



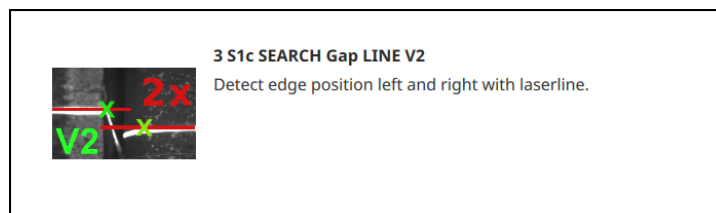
3 - S1c SEARCH Gap LINE V2

■ Description

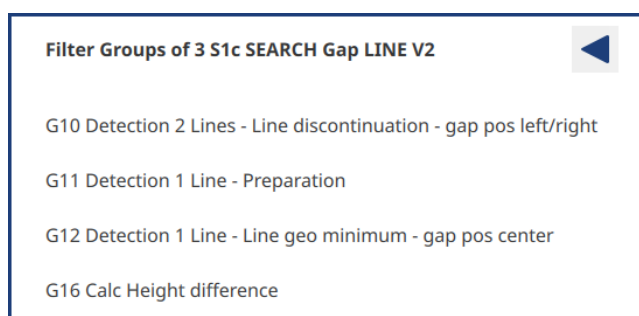
Searches the left and right gap border out of the found laser line parts. For that 2 ways are possible:

- There are two clear laser line parts visible, divided by the gap. If the intensity drops under a given level to set the gap end position.
If the laser line parts are bowed at the gap end, there is a given vertical distance which is used simultaneously to detect the gap end position. Therefore a 'reference line' is calculated for each side from the found vertical laser line position, starting at the laser line ROI border up to 15% of the laser line ROI width.
- There is one through passing laser line visible with an intensity minimum in the gap.

Icon





■ Parameters





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


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


 11 Tracking Threshold 2 Lines left


 12 Y distance left Up


 13 Y distance left Down


 14 Line Tracking left


 15 Gap position left

 21 Tracking Threshold 2 Lines right

 22 Y distance right Up

 23 Y distance right Down

 24 Line Tracking right

 25 Gap position right

Attributes of
11 Tracking Threshold 2 Lines 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
12 Y distance left Up

Number



Parameter	Comment
Number	If the vertical position of the laser line tracking is this value above the left side 'reference line', the search stops and sets the 'found gap position' for the left gap side. [Pixel]




Attributes of
 13 Y distance left Down
 

Number

Parameter	Comment
Number	If the vertical position of the laser line tracking is this value below the left side 'reference line', the search stops and sets the 'found gap position' for the left gap side. [Pixel]


Attributes of
 14 Line Tracking left
 

Verbosity level

None

mean x

—

+

search area y

—

+

mean area y

—

+

 pixel

Resolution X

—

+

 pixel

Resolution Y

—

+

Maximum Gap Width

—

+

Maximum Number of Gaps

—

+

Maximum height jump

—

+

Starting Point Width

—

+

 Pixel

Starting Point Height

—

+

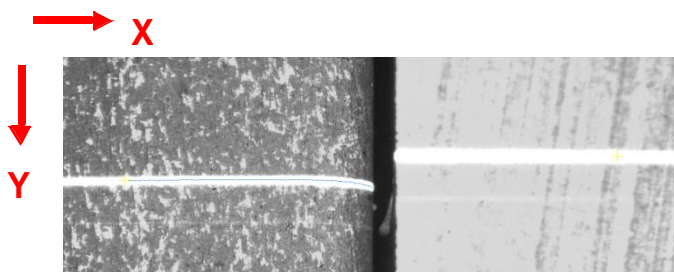
 Pixel

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 area 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
15 Gap position left

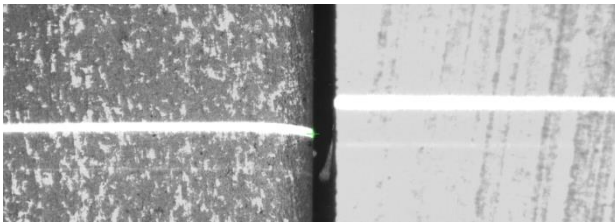
Verbosity level
 None

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 left gap start out of the laser line tracking.



