anyfeedWare User Guide

Part recognition
and feeding setup

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flexfactory**.com**

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1. Loading a job-file

Open the In-Sight Explorer and double-click the camera in the network tree you want to connect to.
(>View >In-Sight-Network)
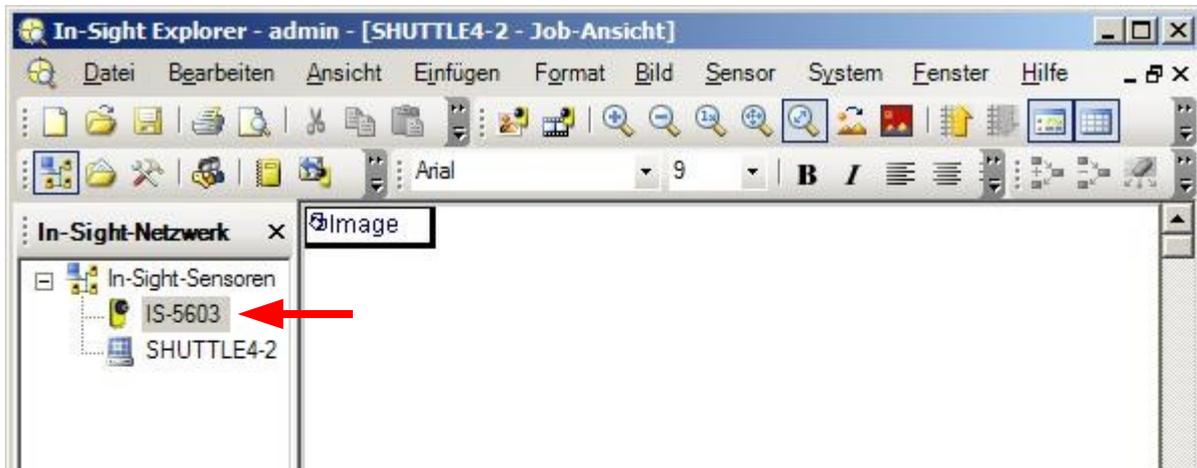
To open a job-file go to (>Files >Open..) or drag the desired Job from the In-Sight-files tab (>Files >In-Sight-Files) into the image area on the right.

To load a Job-file the camera must be offline. The current state is shown in the bottom right corner and can be toggled with this button   or with Ctrl+F8 or in through the menubar (>Sensor).
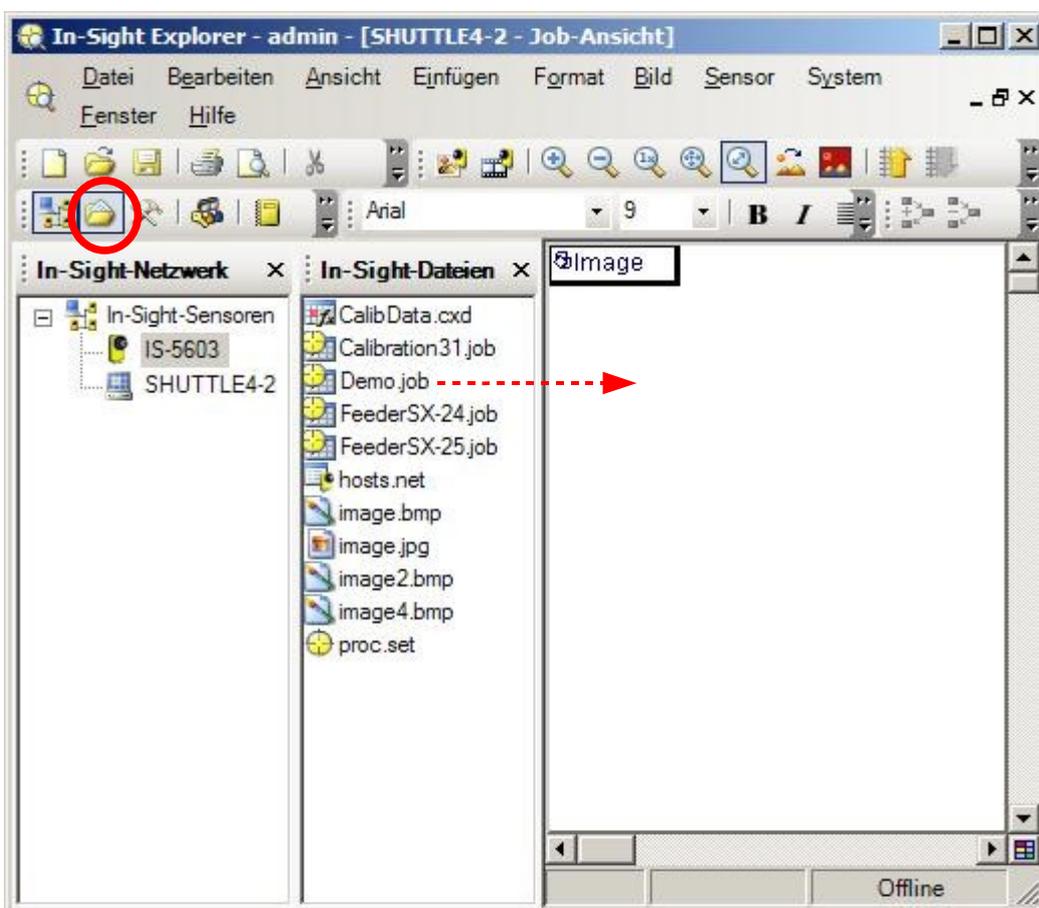
2. Basic camera settings

