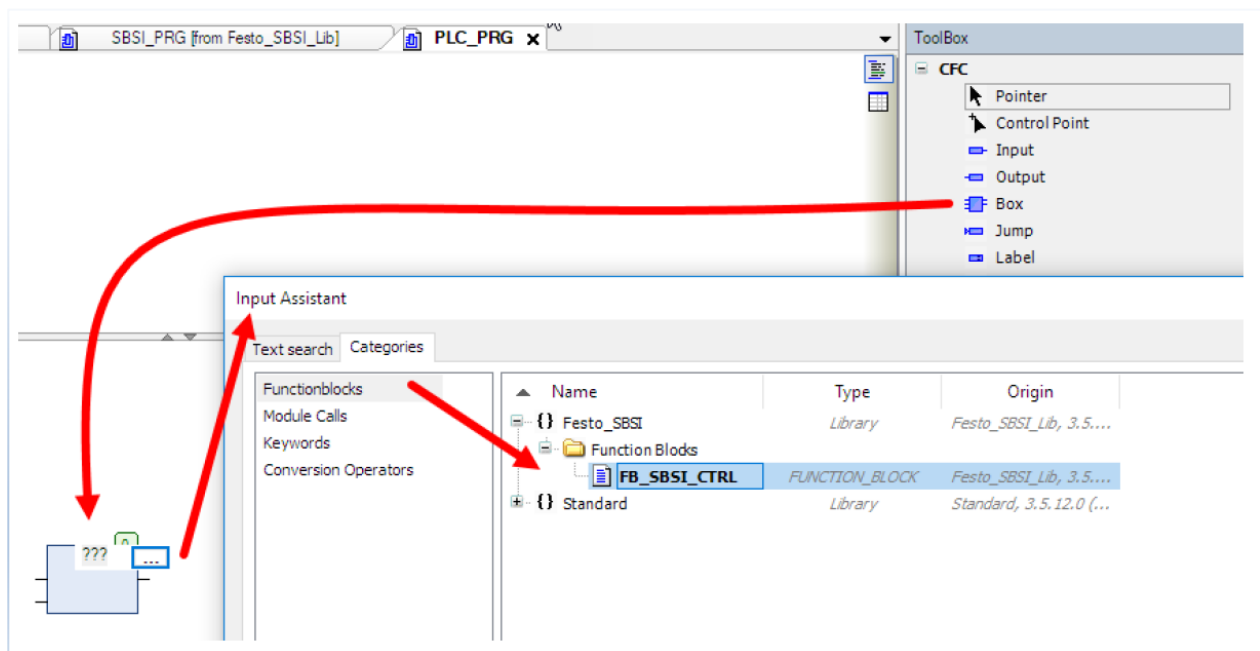
First you have to install the library to the repository of your Codesys. The Library is delivered with the Application note in Support Portal or in SPIMS database or by TSHQ.



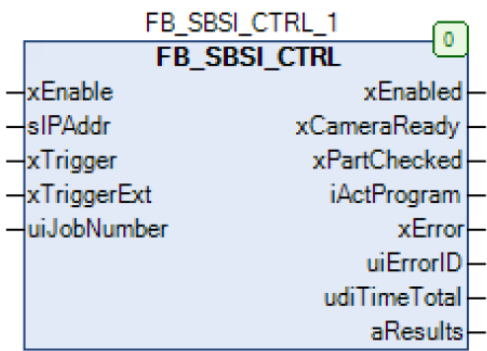
Then add the library to your project.



Then you can use the FB as a usual FB in Codesys. In CFC you can insert a box and use the input assistant with auto declaration and instance no.



