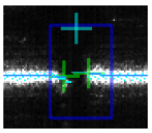
3 - S11 SEARCH Gap LINE GreyMin

Description

Searches the left and right gap border out of the found laser line parts. For different height blanks there is a clear gap at the blank borders. For blanks with (nearly) same thickness the algorithm tries to find either an intensity minimum in the laser line intensity shape or a v form part in the laser line shape as gap position.

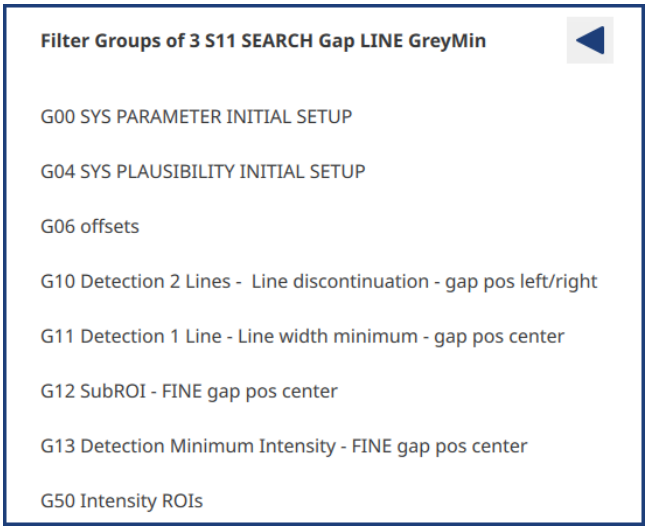
Icon



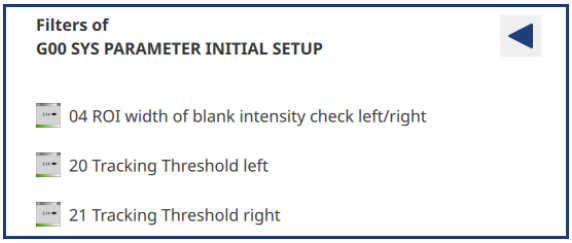
3 S11 SEARCH Gap LINE GreyMin

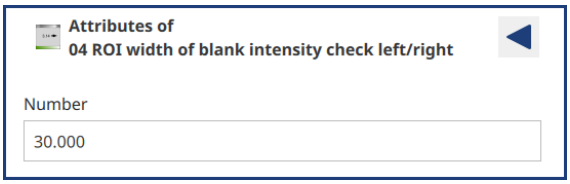
Detect edge position left and right with laserline.

Parameters



G00 SYS PARAMETER INITIAL SETUP



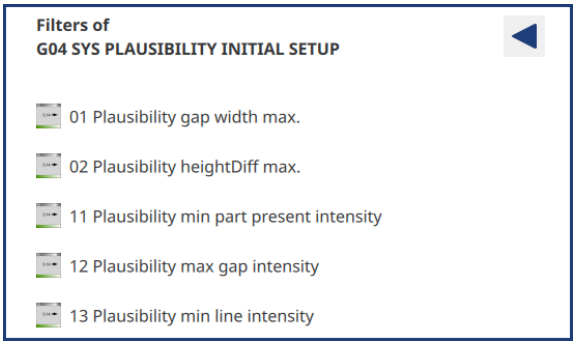


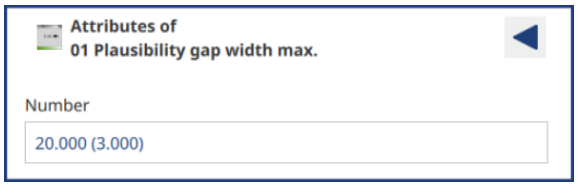
Parameter	Comment
Number	The number of pixels in direction to the gap, starting at the left/right border of the laser line ROI, serving for calculating the left/right side reference brightness. [Pixel]

Parameter	Comment
Number	If the filtered grey level of the laser line tracking is below this value the search stops and sets the 'found gap position' for the left gap side. [Greylevel]

Parameter	Comment
Number	If the filtered grey level of the laser line tracking is below this value the search stops and sets the 'found gap position' for the right gap side. [Greylevel]

G04 SYS PLAUSIBILITY INITIAL SETUP





Parameter	Comment
Number	Maximum allowed value of gap width, that the calculated value is valid. [mm]

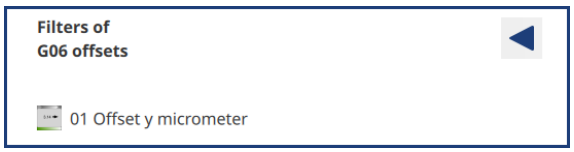
Parameter	Comment
Number	Maximum allowed value of mismatch, that the calculated value is valid. [mm]

Parameter	Comment
Number	Minimum mean intensity value for 'part present' check left and right. [Greylevel]

Parameter	Comment
Number	Maximum allowed intensity value in the gap. [Greylevel]