Open the In-Sight Explorer and double-click the camera in the network tree you want to connect to.

2.1 Serial interface

Go to >Sensor >Serial settings >Port 1 and set the parameters as follows.

Note: If you use the serial line to communicate with the Feeder, set the Baud Rate to 9600 and set the Mode to **'Text'**. The remaining settings should be set as shown below (8, 1, none, none).

If you use the serial line to communicate with the robot, Mode must be set to **'Native'** and the serial settings of the robot controller must match the camera settings.
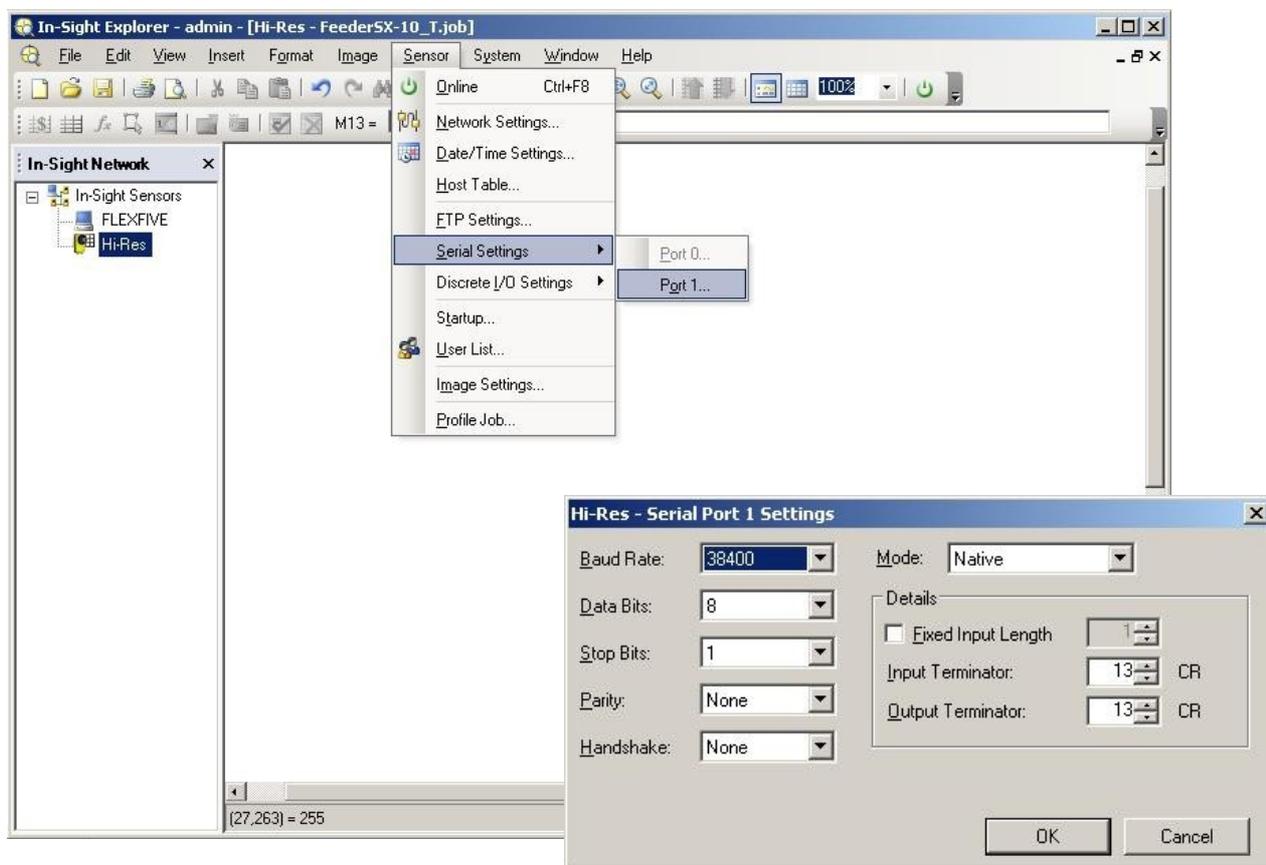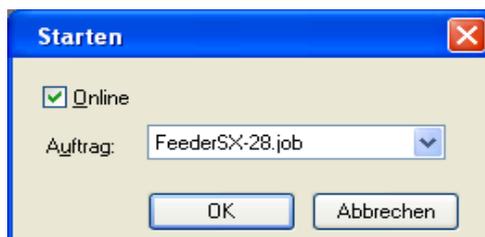

2.2 Startup

You can specify a job that will be loaded automatically at camera startup.