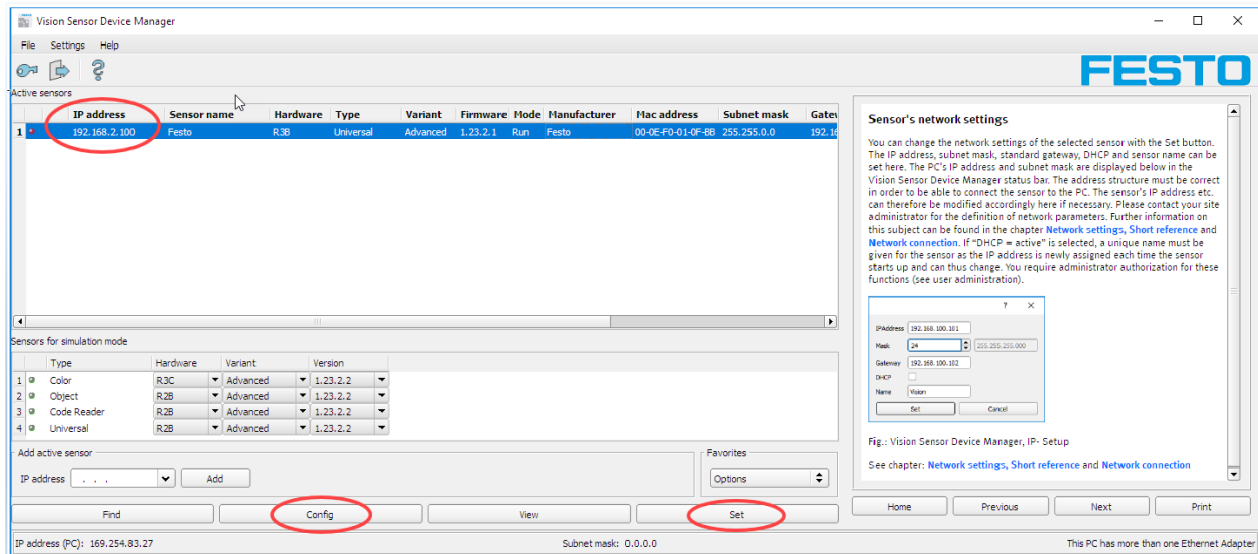
So the fb is applied:



5 Prepare the vision sensor for communication

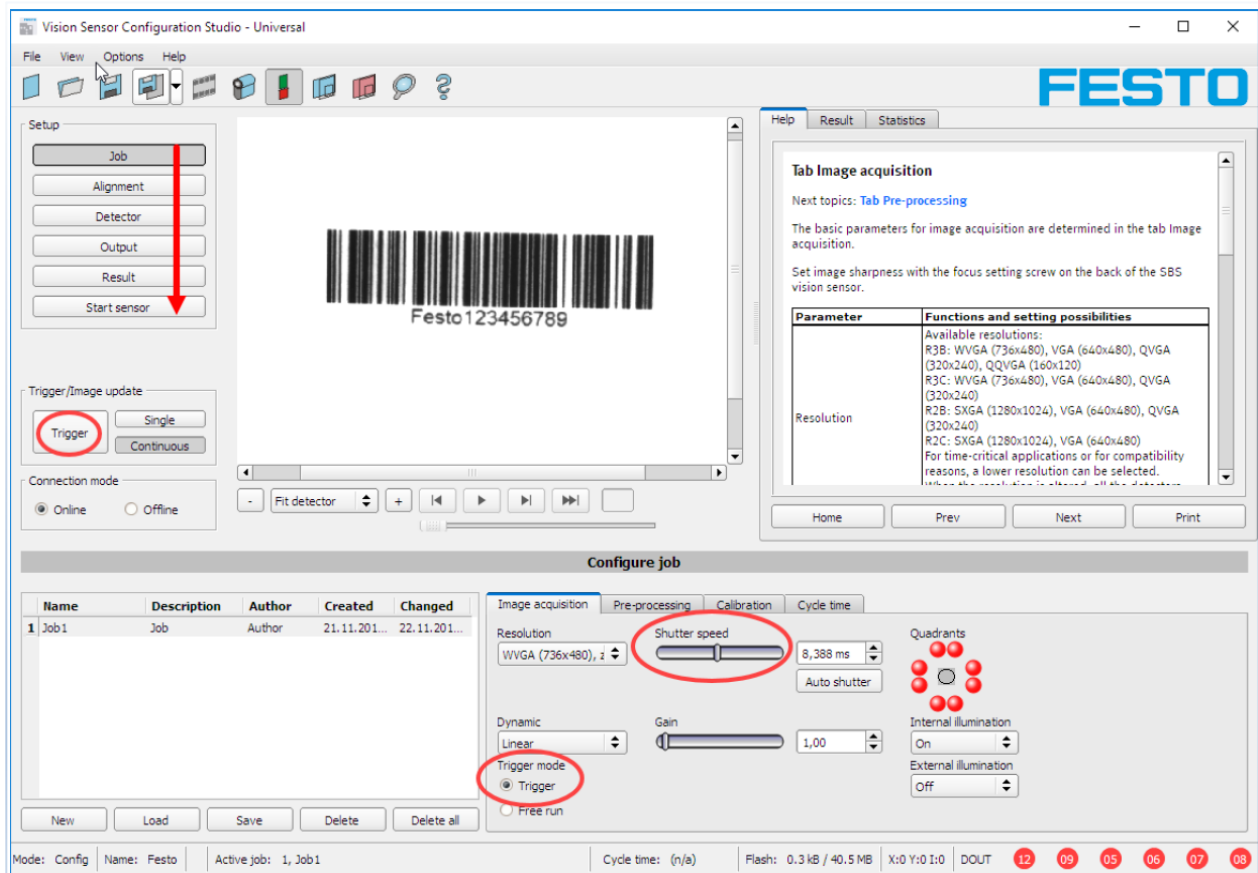
Start the vision sensor device manager.