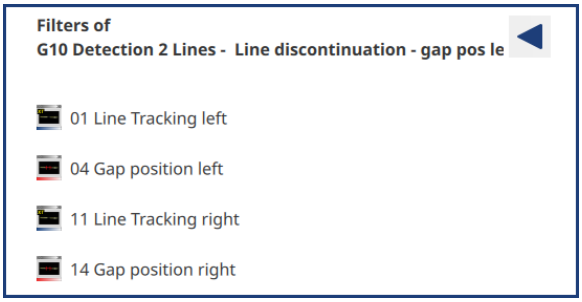
Parameter	Comment
Number	Minimum intensity value for 'line present' check left and right at the line ROI border. [Greylevel]

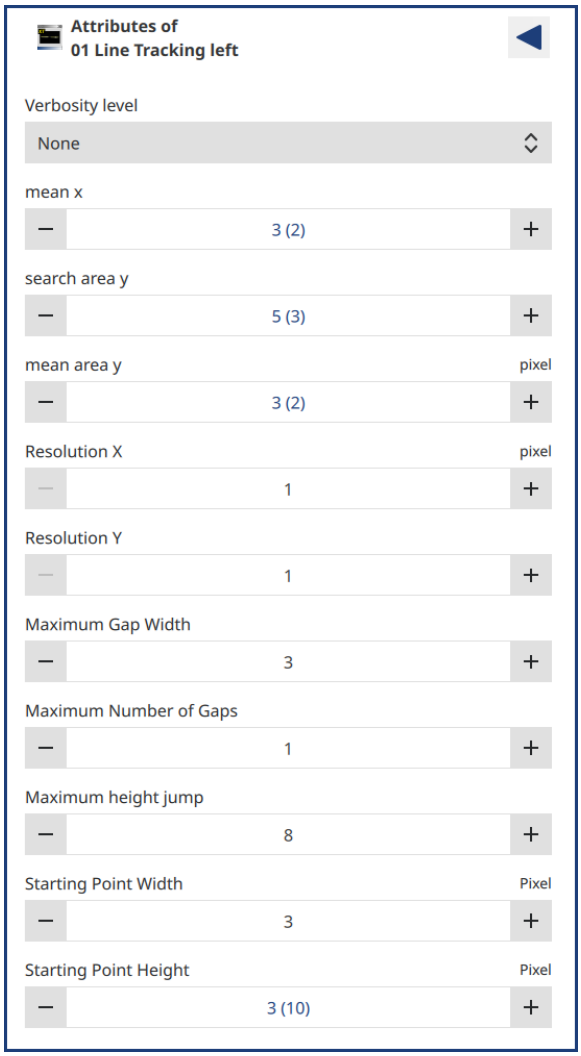
G06 offsets



Parameter	Comment
Number	Constant offset of the found gap position. [µm]

G10 Detection 2 Lines - Line discontinuation - gap pos left/right

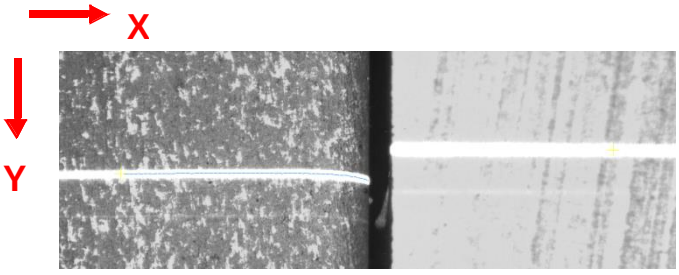


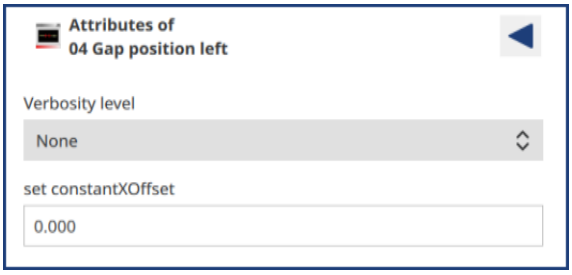


Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
mean x	Number of pixels in X direction, used for averaging the brightness in order to define the next point of the laser line. [Pixel]

search area y	This parameter defines the maximum limits for the search area in Y direction, used for searching the next tracking point. [Pixel]
mean area y	Number of pixels in Y direction, over which the "Average brightness in X direction" is averaged, in order to define the next laser line point. [Pixel]
Resolution X	Resolution of the averaging range. Only every n-th pixel (n= resolution in X direction) is evaluated. [Pixel]
Resolution Y	Resolution for the averaging range. Only every n-th pixel (n= resolution in Y direction) is evaluated. This value must be selected to be lower than the "Search range in Y". [Pixel]
Maximum Gap Width	Maximum allowed width of a laser line interruption: If the number of side by side laying pixels, having a lower grey scale value than the search threshold, exceeds this parameter figure, the line interrupts counter figure is raised by 1. [Pixel]
Maximum Number of Gaps	Maximum number of laser line interrupts: If the number of line interrupts per laser line becomes higher than this parameter, the line search is stopped and a line interrupt warning is released.
Maximum height jump	Maximum interrupt in Y direction: If the height jump of the laser line exceeds this parameter, the line search is stopped. [Pixel]
Starting Point Width	Width of the search area on the left laser line ROI border to find the vertical start position of the laser line. [Pixel]
Starting Point Height	Height of the search area on the left laser line ROI border to find the vertical start position of the laser line. [Pixel]