Note: Only jobs stored on the camera can be selected for startup.
(>Save >In-Sight Network >'Camera-name')

Go to >Sensor >Startup...

Set the the user interface (Custom view) as the camera's default view:

Go to >Sensor >User List... Select "admin" and press the Edit-button. Check "Show Custom View at Log On" and hit OK.
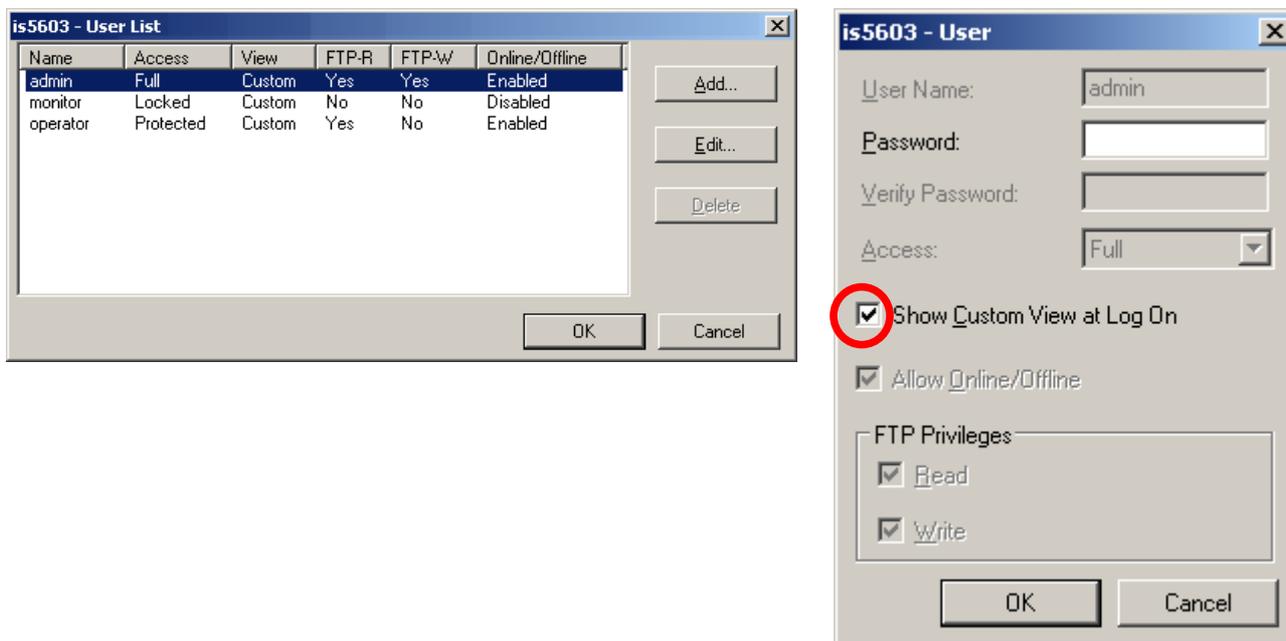
3. anyfeedWare overview

3.1 Custom view

The custom view is the user interface of the vision software. The main panel shows important information and provides access to all settings sub-menus (Button 'Settings').

