3 - S15 SEARCH Gap LINE GeoMin

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 S15 SEARCH Gap LINE GeoMin

Detect edge position left and right with laserline.

Parameters

Filter Groups of 3 S15 SEARCH Gap LINE GeoMin

G00 SYS PARAMETER INITIAL SETUP

G04 SYS PLAUSIBILITY INITIAL SETUP

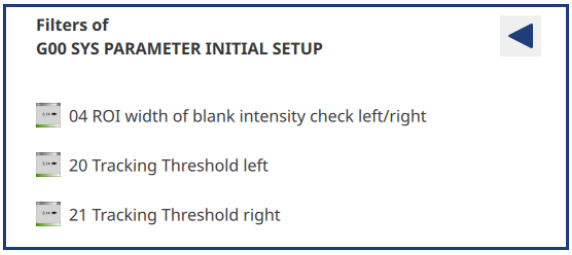
G06 offsets

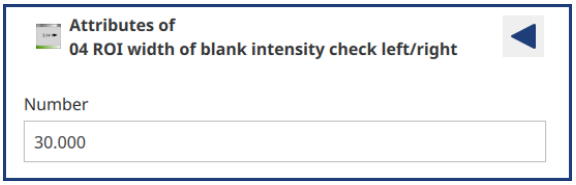
G10 Detection 2 Lines - Line discontinuation - gap pos left/right

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

G50 Intensity ROIs

G00 SYS PARAMETER INITIAL SETUP



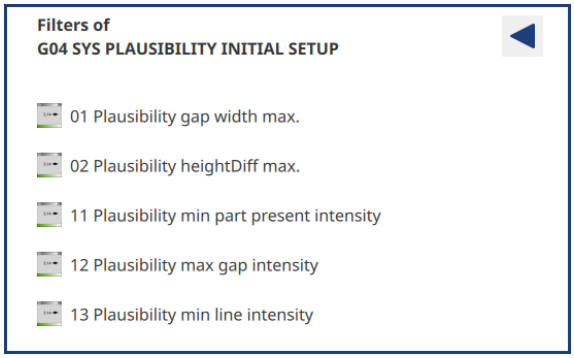


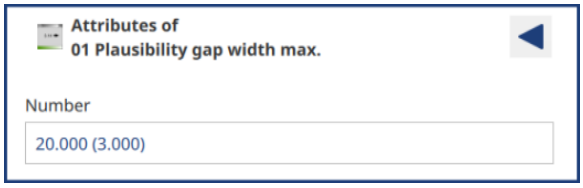
Parameter	Comment
Number	Width of separate ROI for intensity check for blank/part present. ROI is linked to the outer ROI borders left/right of grey image. [Pixel]

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



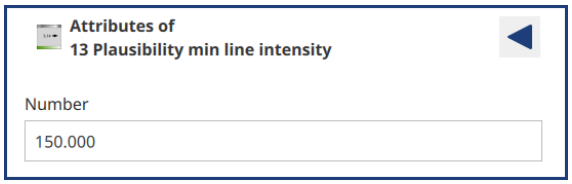


Parameter	Comment
Number	Maximum allowed value of gap width. [mm]

Parameter	Comment
Number	Maximum allowed value of mismatch. [mm]

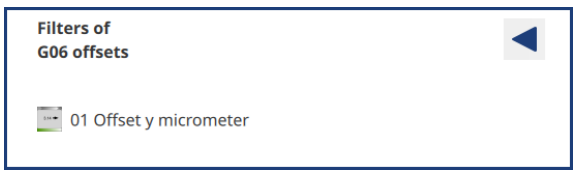
Parameter	Comment
Number	Minimum mean intensity value for 'part present' check left and right. [Greylevel]

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



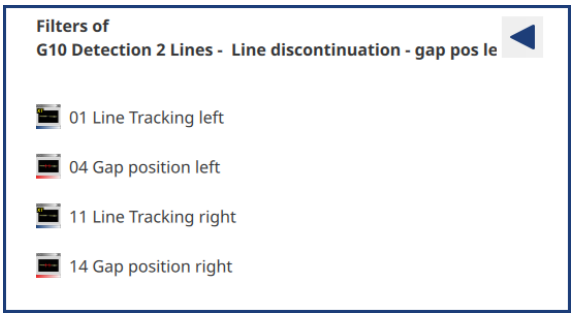
Parameter	Comment
Number	Minimum intensity value for 'line present' check left and right at the line ROI border. [Greylevel]