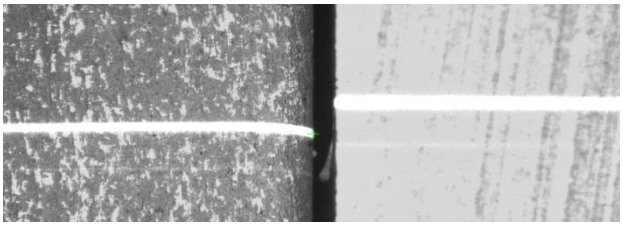
Verbosity example:
The blue line shows the found left laser line part. The two yellow crosses show the left and right side start positions for the laser line tracking.

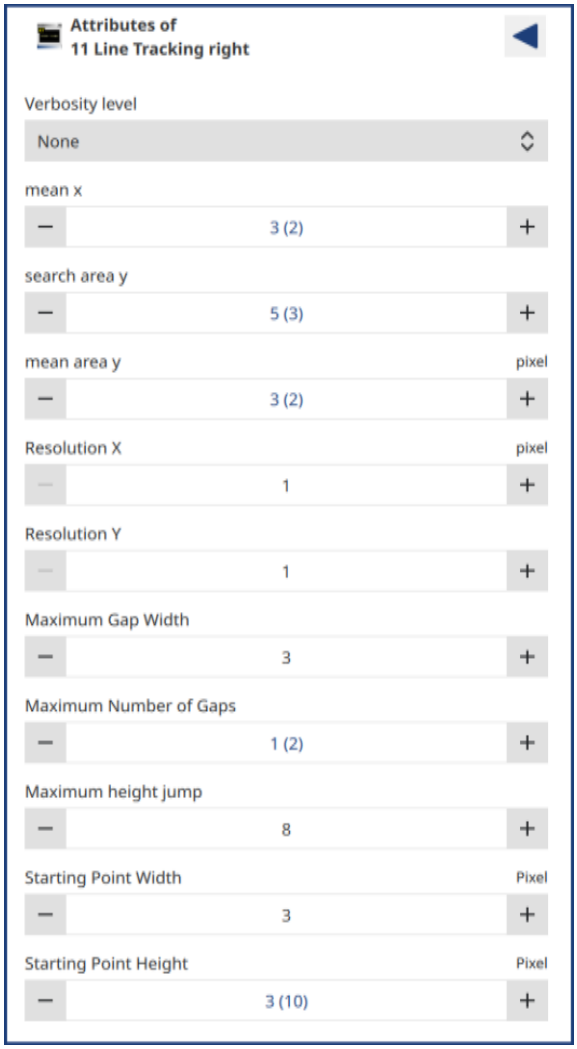




Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
set constantXOffset	Shifts the found left gap position by the given number of pixels. - shift the position to the left + shift the position to the right [Pixel]

Verbosity example:
The blue cross shows the found and shifted left gap start out of the laser line tracking.

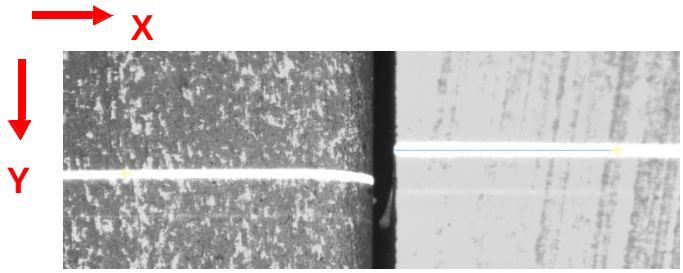


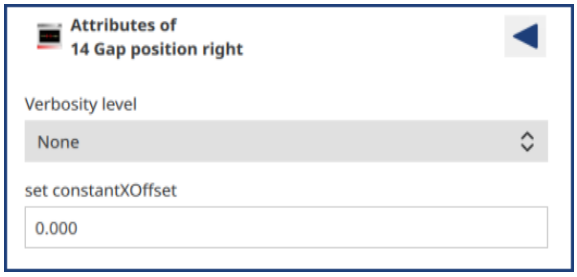


Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
mean x	Number of pixels in X direction, used for averaging the brightness in order to define the next point of the laser line. [Pixel]
search area y	This parameter defines the maximum limits for the search area in Y direction, used for searching the next tracking point. [Pixel]
mean area y	Number of pixels in Y direction, over which the "Average brightness in X direction" is averaged, in order to define the next laser line point. [Pixel]
Resolution X	Resolution of the averaging range. Only every n-th pixel (n= resolution in X direction) is evaluated. [Pixel]
Resolution Y	Resolution for the averaging range. Only every n-th pixel (n= resolution in Y direction) is evaluated. This value must be lower than the "Search range in Y". [Pixel]