3.2   Feeder settings

Go to >Settings >Feeder settings
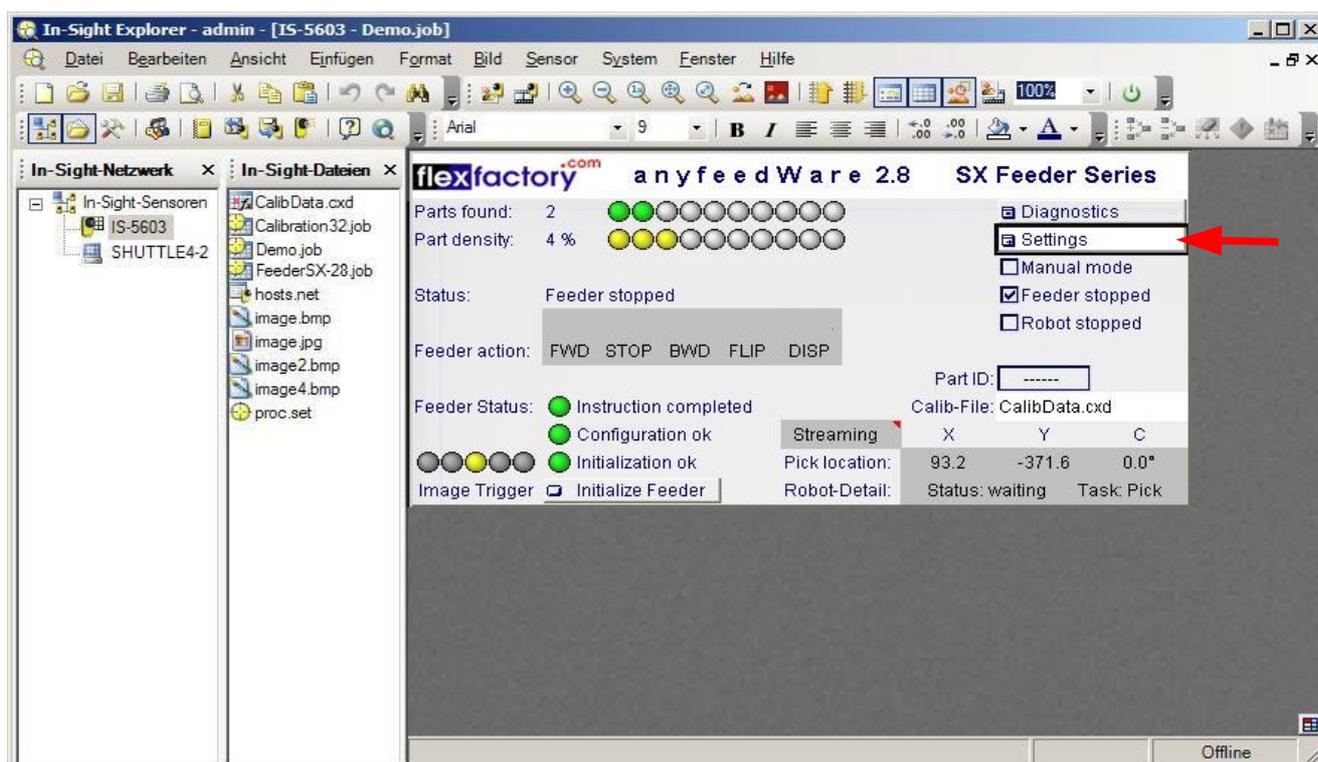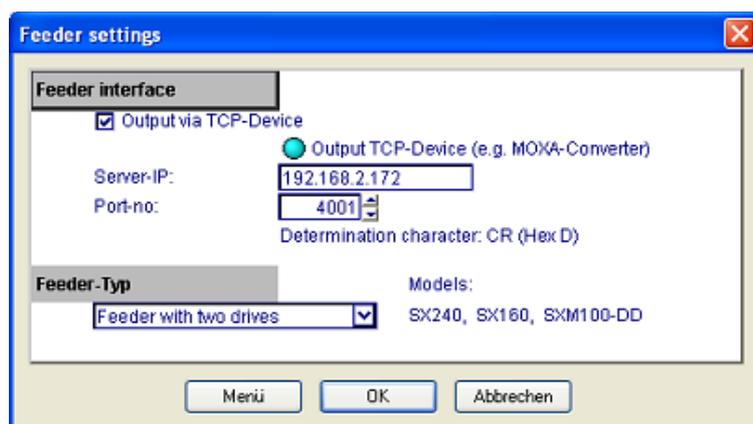
If you communicate with the Feeder via a Ethernet/RS232 converter you need to check "Output TCP-Device" and set the converters IP-address and Port no.

If the Feeder is connected directly to the camera's serial port, leave that checkbox unchecked so that "Output Com1" is displayed.

Select the appropriate Feeder-Typ in order to achieve proper communication.

3.3   Preferences - Basic settings

Go to >Settings >Preferences

Start setting up a recognition by adjusting the aperture and the focus of the lens and set the exposure time to a reasonable value so that you get a good image. Set the PatMax search area to the desired size and specify the type of background color. 'Threshold for parts' specifies the grayscale value beyond which a pixel is considered as part-pixel. This value is important to control the part-flow on the feeder (see chapter 3.9).