Then the connected sensor will be shown in the list:



To change the IP-address press the **Set** button. If not necessary continue with the **Config** button.

After that, the Vision Sensor Configuration Studio will be started.



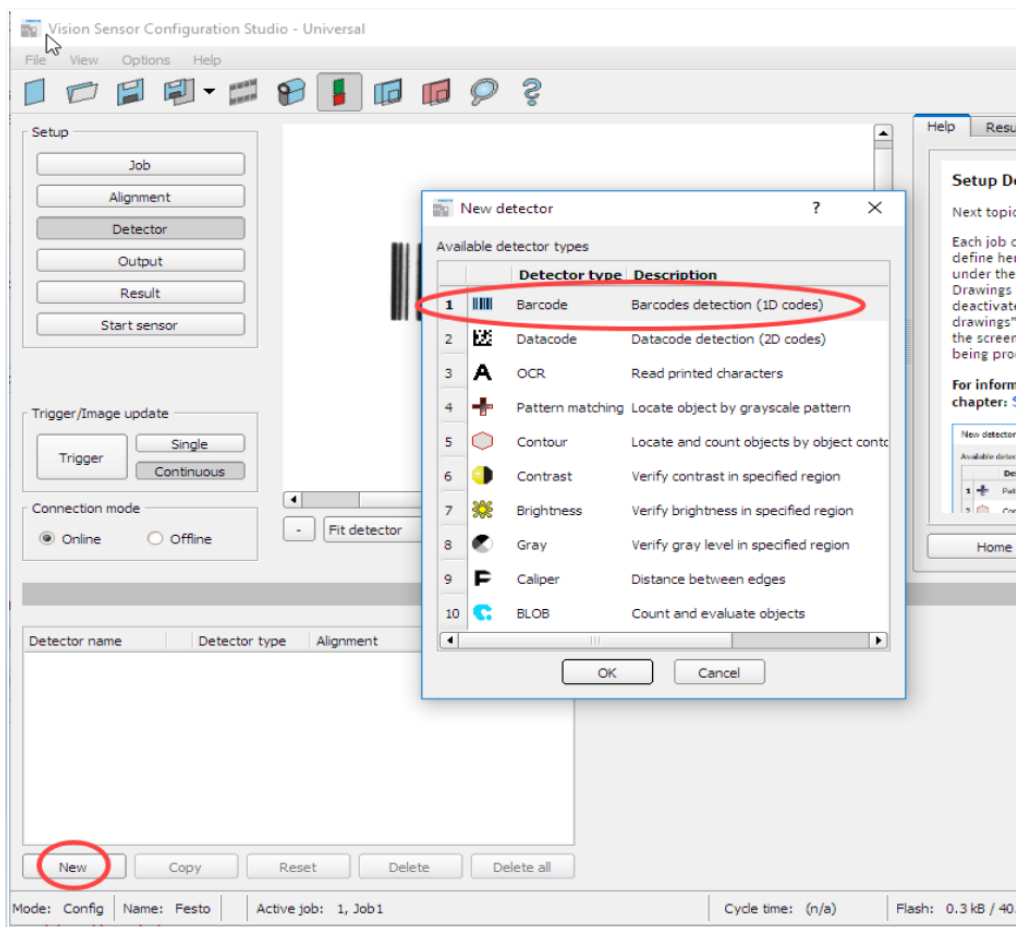
Follow the steps one after the other.

In the Job you adjust the brightness by the shutter speed. Set up the image that you get a good contrast of the code. Set the trigger mode to Trigger. This will be necessary for the data transfer.