Maximum Gap Width	Maximum allowed width of a laser line interruption: If the number of side by side laying pixels, having a lower grey scale value than the search threshold, exceeds this parameter figure, the line interrupts counter figure is raised by 1. [Pixel]
Maximum Number of Gaps	Maximum number of laser line interrupts: If the number of line interrupts per laser line becomes higher than this parameter, the line search is stopped and a line interrupt warning is released.
Maximum height jump	Maximum interrupt in Y direction: If the height jump of the laser line exceeds this parameter, the line search is stopped. [Pixel]
Starting Point Width	Width of the search area on the right laser line ROI border to find the vertical start position of the laser line. [Pixel]
Starting Point Height	Height of the search area on the right laser line ROI border to find the vertical start position of the laser line. [Pixel]

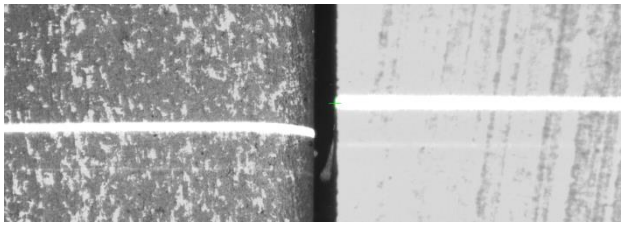
Verbosity example:
The blue line shows the found right laser line part. The two yellow crosses show the left and right side start positions for the laser line tracking.



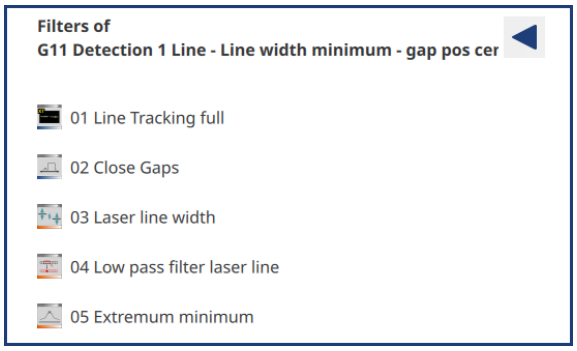


Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
set constantXOffset	Shifts the found right gap position by the given number of pixels. - shift the position to the left + shift the position to the right [Pixel]

Verbosity example:
The blue cross shows the found and shifted right gap start out of the laser line tracking.

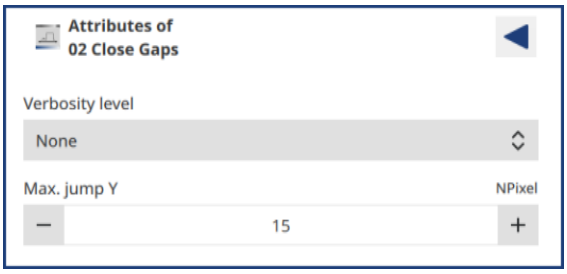


G11 Detection 1 Line - Line width minimum - gap pos center



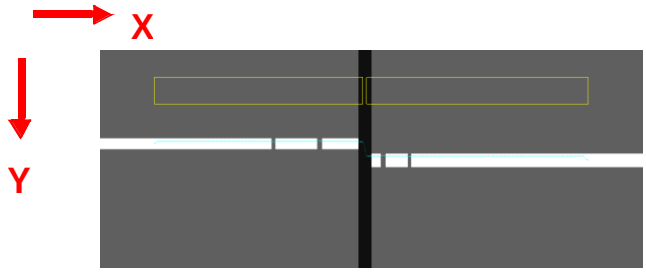
Parameter	Comment
mean x	Number of pixels in X direction, used for averaging the brightness in order to define the next point of the laser line. [Pixel]
search area y	This parameter defines the maximum limits for the search area in Y direction, used for searching the next tracking point. [Pixel]
mean area y	Number of pixels in Y direction, over which the "Average brightness in X direction" is averaged, in order to define the next laser line point. [Pixel]
Resolution X	Resolution of the averaging range. Only every n-th pixel (n= resolution in X direction) is evaluated. [Pixel]
Resolution Y	Resolution for the averaging range. Only every n-th pixel (n= resolution in Y direction) is evaluated. This value must be lower than the "Search range in Y". [Pixel]
Maximum Gap Width	Maximum allowed width of a laser line interruption: If the number of side by side laying pixels, having a lower grey scale value than the search threshold, exceeds this parameter figure, the line interrupts counter figure is raised by 1. [Pixel]