Hint: In the status bar, at bottom left corner, the grayscale value at the current mouse position is displayed.
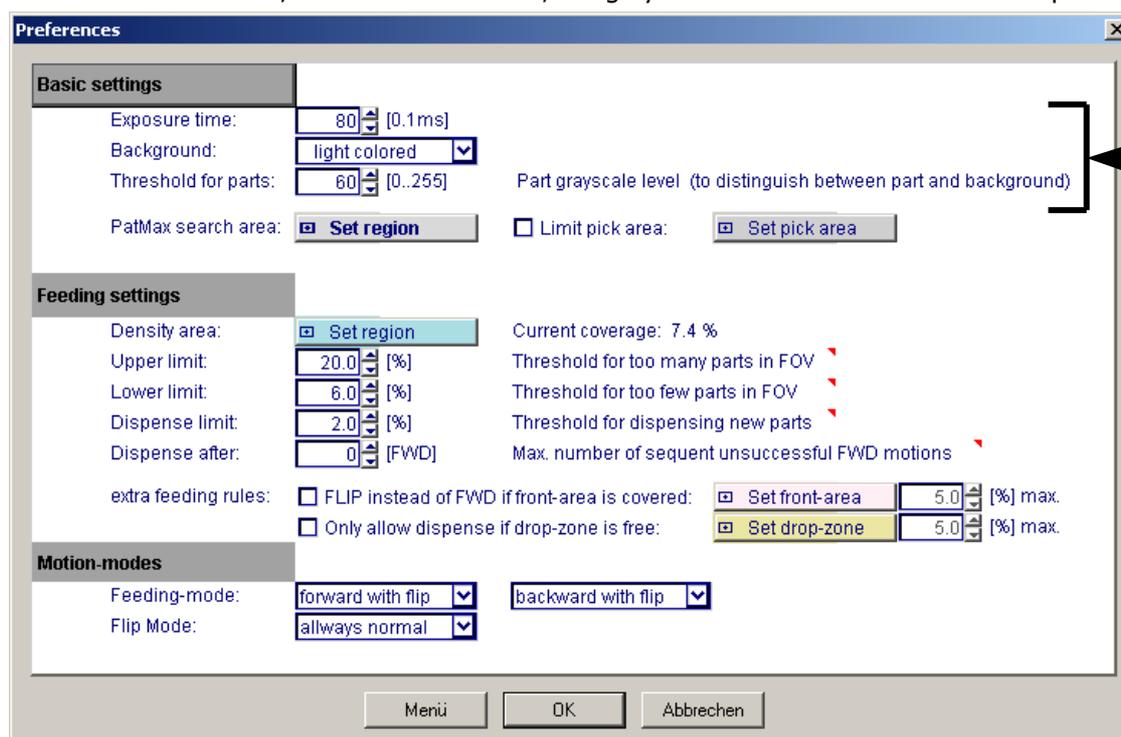
3.4 Teaching a part

Go to >Settings >Teach in & Search Settings

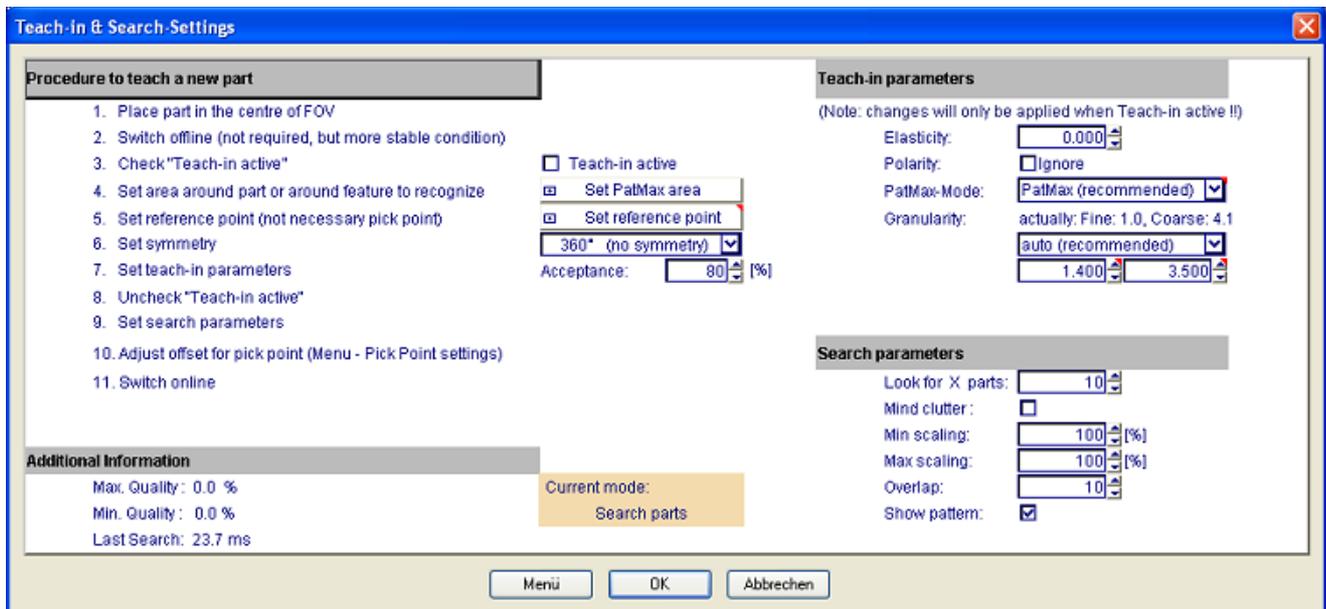In the Teach-in window you find a step by step guidance through the teach-in process.
To confirm the position of the PatMax area and the reference point, press Return or double click the geometry.

When the teach-in is done don't forget to uncheck 'Teach-in active' check box and save the job.