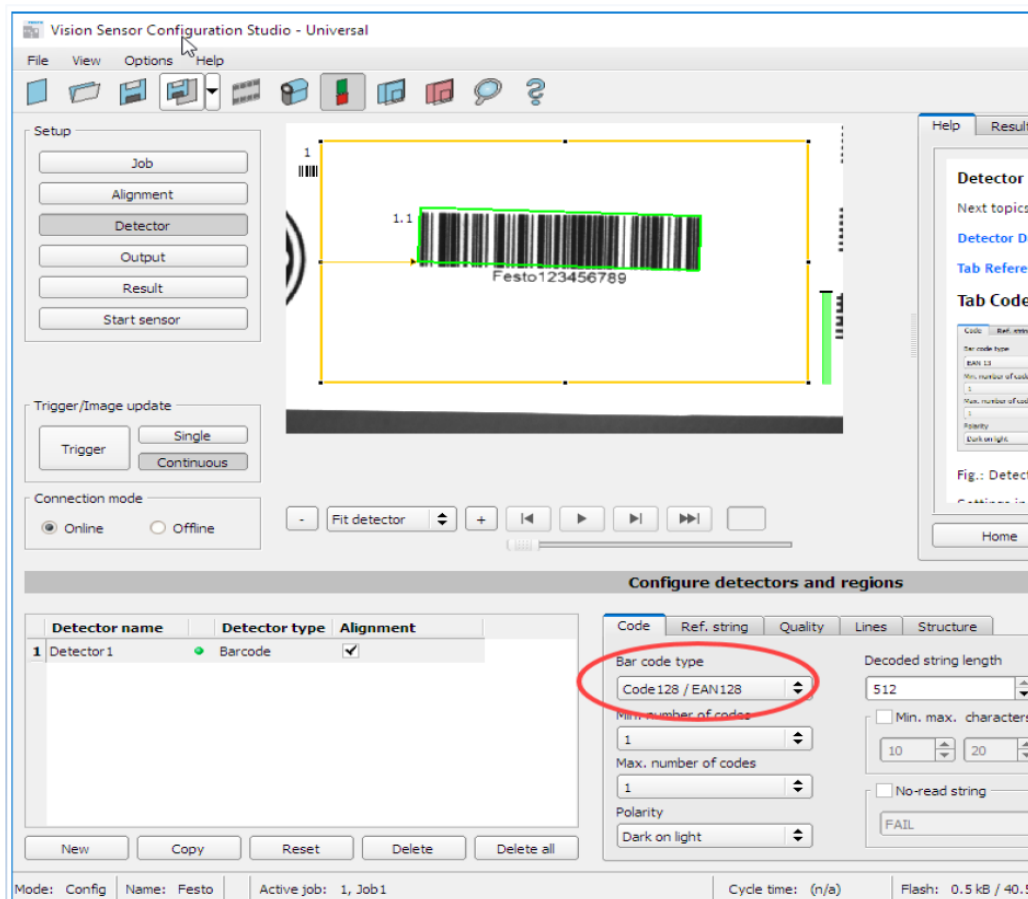
Prepare the vision sensor for communication

With the Trigger button you can initiate a new image.

Next step Detector. (Alignment is not used for this example)

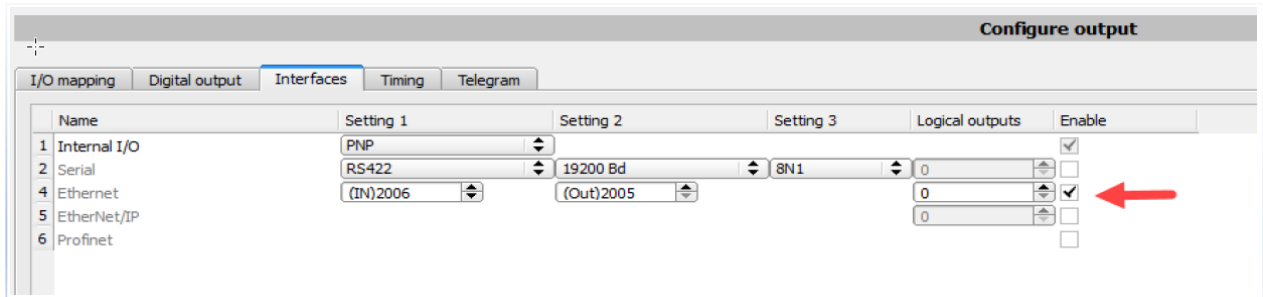


Select the correct kind and type of code.