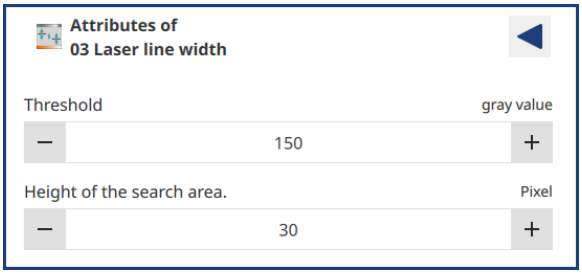
Maximum Number of Gaps	Maximum number of laser line interrupts: If the number of line interrupts per laser line becomes higher than this parameter, the line search is stopped and a line interrupt warning is released.
Maximum height jump	Maximum interrupt in Y direction: If the height jump of the laser line exceeds this parameter, the line search is stopped. [Pixel]
Starting Point Width	Width of the search area on the left and right laser line ROI border to find the vertical start position of the laser line. [Pixel]
Starting Point Height	Height of the search area on the left and right laser line ROI border to find the vertical start position of the laser line. [Pixel]



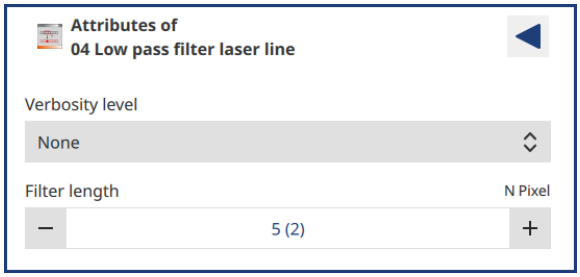
Parameter	**Comment**
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Max. jump Y	A gap in the laser line shape may be closed by a direct line if the vertical difference between the two end points of the gap are smaller than 'Max. jump Y'. [Pixel]

Verbosity example:
The blue line shows the laser line tracking. The yellow rectangles mark the correct found laser line parts. The gaps in the laser line parts were closed because the vertical distance was small enough, and the two yellow rectangles mark that there was no interrupt in the laser line parts.



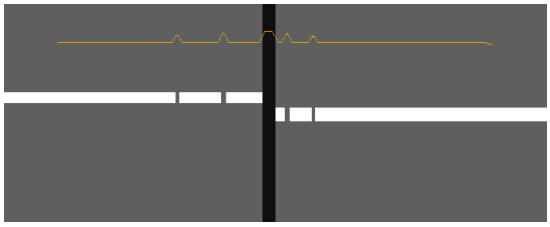


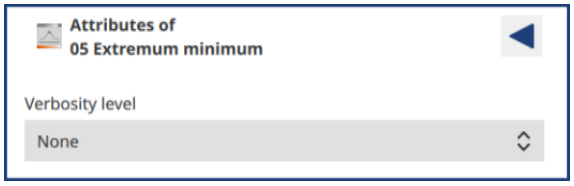
Parameter	Comment
Threshold	Minimum grey scale value from which on a point is defined to belong to the laser line. [Greylevel]
Height of the search area	Upwards and downwards laser line search area (vertical). Value = 30 means: 30 pixel upwards and also 30 pixel downwards from a straight line between the laser line start points. [Pixel]



Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	During "Tracking" on the laser line, the grey scale values of the found intensity values are averaged over "Filter length" pixels. The higher the value the flatter is the intensity curve for the analysis. [Pixel]

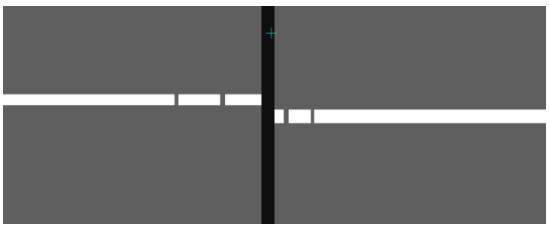
Verbosity example:
The orange line indicates the filtered intensity on the tracked laser line with the upper image border as zero reference.



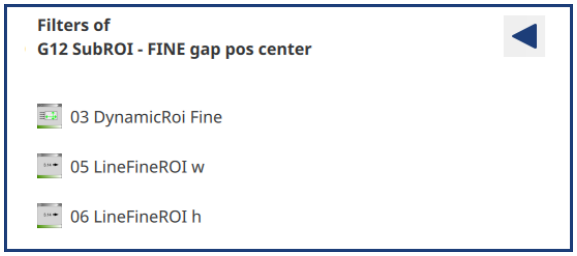


Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

Verbosity example:
The blue cross shows the found horizontal laser line intensity minimum position.