On the right hand side you can set the parameters to adjust the pattern teach-in and search. In most cases the settings as shown below are suitable. However, sometimes you might get better results or a faster processing time by setting the Granularity to a higher level than it is proposed in auto-mode.

Note 1: The level of acceptance should be set as high as possible but as low so that all 'good' parts in the whole FOV are still recognized.

Note 2: To change the Teach-in parameters the teach-in mode must be active. Whenever you activate the teach-in mode a new model is built from the current geometry inside the (static) PatMax area. Therefore it is very useful to store the image of the reference part from which the PatMax-model has been taken. To change the Teach-in settings just reload the image before activating the teach-in mode.

The 'Mind clutter' option in the search parameters causes patterns not to be recognized if there is disturbance within the PatMax-pattern Here an example:

You teach pattern A. With 'Mind clutter' disabled pattern B will be found as well as pattern A. With 'Mind clutter' enabled pattern B will not be recognized as good part
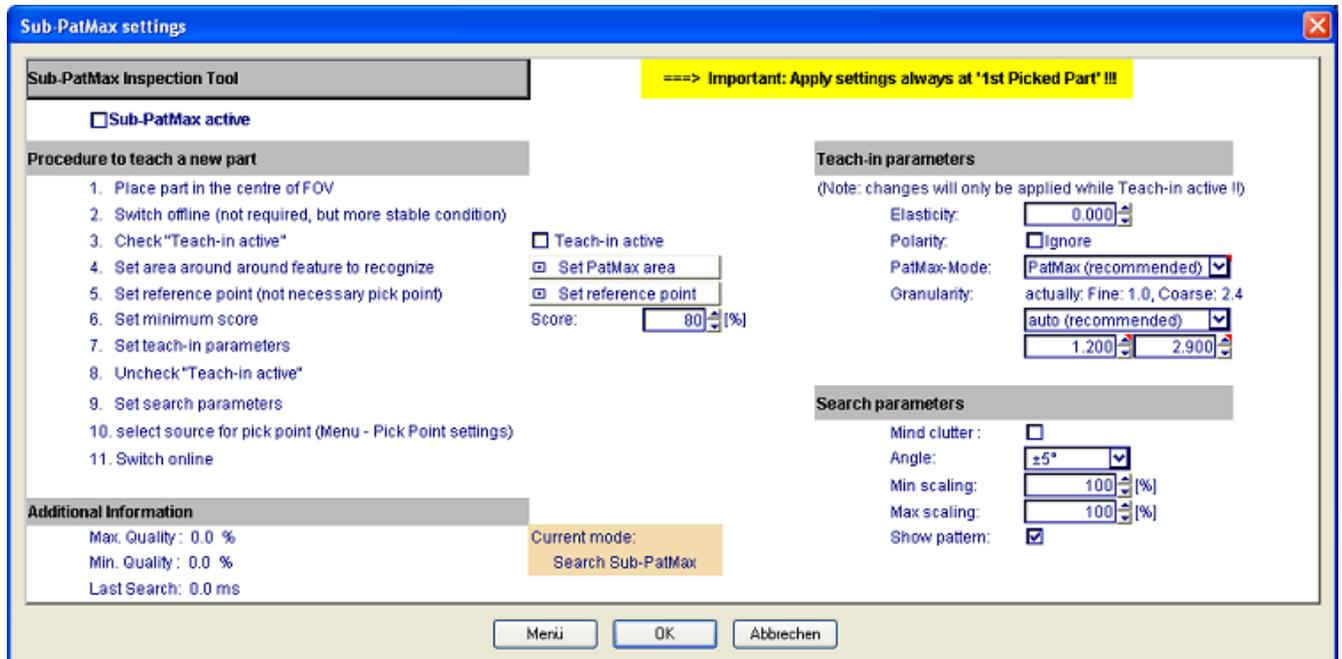
3.5 Sub PatMax