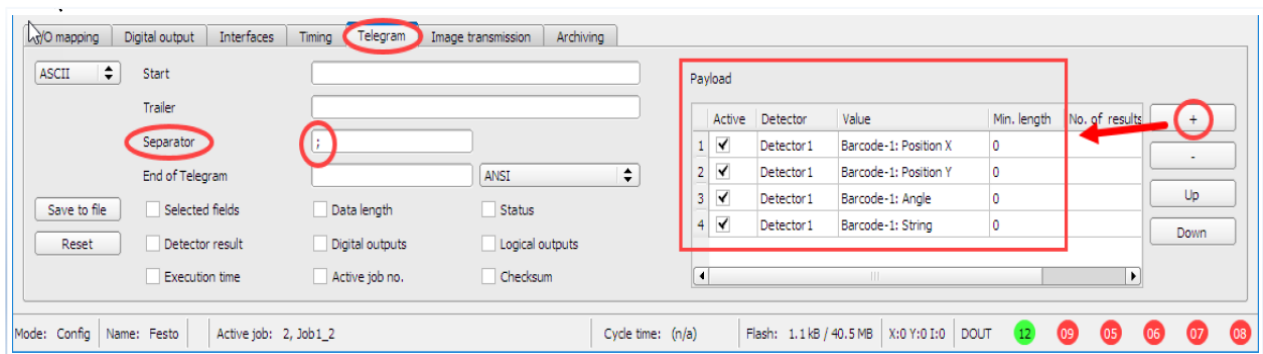
If the code is readable, it will be bounded with a green box.

Next step: Output > tab Interfaces



Enable the Ethernet interface.

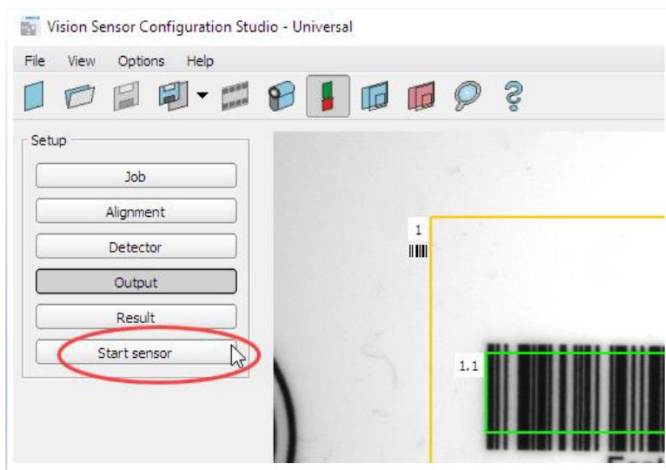
Change to tab Telegram



The FB is made for max. 100 result string. In this demo we transfer 4 values. Position coordinate of the Bar code x, y, angle and the detected string. Important is to insert the semicolon as a separator sign. By clicking the + it is possible to add more entry in the payload list.

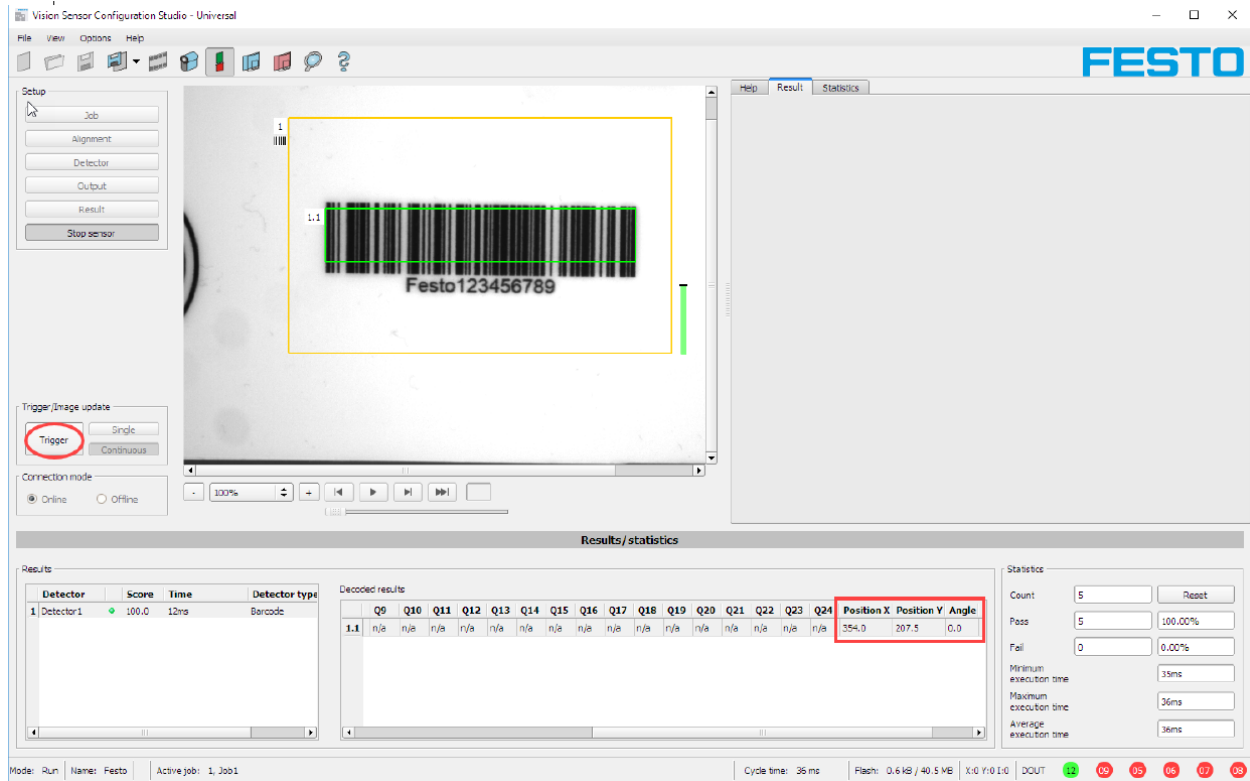
Finish the project.