G12 SubROI - FINE gap pos center

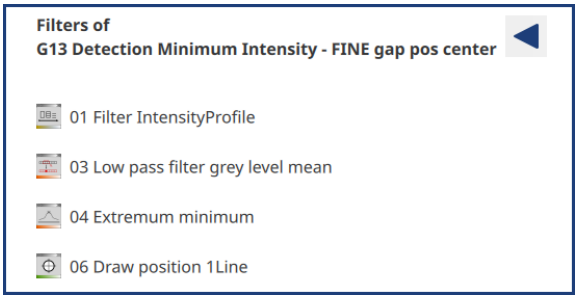


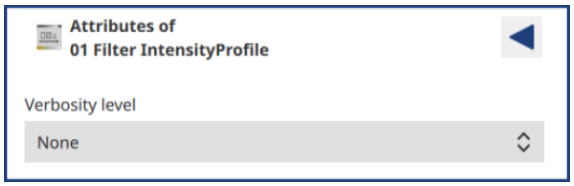
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

Parameter	Comment
Number	Width of a special FineROI around the found gap position for a more precise position value recalculation. [Pixel]

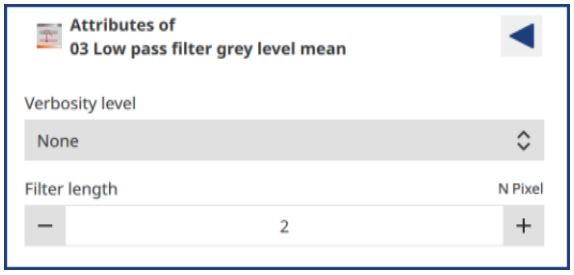
Parameter	Comment
Number	Height of a special FineROI around the found gap position for a more precise position value recalculation. [Pixel]

G13 Detection Minimum Intensity - FINE gap pos center

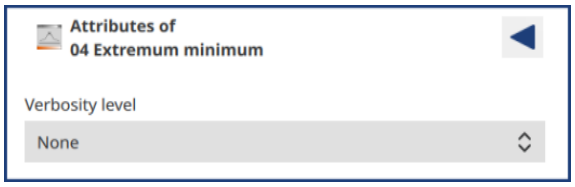




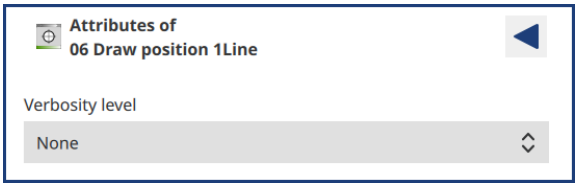
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.



Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	In the special FineRoi the vertically summed grey scale values are averaged over "Filter length" pixels. The higher the value the flatter is the intensity curve for the analysis. [Pixel]

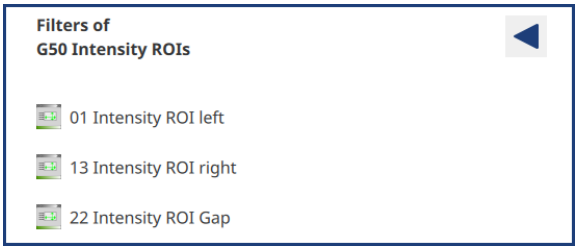


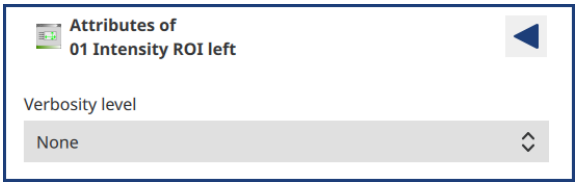
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.



Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

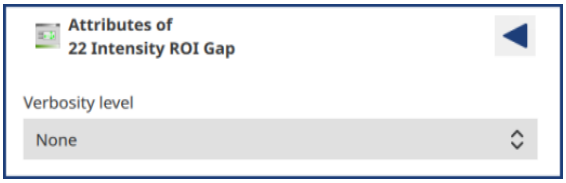
G50 Intensity ROIs





Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.



Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

- **Measured values for plotter**

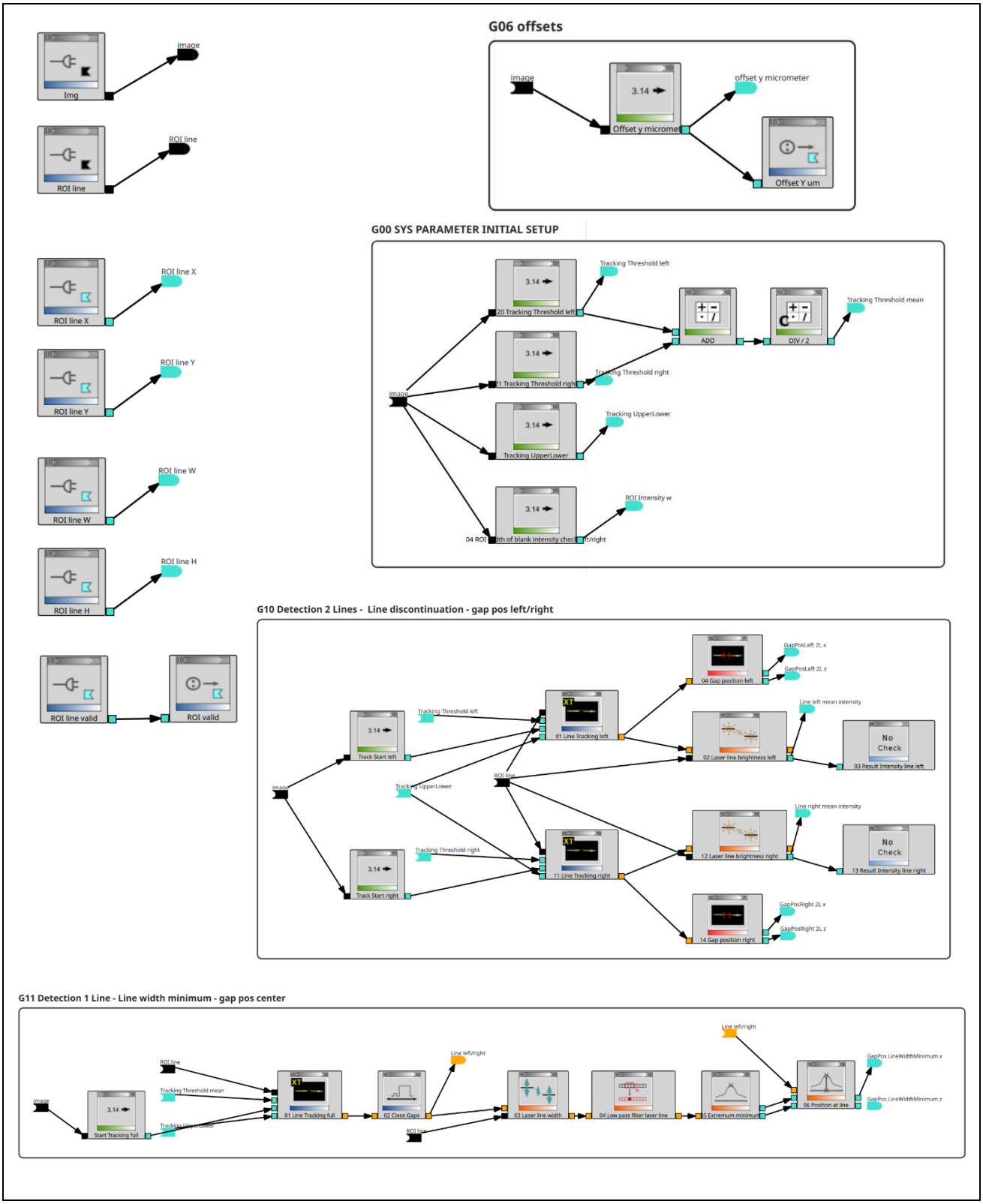
558	0 / 1	Plausibility Intensity error
573	0 … 255	Intensity Line left
574	0 … 255	Intensity Line right
575	0 … 255	Intensity Part left
576	0 … 255	Intensity Part right
577	0 … 255	Intensity Gap
581	0 … xxx	TCP_x
582	0 … xxx	TCP_y
583	0 … xxx	HWROI_x
584	0 … xxx	HWROI_y