Attributes of

21 Tracking Threshold 2 Lines right

Number

200.000

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]

Attributes of

22 Y distance right Up

Number

3.000

Parameter	Comment
Number	If the vertical position of the laser line tracking is this value above the right side 'reference line', the search stops and sets the 'found gap position' for the right gap side. [Pixel]

Attributes of

23 Y distance right Down

Number

8.000

Parameter	Comment
Number	If the vertical position of the laser line tracking is this value below the right side 'reference line', the search stops and sets the 'found gap position' for the right gap side. [Pixel]



Attributes of
24 Line Tracking right

Verbosity level
 None

mean x
 — 2 +

search area y
 — 5 +

mean area y
 — 3 + pixel

Resolution X
 — 1 + pixel

Resolution Y
 — 1 +

Maximum Gap Width
 — 5 +

Maximum Number of Gaps
 — 2 +

Maximum height jump
 — 4 +

Starting Point Width
 — 3 + Pixel

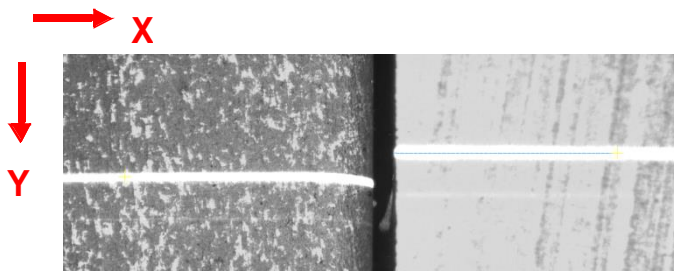
Starting Point Height
 — 3 + Pixel

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 "search area 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
25 Gap position right**

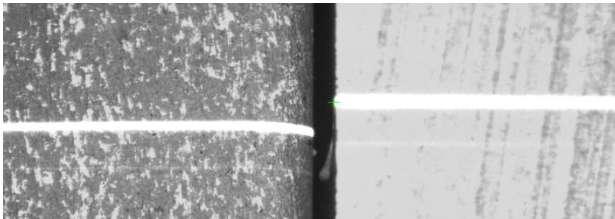
Verbosity level
 None

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 right gap start out of the laser line tracking.



G11 Detection 1 Line - Preparation



**Filters of
G11 Detection 1 Line - Preparation**

01 Line Tracking full

02 Low pass filter laser line

03 Close Gaps

22 Tracking Threshold 1 Line


Attributes of
01 Line Tracking full


Verbosity level
 None

mean x
 — 2 +

search area y
 — 8 +

mean area y
 — 3 +
 pixel

Resolution X
 — 1 +
 pixel

Resolution Y
 — 1 +

Maximum Gap Width
 — 6 +

Maximum Number of Gaps
 — 10 +

Maximum height jump
 — 5 +


Starting Point Width
 — 3 +
 Pixel

Starting Point Height
 — 3 +
 Pixel

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 " search area 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]


Attributes of
 02 Low pass filter laser line

Verbosity level
 None

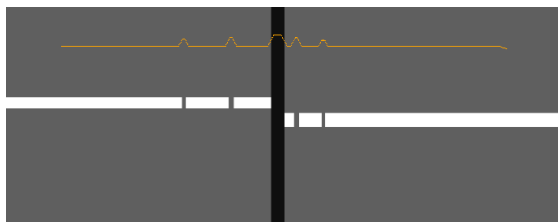
Filter length
 3

N 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.



Verbosity level
 None

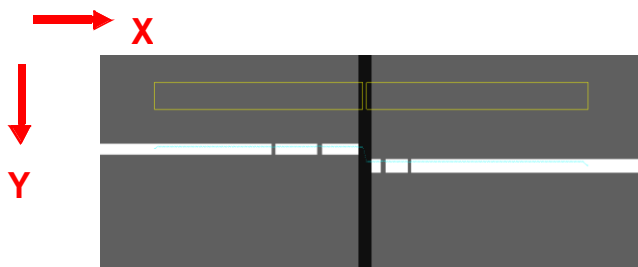
Max. jump Y
 5

Maximal interpolation length
 5

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 is smaller than 'Max. jump Y'. [Pixel]
Maximal interpolation length	A gap in the laser line shape may be closed by a direct line if the horizontal difference between the two end points of the gap is smaller than 'Maximal interpolation length'. [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 horizontal/vertical distance was small enough, and the two yellow rectangles mark that there was no interrupt in the laser line parts.



Number
 150.000

Parameter	Comment
Number	If there is no gap position found with " G10 Detection 2 Lines - Line discontinuation - gap pos left/right ", the laser line is tracked again with this threshold to search for an intensity minimum as the 'found gap position'. The gap width will be zero. [Greylevel]