Go to >Settings >Sub PatMax settings

You have the option to set up a 2nd PatMax relative to the main recognition. This can be very helpful to check for a small detail with high accuracy while quickly locating the whole part with lower accuracy.
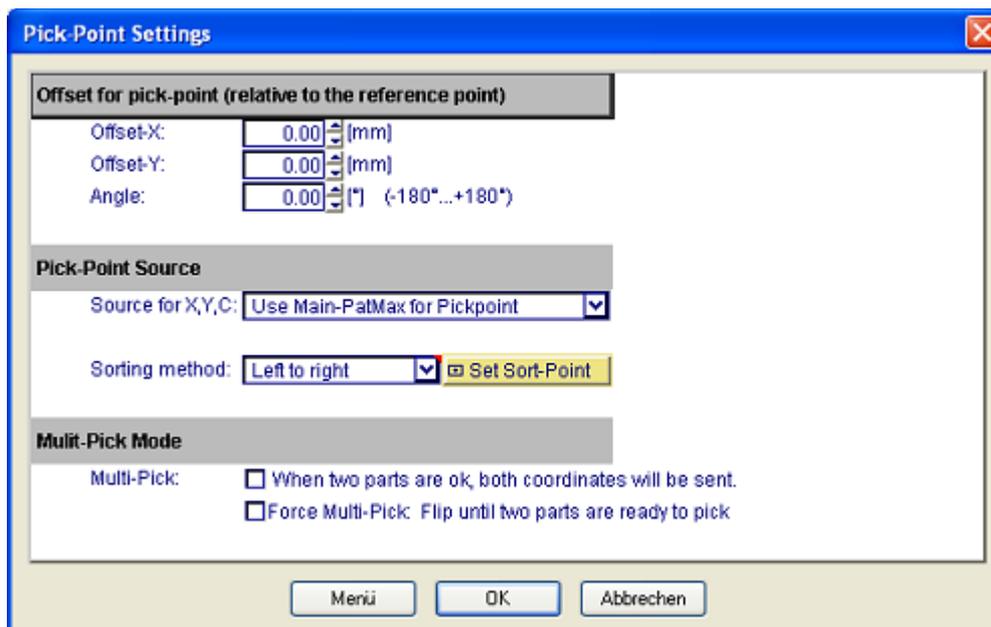The procedure to teach in a reference model for Sub PatMax is the same as used for main PatMax.

3.6 Pick-Point settings

Go to >Settings >Pick-Point Settings

The pick-point (coordinate which is sent to the robot) can be defined by an offset relative to the reference point of either the main PatMax or the Sub-PatMax.

3.7 Additional Inspections

Go to >Settings >Additional inspections

With these inspections you can set additional conditions that must be fulfilled for a part to be recognized as good part. Mainly Clear-Grip areas are used to avoid gripper fingers crash into adjacent parts or to prevent picking overlapping parts. To define such an inspection activate it by ticking the check box. Then you click 'Set region' and place the area wherein the condition should be checked. After that it is necessary to click 'Apply region' to reference the area to the current part. Finally set the Threshold to the desired level. (Clear-Grip: Threshold=percentage of coverage above which the inspection fails and the part will not be picked)

Note: Always set the region at the part marked as '1st Picked Part' because the position of the region will be referenced relative to its coordinates as soon as the 'Apply region'-button is hit.

3.8   Feeder Motion-parameter

Go to >Settings >Feeder motion-parameter

In this menu you can adjust and test the parameters for each feeder motion.

Note: The values entered must be sent to the Feeder to become effective. To do so the camera needs to be online. Then click the button "Send all parameters to Feeder". The download process may take a few seconds. See the state next to the button. The parameters sent to the feeder are stored in a temporary memory, so after a power cycle they must be sent again.

When the configuration is ok you can test the parameters by clicking the button of the desired motion.

Once you found a set of appropriate values, don't forget to save the job.

The trigger timer should be set about twice the average processing time (shown in the status bar).

The trigger delay (=Part settling time) specifies the delay time after each feeder-motion until the next trigger is initiated.

To simplify the Startup process and the procedure for product change there are two options that can be used:
 - 'send feeder-init after parameter' initializes the feeser after the parameters have been downloaded.
 - 'send feeder configuration after Job-load' starts the parameter-download automatically the first time you go online after a new job was loaded.

The following settings are only applicable if an anyfeed SX is used in combination with an external prefeeder and the interface-kit (p/n: 90-000-154):
 - The 'Light barrier sensitivity' defines the time that the light barrier must be free of obstacles until the control signal to the prefeeder is output.
 - The 'Prefeeder ON-impulse' specifies the duration of the control signal. After the signal is switched off, the light barrier is active again.

3.9   Preferences - Feeding settings

Go to >Settings >Preferences

Apart from the feeder motion parameter there are several settings to be tuned to achieve a good feeding flow. The feeding actions are based on the part density within the density area. If there is no pickable part ready then a feeder motion is performt. Which action is initiated depends on the current part density and the defined limit settings:

- Exceeds the density the upper limit then a backward motion is initiated.

- As long as the density stays between the upper and the lower limit parts are flipped stationary.

- Drops the density below the lower limit parts are fed forward.

- If the density goes below the dispense limit new parts are supplied from the bulk container.

- Dispensing new parts is also possible if after the specified number of feed forward motions (FWD) still no good part can be located, regardless of the current density.

- The additional rule 'FLIP instead of FWD if front-area is covered' prevents from parts to pile up at the frontend of the feeder. If the coverage of density-area is below the lower limit and no part is readyto pick, then normally a forward (FWD) motion would be issued, but if the rule is active and the front-area is covered more than the specified value, then a FLIP motion is performed.

