



3 - S1b 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 S1b SEARCH Gap LINE GeoMin

Detect edge position left and right with laserline.

■ Parameters

Filter Groups of 3 S1b SEARCH Gap LINE GeoMin



G00 SYS PARAMETER INITIAL SETUP

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


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


G16 Calc Height difference



G00 SYS PARAMETER INITIAL SETUP

Filters of G00 SYS PARAMETER INITIAL SETUP



 20 Tracking Threshold left

 21 Tracking Threshold right


Attributes of
20 Tracking Threshold left


Number


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]






Attributes of
21 Tracking Threshold right


Number



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]

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

Filters of
G10 Detection 2 Lines - Line discontinuation - gap pos le


 01 Line Tracking left
 04 Gap position left
 11 Line Tracking right
 14 Gap position right




Attributes of
01 Line Tracking left


Verbosity level
 None

mean x
 — 2 +

search area y
 — 7 (3) +

mean area y
 — 3 (2) +
 pixel

Resolution X
 — 1 +
 pixel

Resolution Y
 — 1 +
 pixel

Maximum Gap Width
 — 3 +

Maximum Number of Gaps
 — 1 +

Maximum height jump
 — 8 +

Starting Point Width
 — 3 +
 Pixel

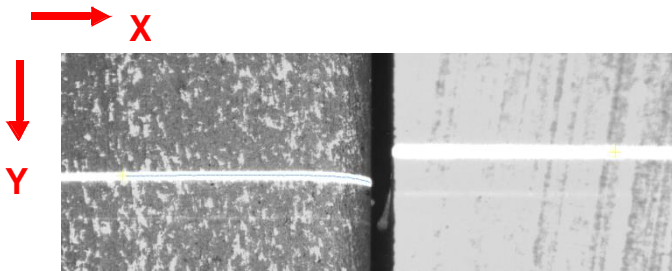
Starting Point Height
 — 3 (10) +
 Pixel


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.




Attributes of
04 Gap position left

Verbosity level
None

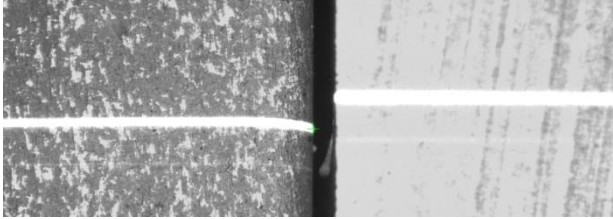
set constantXOffset
0.000



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.




Attributes of
11 Line Tracking right


Verbosity level
 None

mean x
 — 2 +

search area y
 — 7 (3) +

mean area y
 — 3 (2) +
 pixel

Resolution X
 — 1 +
 pixel

Resolution Y
 — 1 +

Maximum Gap Width
 — 3 +

Maximum Number of Gaps
 — 2 +

Maximum height jump
 — 8 +

Starting Point Width
 — 3 +
 Pixel

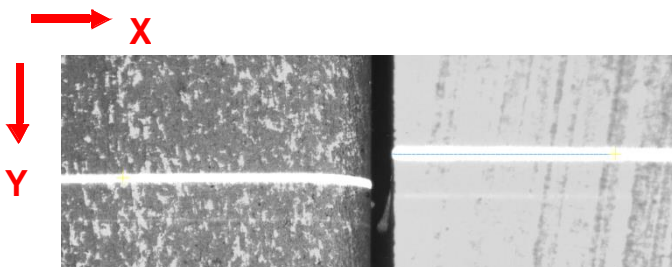
Starting Point Height
 — 3 (10) +
 Pixel

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.