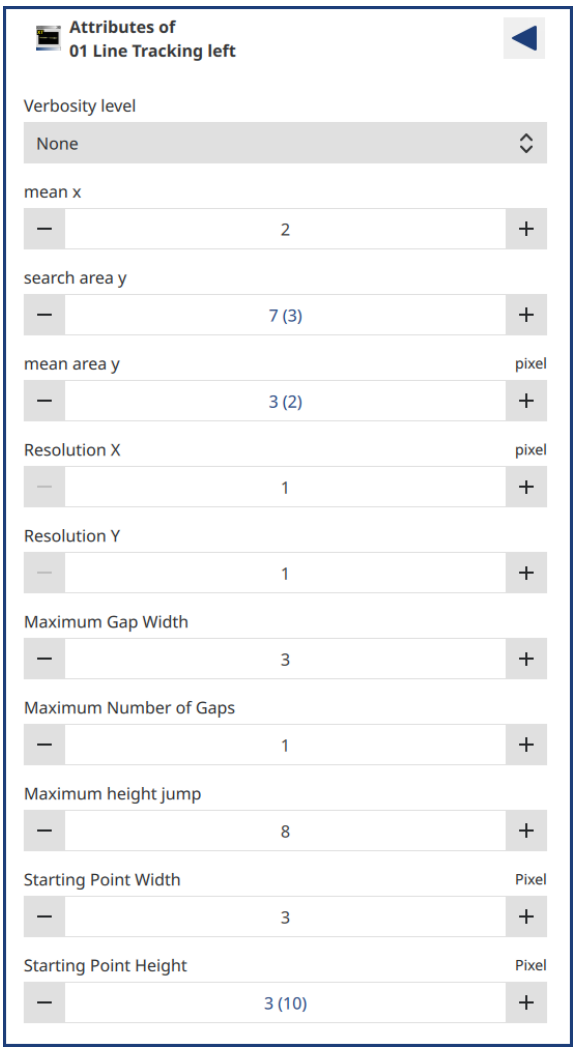
G06 offsets



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

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

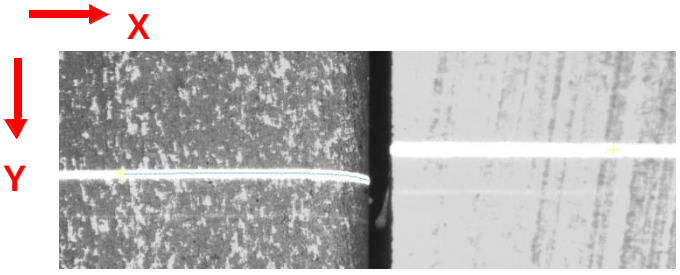


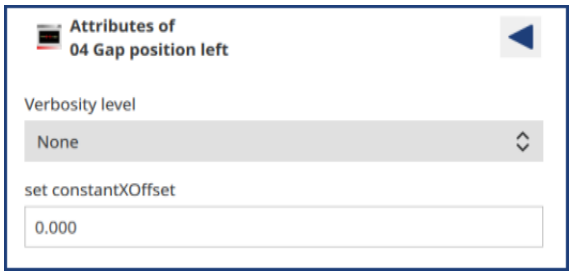


Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
mean x	Number of pixels in X direction, used for averaging the brightness in order to define the next point of the laser line. [Pixel]

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]

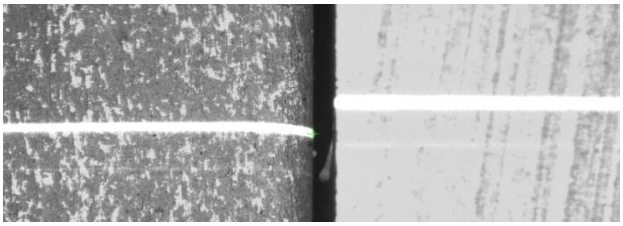
Verbosity example:
The blue line shows the found left laser line part. The two yellow crosses show the left and right side start positions for the laser line tracking.