To store and activate the setting in the sensor you have to press "START sensor"



Prepare the vision sensor for communication

After a trigger by button in software, the following result will be calculated:



Now the sensor is prepared for the next step and connection to the Codesys controller.

6 Test of communication

In the example project the Codesys Control Win V3 is used. But any other Festo Codesys controller should work similar.

Login to the controller and download the project to the controller. Start the PLC.

Force (ctrl+F7) the ip address of the sensor and then force "True" to the xEnable input. After that the connection will be established, and if all is o.k, the FB set the output xEnabled and xCameraReady.

If not then the Error output occur. Error Id could be checked in the library documentation in Codesys.

Expression	Type	Value	Prepared value
FB_SBSL_CTRL_1	FB_SBSL_CTRL		
xEnable	BOOL	TRUE	
xIPAddr	STRING	192.168.2.100	
xTrigger	BOOL	FALSE	
xTriggerExt	BOOL	FALSE	
uJobNumber	INT	0	
xEnabled	BOOL	TRUE	
xCameraReady	BOOL	TRUE	
xPartChecked	BOOL	FALSE	
iActProgram	INT	0	
xError	BOOL	FALSE	
uErrorID	SBSL_ERRORS	NO_ERROR	
udiTimeTotal	UDINT	0	
aResults	ARRAY [0..100] OF ...		
iSTEP	INT	30	

Feedback when connection is o.k.

Now the FB is ready for trigger input.

Force True to xTrigger.

After the image processing time the output xPartChecked will become true. Then the results are available in the aResult array.

Expression	Type	Value	Prepared value	A...	Comment
FB_SBSL_CTRL_0	FB_SBSL_CTRL				
FB_SBSL_CTRL_1	FB_SBSL_CTRL				
xEnable	BOOL	TRUE			TRUE = Enable Function Block
xIPAddr	STRING	192.168.2.100			IP address of the SBSL Vision Sensor
xTrigger	BOOL	TRUE			Rising Edge: Trigger SBSL
xTriggerExt	BOOL	FALSE			
uJobNumber	INT	0			Set SBSL active Job: 1 - 255
xEnabled	BOOL	TRUE			TRUE = Camera connected
xCameraReady	BOOL	TRUE			TRUE = Camera waiting for Command
xPartChecked	BOOL	TRUE			TRUE = Trigger executed ...cessfully and aResults c...
iActProgram	INT	0			Active Camera Program.
xError	BOOL	FALSE			TRUE = Error is present
uErrorID	SBSL_ERRORS	NO_ERROR			See SBSL_Errors
uTimeTotal	UDINT	42			Camera Execution time + ...IP communication time.
aResults	ARRAY [0..100] OF ...				Array of results configure ... the Output Tab of Visio...
aResults[0]	STRING	382000			
aResults[1]	STRING	233502			
aResults[2]	STRING	-8142			
aResults[3]	STRING	Festo123456789			
aResults[4]	STRING				

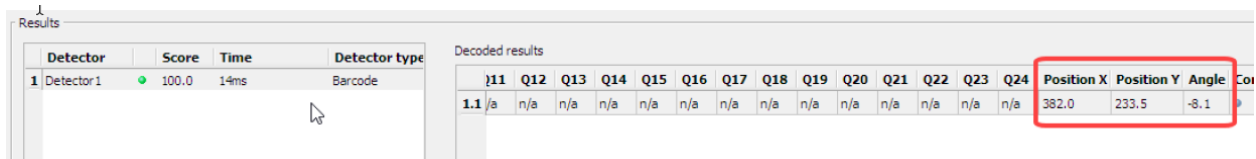
All result value x 1000 !!