Attributes of
14 Gap position right

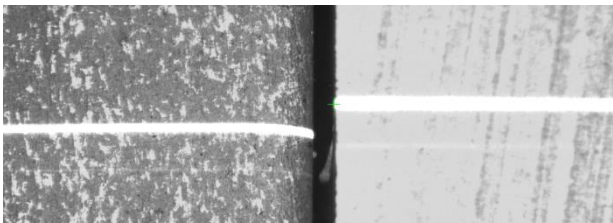
Verbosity level
None

set constantXOffset
0.000

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

Filters of
G11 Detection 1 Line - Line width minimum - gap pos cer

01 Line Tracking full
02 Close Gaps
04 Low pass filter laser line
05 Extremum minimum

mean x

search area y

mean area y

Resolution X

Resolution Y

Maximum Gap Width

Maximum Number of Gaps

Maximum height jump

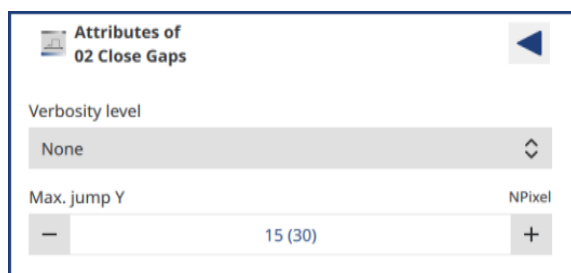
Starting Point Width

Starting Point Height

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.



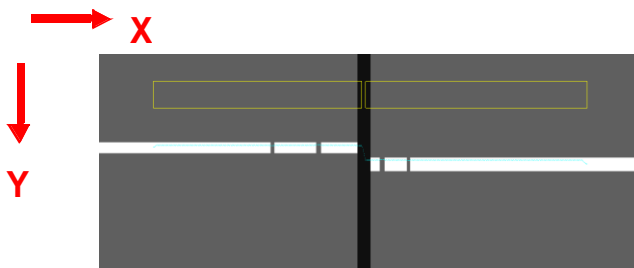
Maximum height jump	Maximum interrupt in Y direction: If the height jump of the laser line exceeds this parameter, the line search is stopped. [Pixel]
Starting Point Width	Width of the search area on the left and right laser line ROI border to find the vertical start position of the laser line. [Pixel]
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 will be closed by a straight connection if the vertical distance between the end points of the gap is 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. Gaps between the yellow rectangles mark position and width of a gap in the laser line tracking, that was passed over.



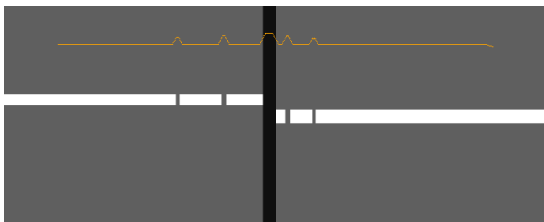
Verbosity level
 None

Filter length N Pixel
 - 5 (1) +

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.

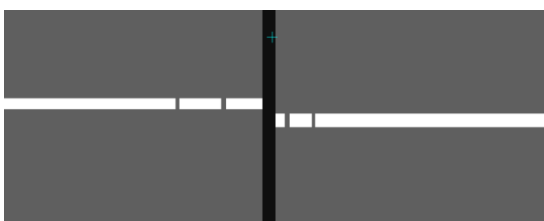


Verbosity level
 None

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

Verbosity example:

The blue cross shows the (horizontally) found laser line intensity minimum position.





G16 CALC Height difference

Filters of
G16 Calc Height difference

01 Median Moving average
 02 Cavvex

Attributes of
01 Median Moving average

Verbosity level
None

Filter length
 NPixel

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	Smoothens the found laser line shape with a Median filter.

Attributes of
02 Cavvex

Verbosity level
None

Start value
 %

End value
 %

Start value
 %

End value
 %

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

Start value	In the laser line Roi this is horizontally the 'start point' on the the found laser line shape for the left side height reference to measure the 'height difference'. Value = 0 is the left side ROI border. Value = 100 is the right side ROI border. [Percent]
End value	In the laser line Roi this is horizontally the 'end point' on the the found laser line shape for the left side height reference to measure the 'height difference'. Value = 0 is the left side ROI border. Value = 100 is the right side ROI border. [Percent]
Start value	In the laser line Roi this is horizontally the 'start point' on the the found laser line shape for the right side height reference to measure the 'height difference'. Value = 0 is the left side ROI border. Value = 100 is the right side ROI border. [Percent]
End value	In the laser line Roi this is horizontally the 'end point' on the the found laser line shape for the right side height reference to measure the 'height difference'. Value = 0 is the left side ROI border. Value = 100 is the right side ROI border. [Percent]