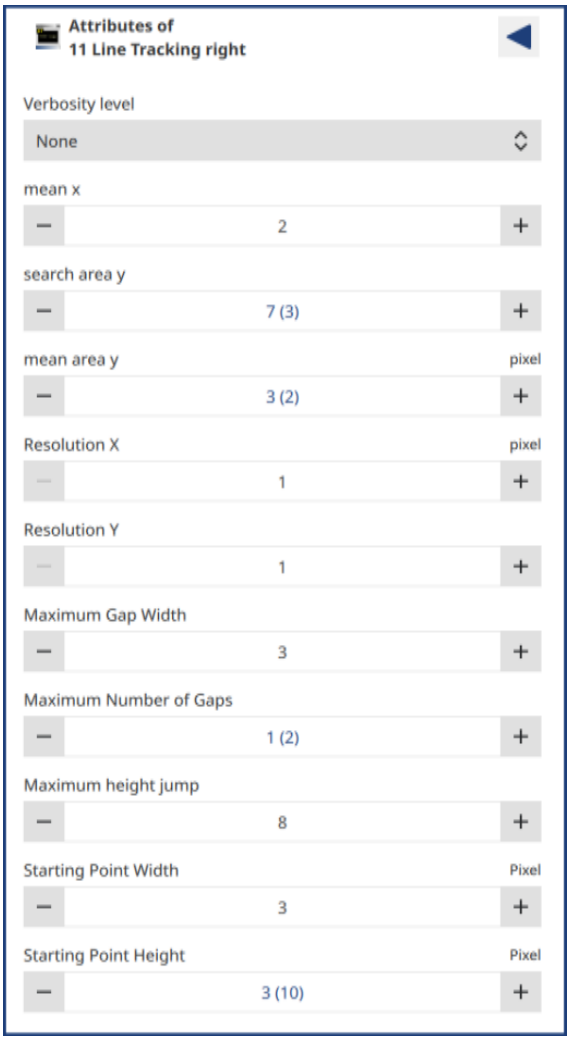




Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
set constantXOffset	Shifts the found left gap position by the given number of pixels. - shift the position to the left + shift the position to the right [Pixel]

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

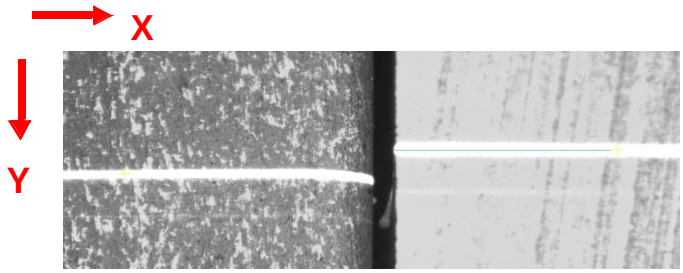


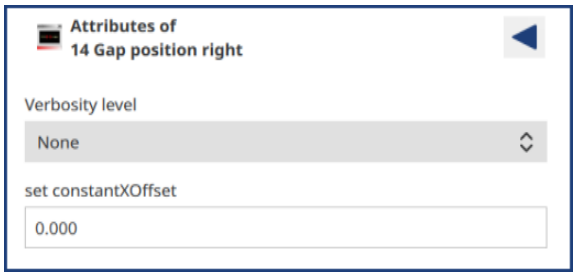


Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
mean x	Number of pixels in X direction, used for averaging the brightness in order to define the next point of the laser line. [Pixel]
search area y	This parameter defines the maximum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

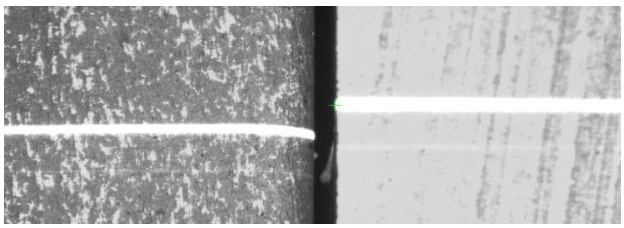
Verbosity example:
The blue line shows the found right laser line part. The two yellow crosses show the left and right side start positions for the laser line tracking.