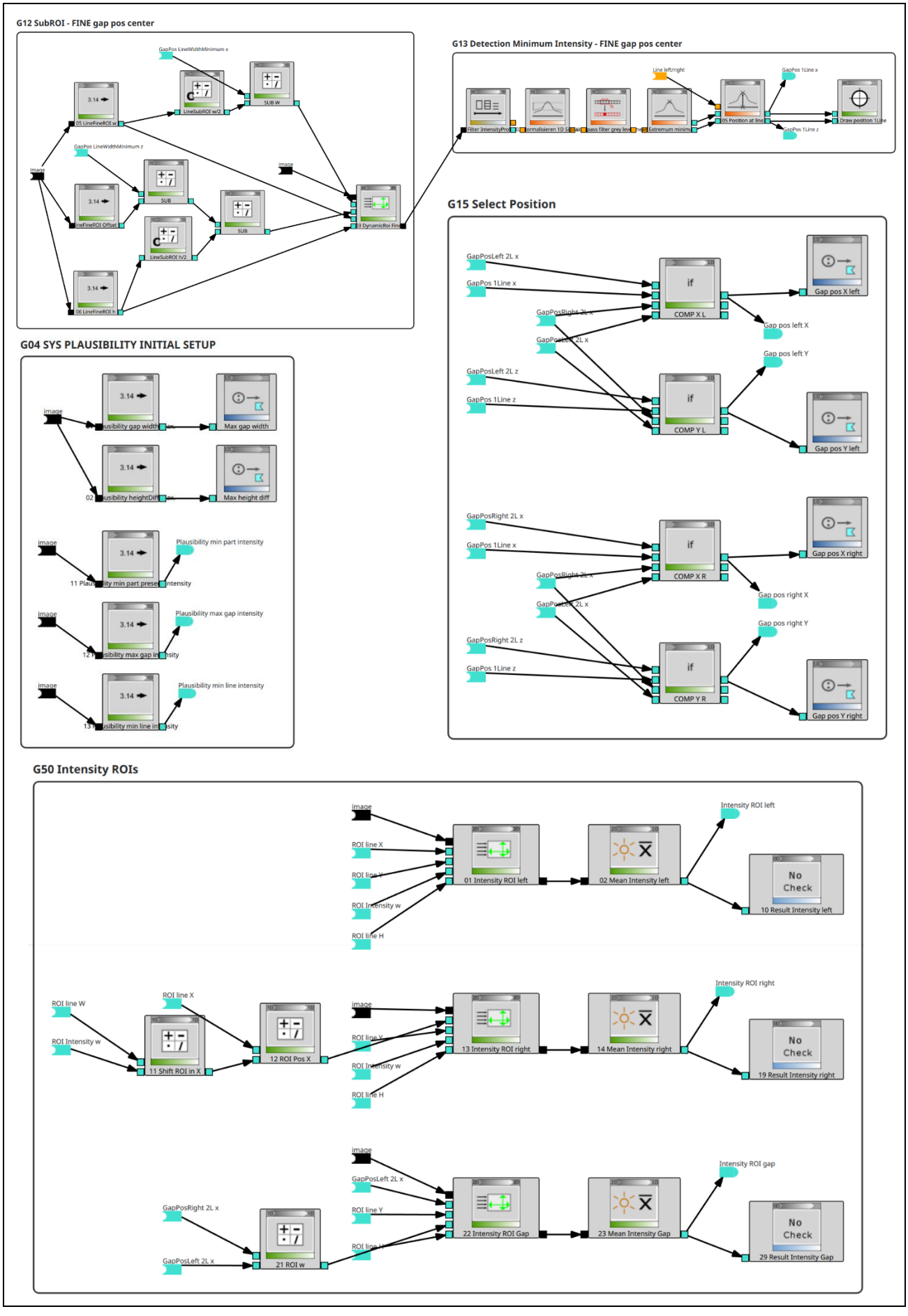
- **Subgraphs interface**

IN bridges **OUT bridges**

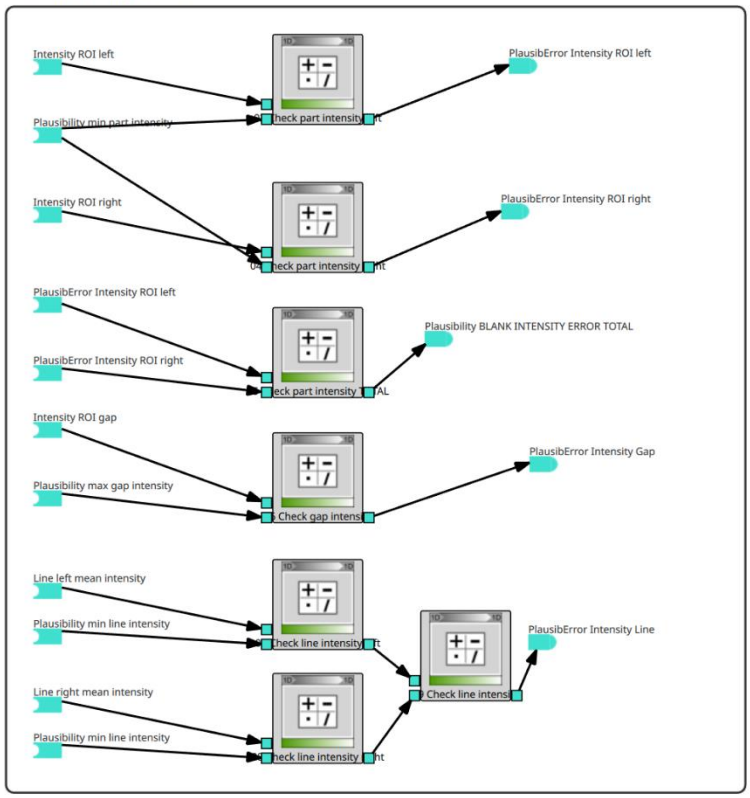
image	Img	**value**	Gap pos X left / right
	ROI line		Gap pos Y left / right
			Plaus error
value	ROI line X		Offset Y um
	ROI line Y		Max gap width
	ROI line W		Max height diff
	ROI line H		

Graph block diagram

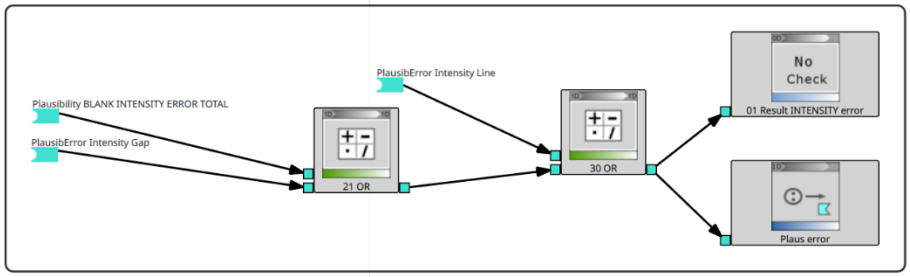




G60 Plausibility Check



G61 Plausibility Logic and Rank



G70 TCP Position