- The option 'Only allow dispense if drop-zone is free' prevents any dispense motion as long as the drop-zone in front of the bulk container is covered to a degree higher than the specified value.
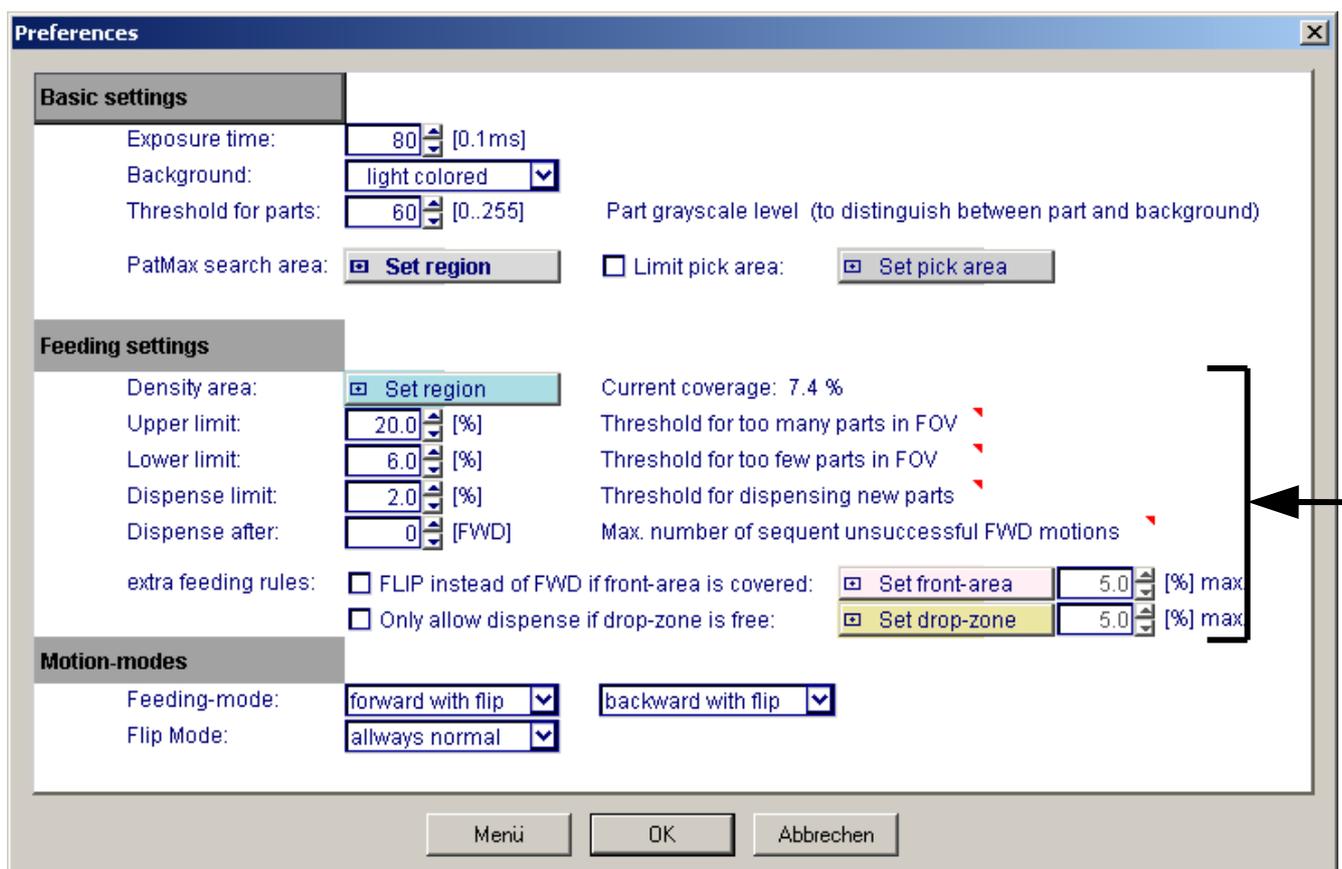
3.10   Robot calibration data

Go to >Settings >Robot calibration data

The calibration data that converts the camera pixel-coordinates into the robot's mm-coordinate system is stored in a file in the camera memory. The filename can be specified by the user and has the file extension CXD.
In each job the appropriate calibration file has to be referenced to the application by its filename.

There are several options to check the correct correlation between vision- and robot coordinates. Either you set a test-point in the FOV and check if the resulting robot coordinates are correct, or you enter X- and Y-values as robot coordinates and verify that the shown point represents the indicated position.

Robot calibration data

Robot coordinate system

| File name for external: | CalibData | load data | File loaded |

Resolution   **0.309 mm/Pixel**

Determined by both camera diagonal

Calibration Test

	X-Wert	Y-Wert	
Test-Point	367.3	511.1	[Pixel]
show it	414.4	417.4	[Robot]
Field of View:	237.5	316.6	[Robot]
Robot-Point:	340.000	370.000	[Robot]
show it	Point within FOV		
	212.9	751.4	Pixel]

Menü   OK   Abbrechen