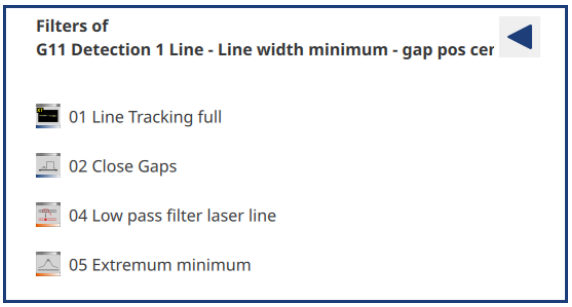


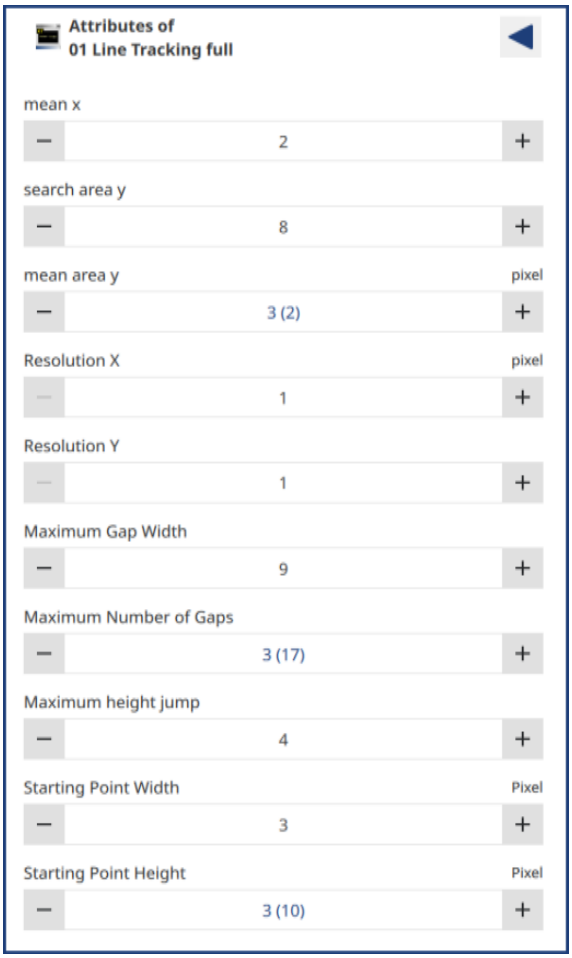
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
set constantXOffset	Shifts the found right gap position by the given number of pixels. - shift the position to the left + shift the position to the right [Pixel]

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



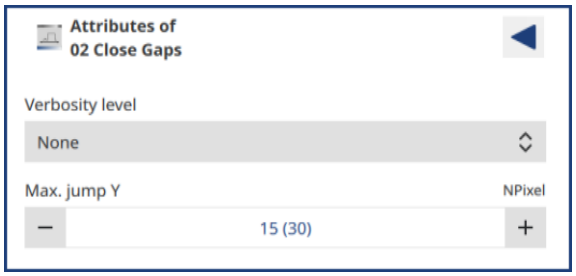
G11 Detection 1 Line - Line width minimum - gap pos center





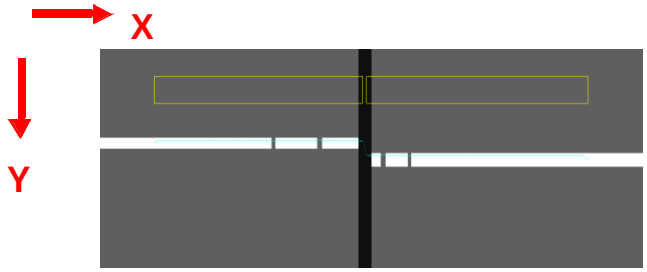
Parameter	Comment
mean x	Number of pixels in X direction, used for averaging the brightness in order to define the next point of the laser line. [Pixel]
search area y	This parameter defines the maximum limits for the search area in Y direction, used for searching the next tracking point. [Pixel]

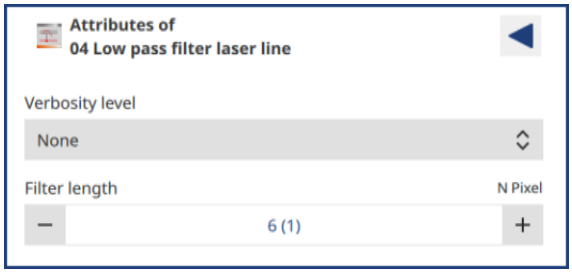
mean area y	Number of pixels in Y direction, over which the "Average brightness in X direction" is averaged, in order to define the next laser line point. [Pixel]
Resolution X	Resolution of the averaging range. Only every n-th pixel (n= resolution in X direction) is evaluated. [Pixel]
Resolution Y	Resolution 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	The maximum vertical deviations to the laser line are searched out of a calculated line between the left and the right line start position. Only the maxima higher than "Max. jump Y" are taken for the edge detection. This method makes sense only with steel sheets with the same thickness. This method can be deactivated by selecting a very high parameter value (e.g. 100). [Pixel]

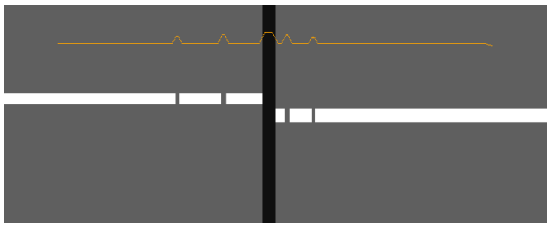
Verbosity example:
The blue line shows the laser line tracking. The yellow rectangles mark the correct found laser line parts. Gaps between the yellow rectangles mark position and width of a gap in the laser line tracking, that was passed over.