■ Measured values for plotter

573	0 ... 255	Intensity Line left
574	0 ... 255	Intensity Line right
709	-xxx ... +xxx	Height difference

■ Subgraphs interface

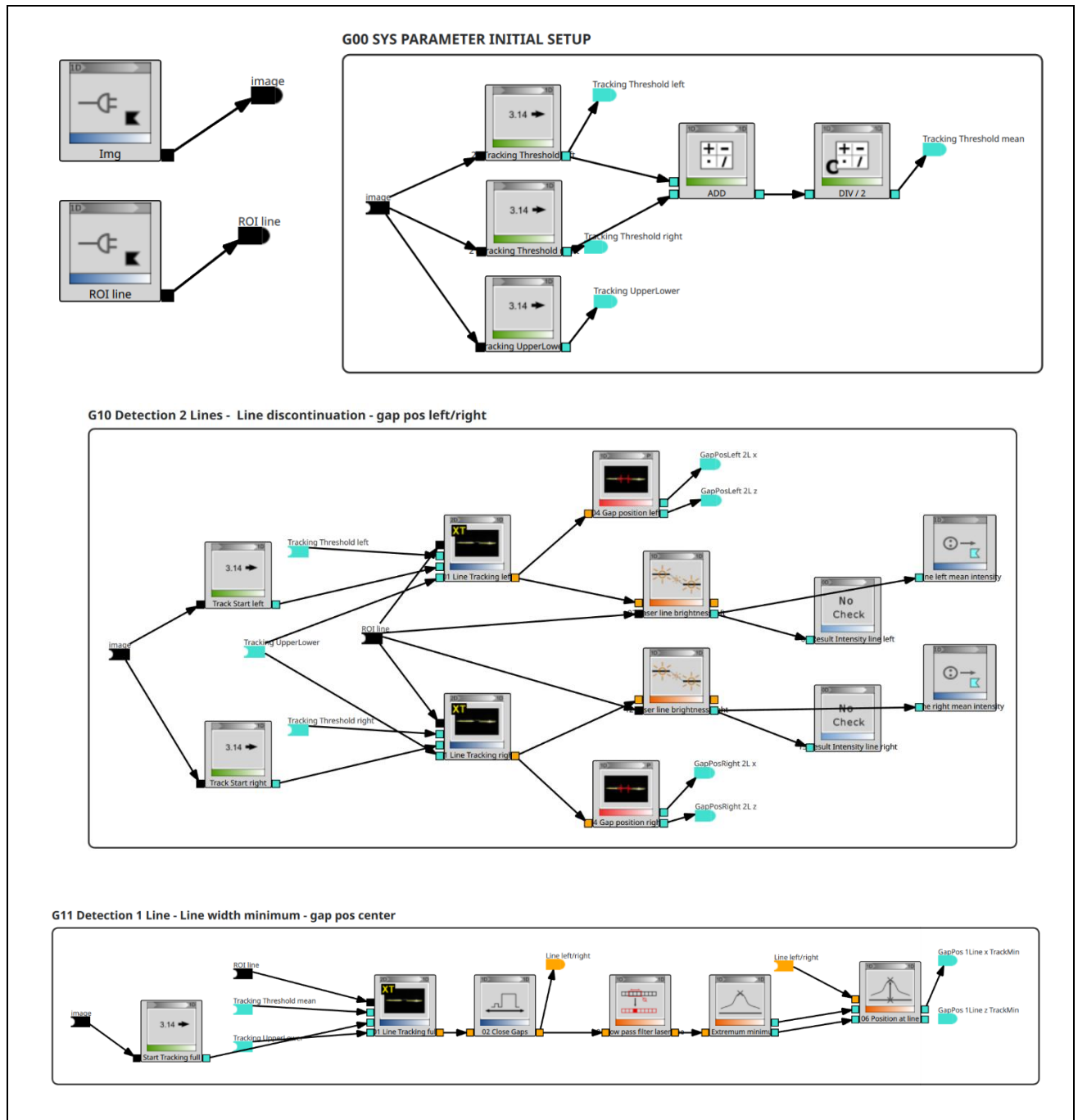
IN bridges

OUT bridges

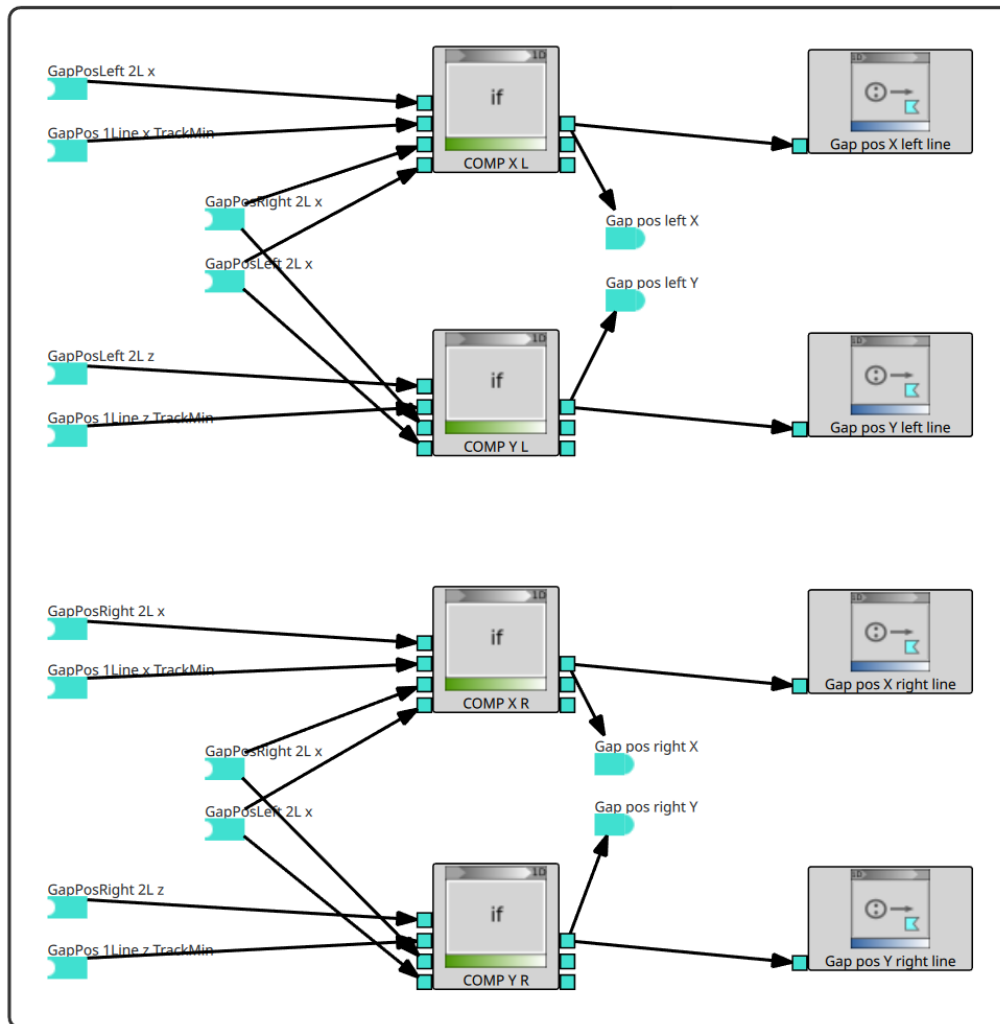
 image	Img ROI line	 value	Gap pos X left / right line Gap pos Y left / right line Line left / right mean intensity HeightDiff mm
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■ Graph block diagram



G15 Select Position



G16 Calc Height difference