382000 = 382,0
233502 = 233,5
-8142 = -8,1

The sensor transmit the results multiplied by 1000! So for further processing in Codesys the values have to be divided by 1000!

Test of communication

Compare the result in sensor software

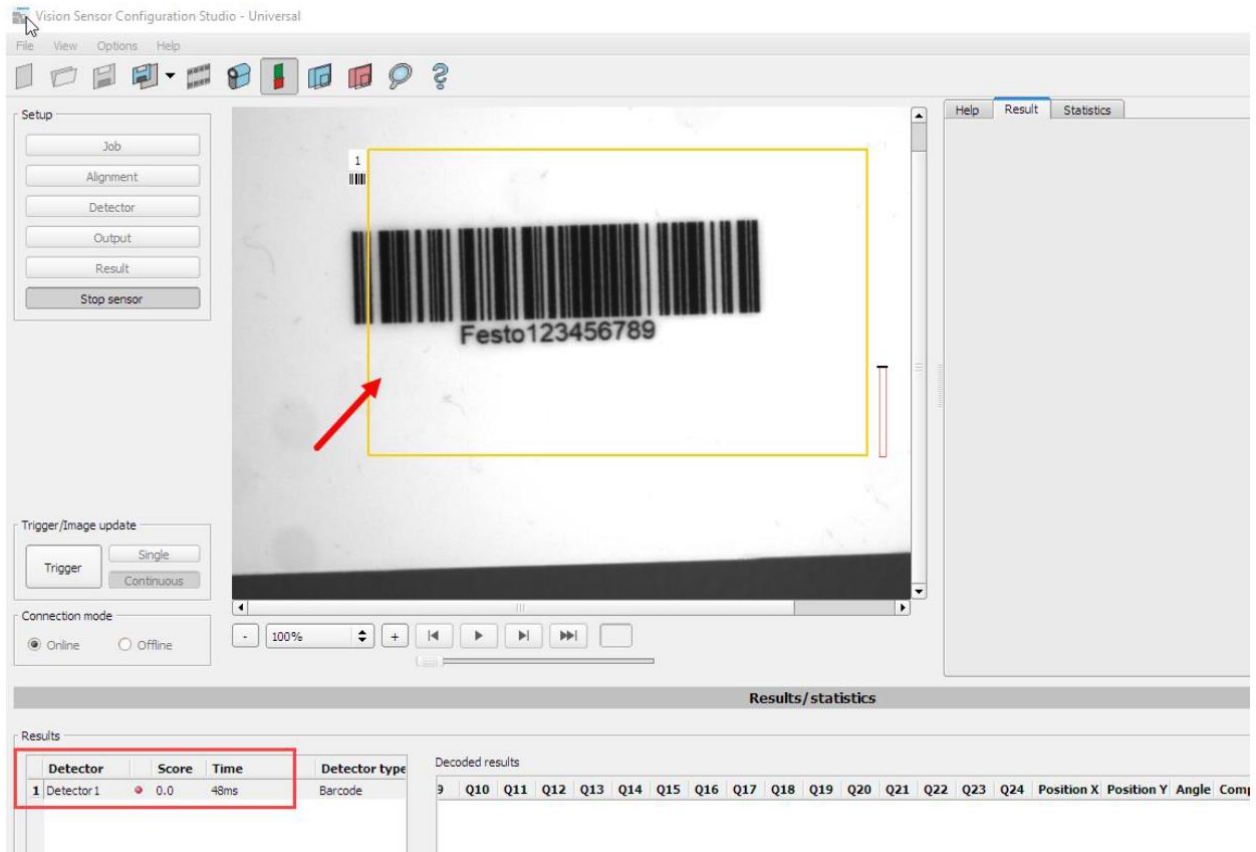


The screenshot shows the 'Results' tab of the Vision Sensor Configuration Studio. A table lists the detection results for Detector 1, which successfully detected a barcode with a score of 100.0 and a time of 14ms. The 'Decoded results' table shows various data points (Q11-Q24) and position information (Position X: 382.0, Position Y: 233.5, Angle: -8.1), which are highlighted with a red box.