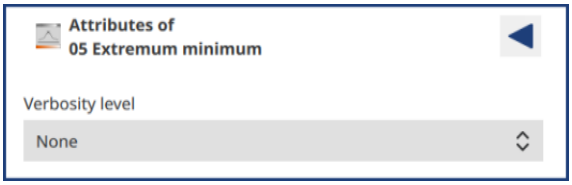




Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	During "Tracking" on the laser line, the grey scale values of the found curve are taken the mean over "Filter length" pixels. The higher the value the flatter is the intensity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

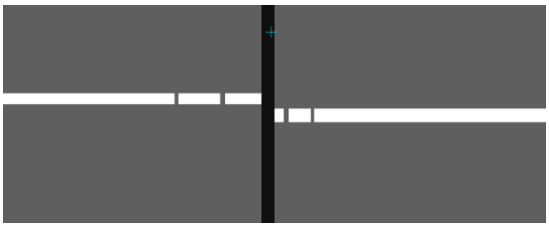
Verbosity example:
The orange line indicates the filtered intensity on the tracked laser line with the upper image border as zero reference.



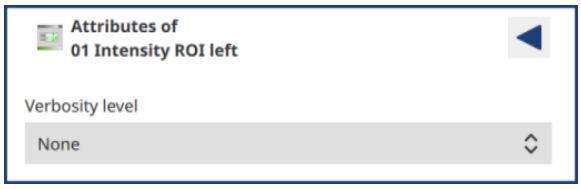


Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

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

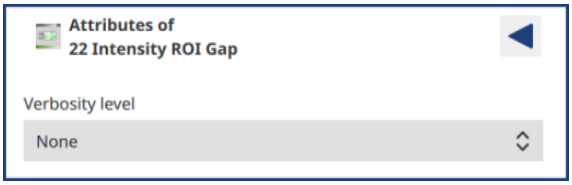


G50 Intensity ROIs



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**

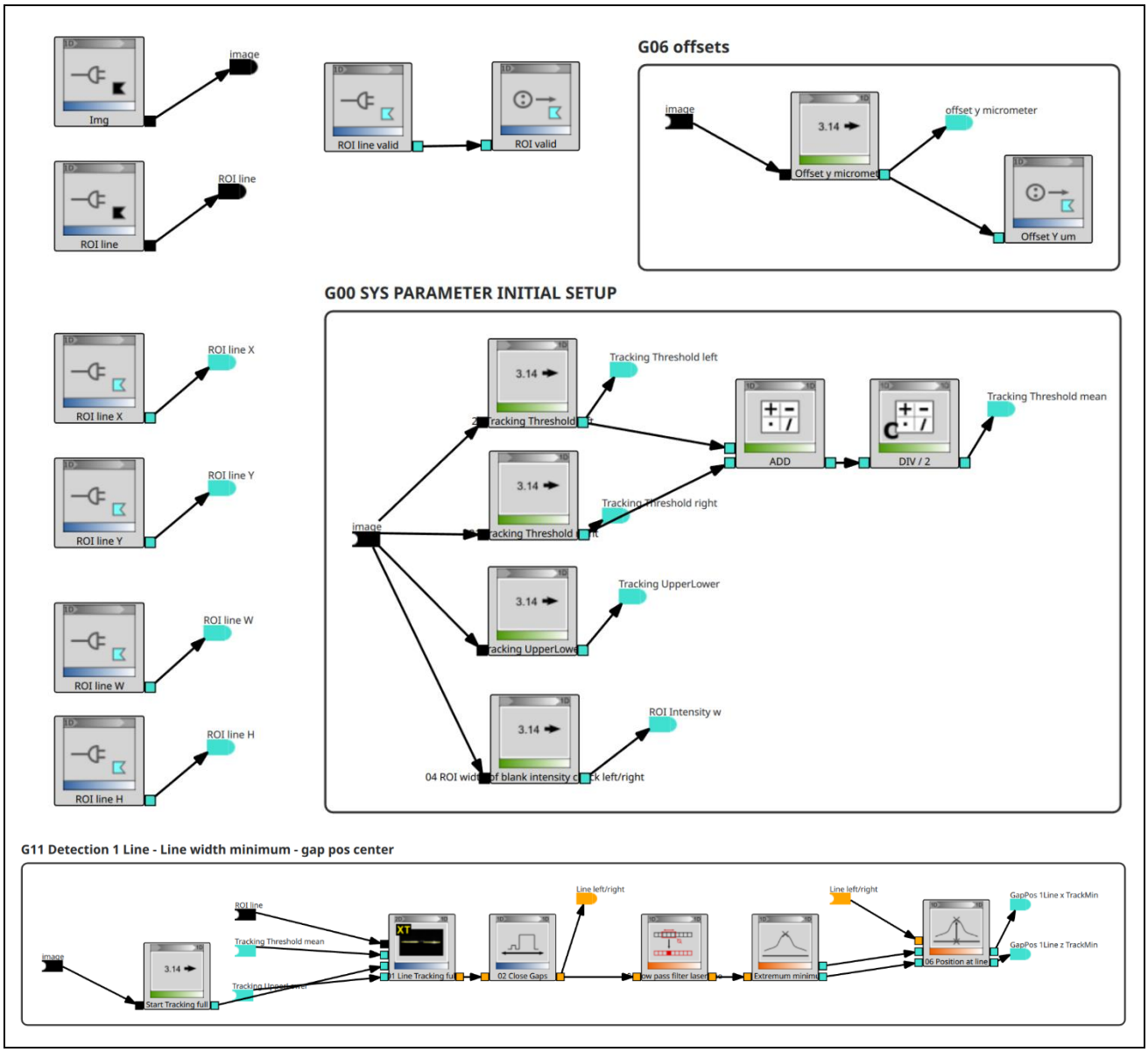
558	0 / 1	Plausibility Intensity error
573	0 … 255	Intensity Line left
574	0 … 255	Intensity Line right
575	0 … 255	Intensity Part left
576	0 … 255	Intensity Part right
577	0 … 255	Intensity Gap
581	0 … xxx	TCP_x
582	0 … xxx	TCP_y
583	0 … xxx	HWROI_x
584	0 … xxx	HWROI_y