G12 Detection 1 Line - Line width minimum - gap pos center

Filters of
G12 Detection 1 Line - Line geo minimum - gap pos cente

04 Extremum from left
 05 Extremum from right

Attributes of
04 Extremum from left

Verbosity level
None

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

Attributes of
05 Extremum from right


Verbosity level
None


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

G16 CALC Height difference

Filters of

G16 Calc Height difference

 01 Height Difference left

 11 Height Difference right

Attributes of

01 Height Difference left

Verbosity level

None

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

Attributes of

11 Height Difference right

Verbosity level

None

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





■ Measured values for plotter

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

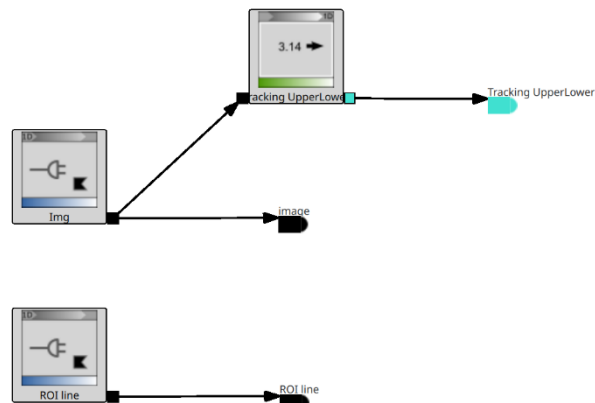
■ Subgraphs interface

IN bridges

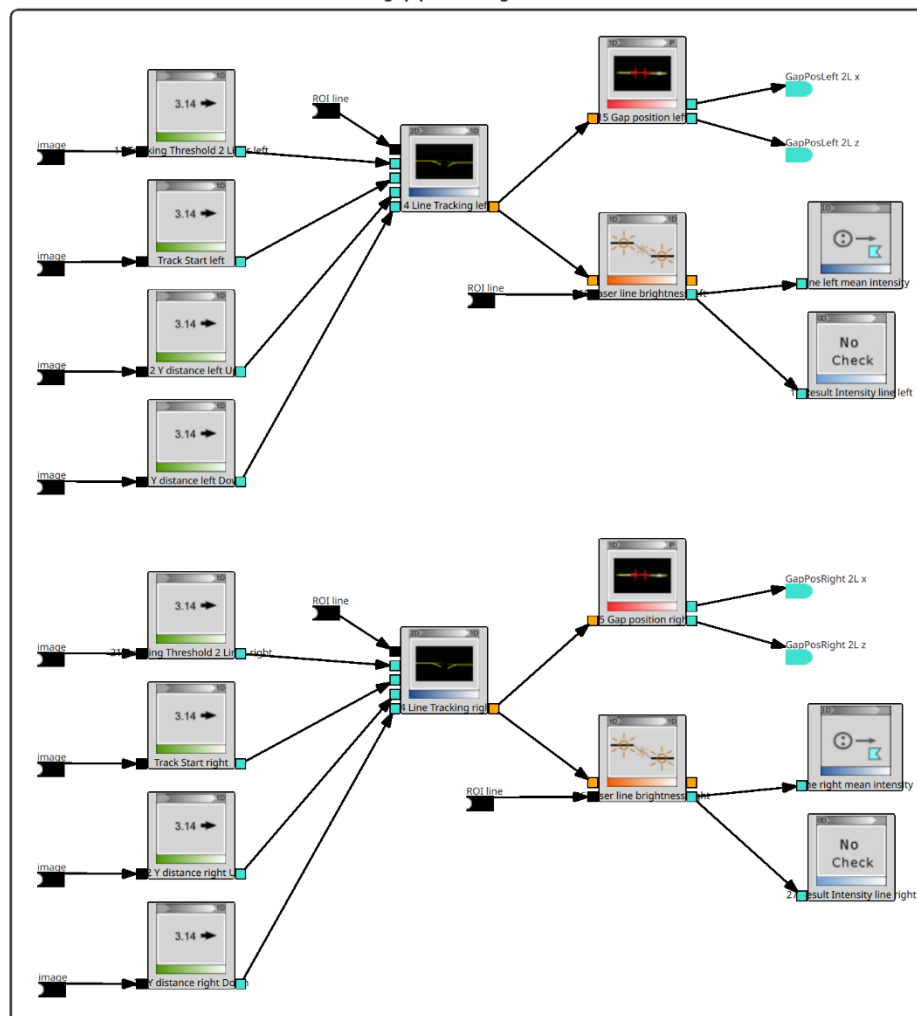
OUT bridges

 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

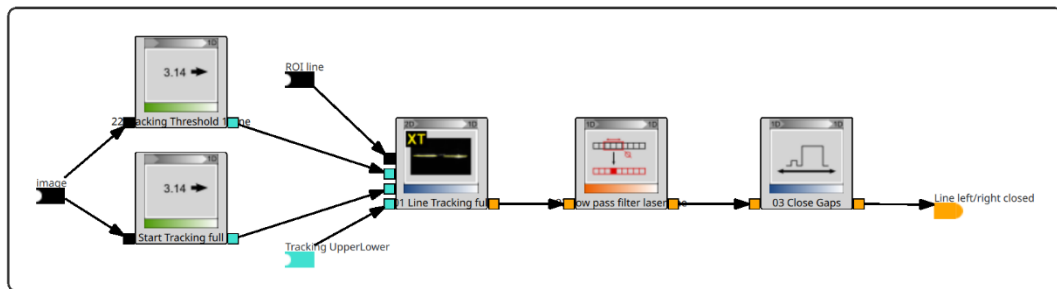


G10 Detection 2 Lines - Line discontinuation - gap pos left/right

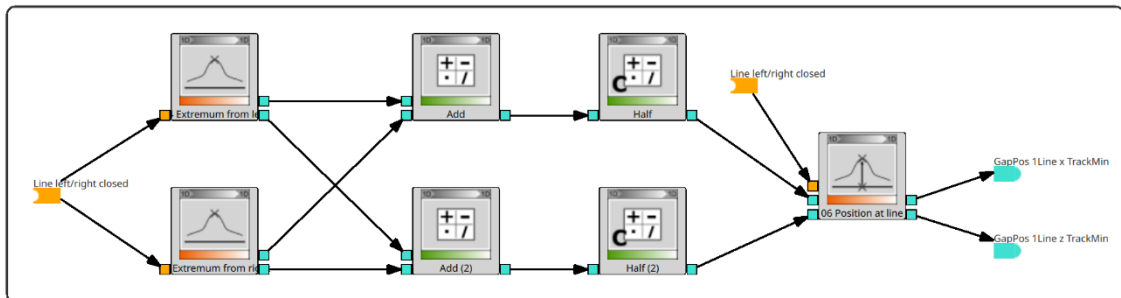




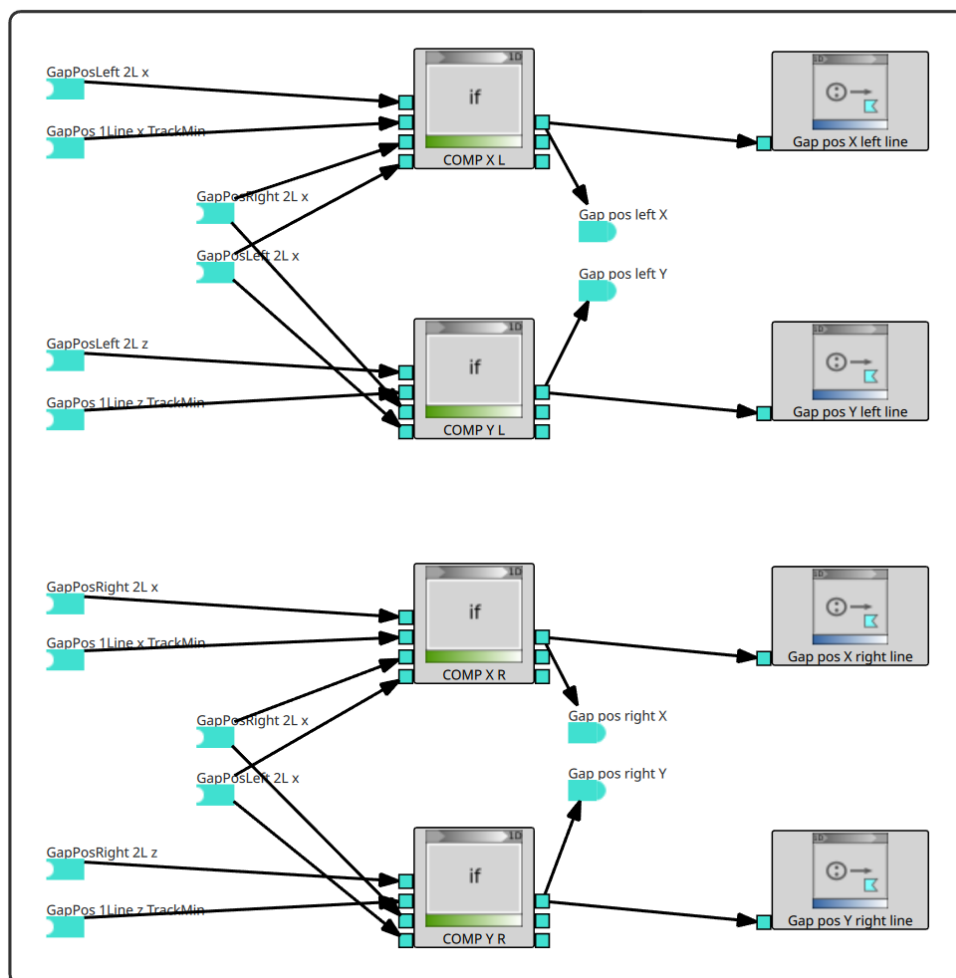
G11 Detection 1 Line - Preparation



G12 Detection 1 Line - Line geo minimum - gap pos center



G15 Select Position



G16 Calc Height difference