Detector	Score	Time	Detector type
1 Detector1	100.0	14ms	Barcode

Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Position X	Position Y	Angle
1.1	/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	382.0	233.5	-8.1

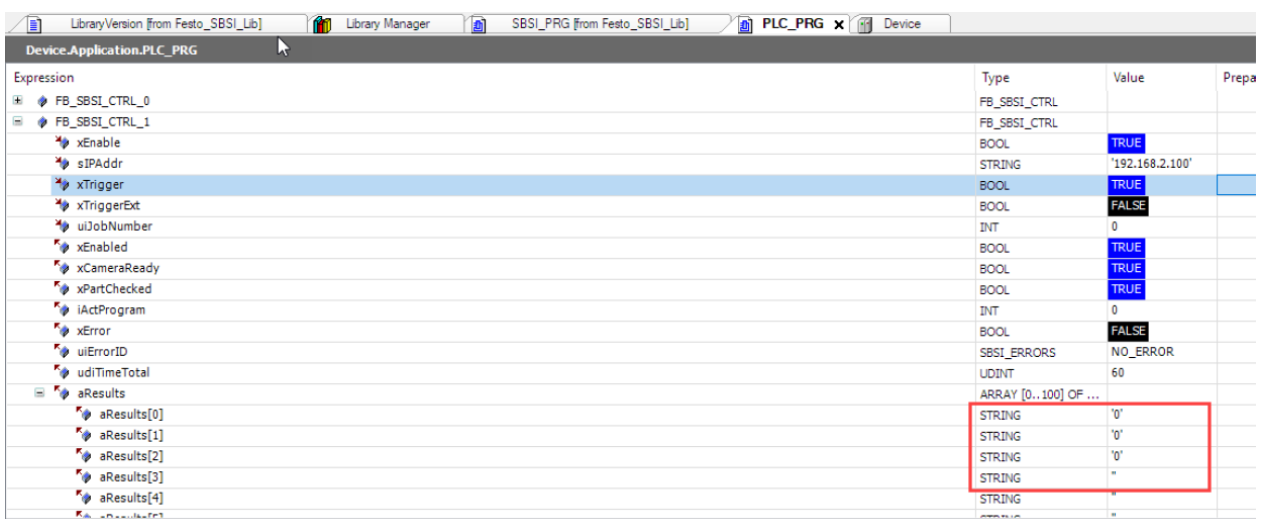
If result is not possible or calculated. The String is empty and the value is 0.



The screenshot shows the 'Results' tab of the Vision Sensor Configuration Studio. A red arrow points to the 'Results' table, which shows a failed detection for Detector 1 with a score of 0.0 and a time of 48ms. The 'Decoded results' table shows various data points (Q10-Q24) and position information (Position X, Position Y, Angle), which are highlighted with a red box.

Detector	Score	Time	Detector type
1 Detector1	0.0	48ms	Barcode

Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Position X	Position Y	Angle
9																	



The screenshot shows the 'PLC_PRG' editor with the 'Device.Application.PLC_PRG' project. The 'Expression' table lists the variables and their values. The 'aResults' array is highlighted with a red box, showing the results of the sensor detection.

Expression	Type	Value	Prepa
FB_SBSI_CTRL_0	FB_SBSI_CTRL		
FB_SBSI_CTRL_1	FB_SBSI_CTRL		
xEnable	BOOL	TRUE	
sIPAddr	STRING	'192.168.2.100'	
xTrigger	BOOL	TRUE	
xTriggerExt	BOOL	FALSE	
uiJobNumber	INT	0	
xEnabled	BOOL	TRUE	
xCameraReady	BOOL	TRUE	
xPartChecked	BOOL	TRUE	
iActProgram	INT	0	
xError	BOOL	FALSE	
uiErrorID	SBSI_ERRORS	NO_ERROR	
udiTimeTotal	UDINT	60	
aResults	ARRAY [0..100] OF ...		
aResults[0]	STRING	'0'	
aResults[1]	STRING	'0'	
aResults[2]	STRING	'0'	
aResults[3]	STRING	'0'	
aResults[4]	STRING	'0'	

To get also a string for a "no read", it is possible to give an own text.
Therefor adjust in the detector setting a text for a no read result. Do not forget to start the sensor when you leave the config software!

Detector name	Detector type	Alignment
1 Detector1	Barcode	☒

NewCopyResetDeleteDelete all

CodeRef. stringQualityLinesStructure

Bar code typeCode128 / EAN128

Min. number of codes1

Max. number of codes1

PolarityDark on light

Decoded string length512

☐ Min. max. characters1020

☒ No-read stringFAIL

To test again in Codesys, you have to disable the fb and enable again.

Remark: The Config software of the sensor interrupt existing TCP/IP connection to codesys controller.
In the result array the given text is shown:

ARRAY [0..100] OF ...	
STRING	'0'
STRING	'0'
STRING	'0'
STRING	'FAIL'
STRING	"
STRING	"