Subgraphs interface

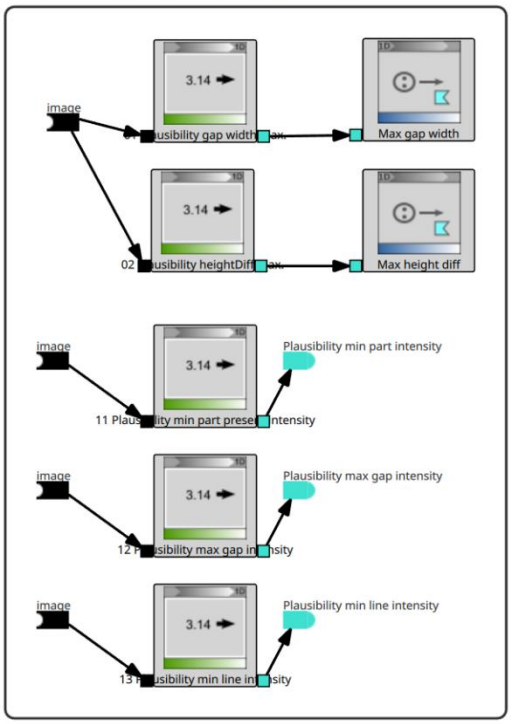
IN bridges **OUT bridges**

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

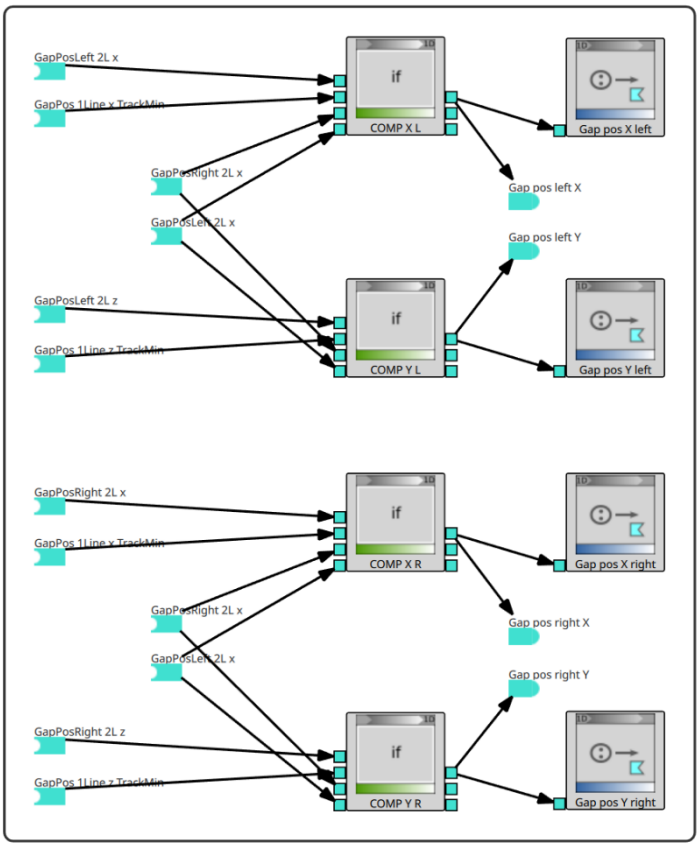
Graph block diagram



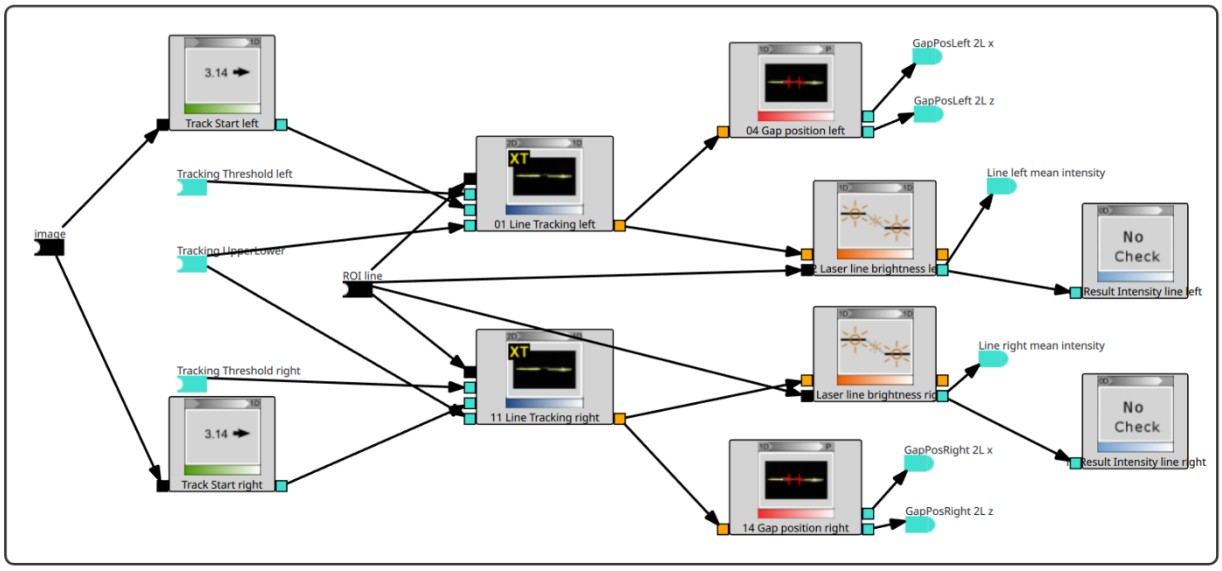
G04 SYS PLAUSIBILITY INITIAL SETUP



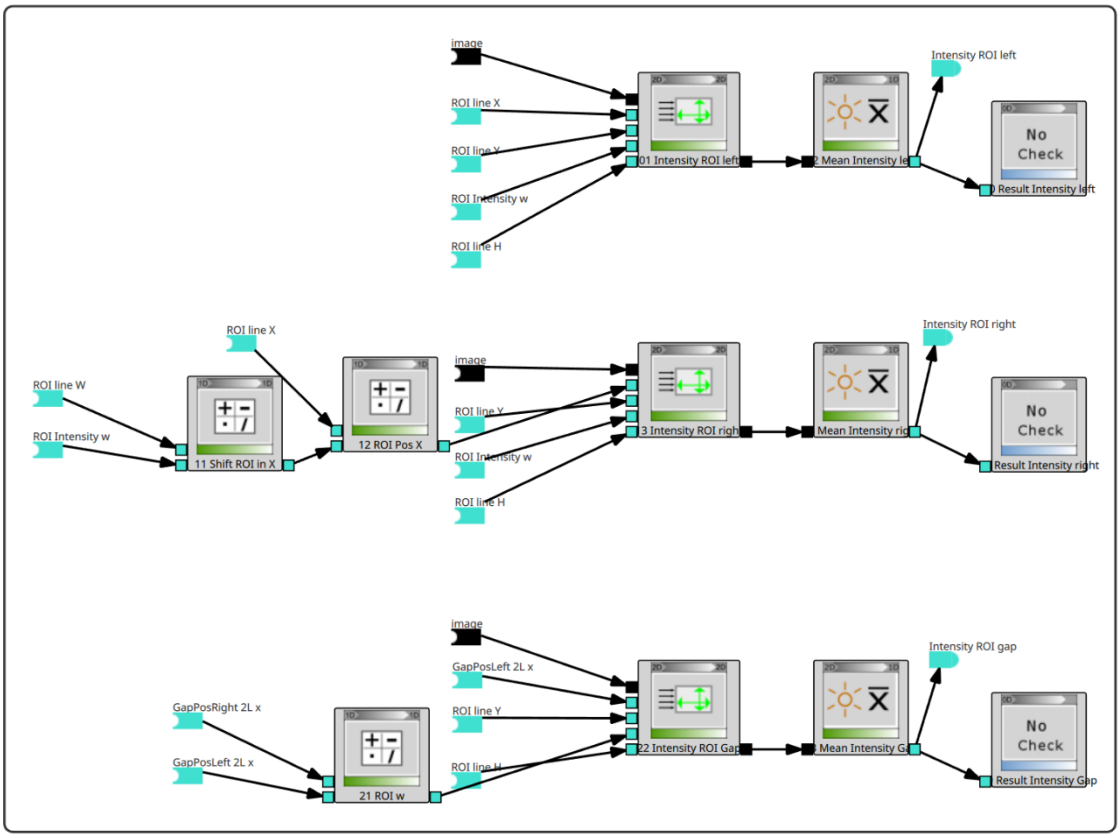
G15 Select Position



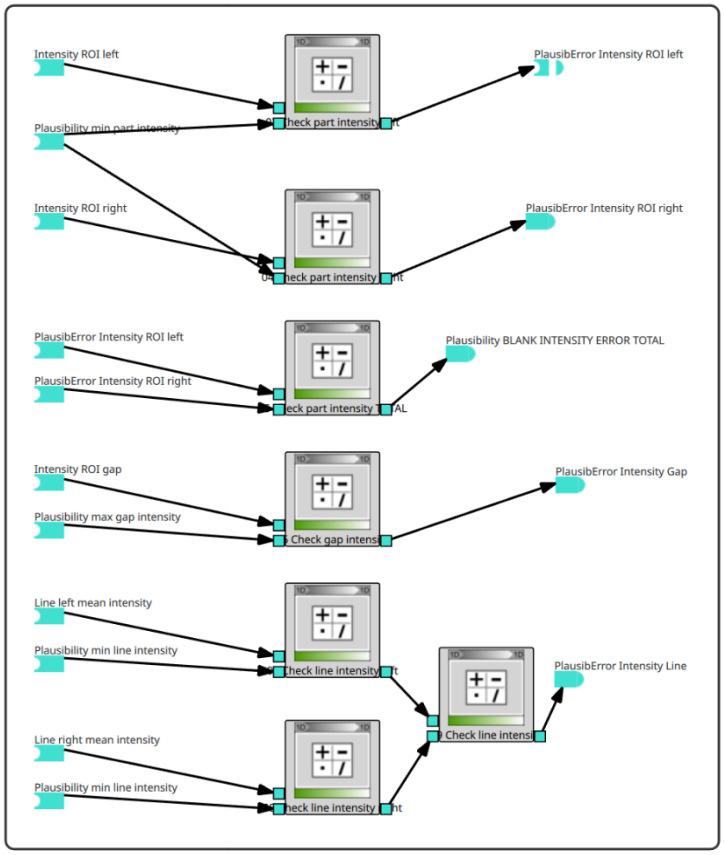
G10 Detection 2 Lines - Line discontinuation - gap pos left/right



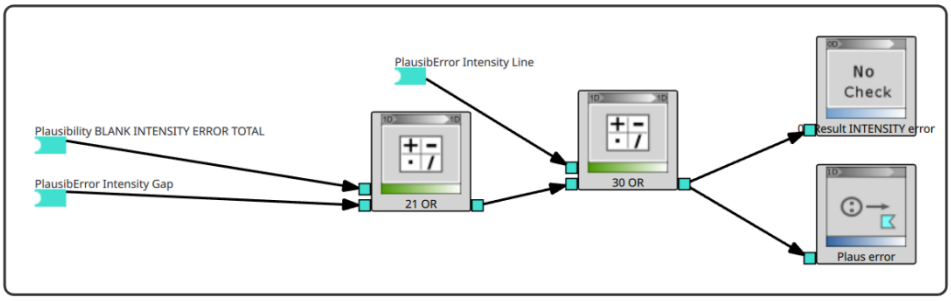
G50 Intensity ROIs



G60 Plausibility Check



G61 Plausibility Logic and Rank



G70 TCP Position