# 5 - S29 SEARCH Seam LINE width+GREY Gradient V2

- **Description**

Search seam borders left and right by first searching the seam center with "line width" algorithm and then check for correct seam border positions with the gradient algorithm.

For the Gradient algorithm the rectangle of the ROI (**R**egion **O**f **I**nterest) is cut in small horizontal stripes. In each stripe a left and right seam border position is searched. The average over all positions gives the final position for the left and for the right border position.
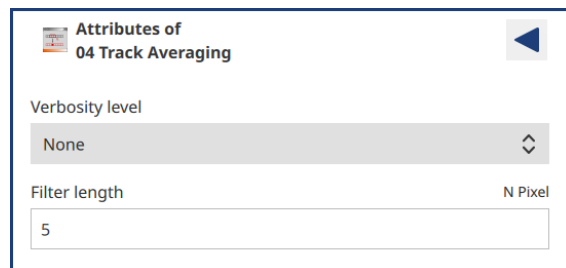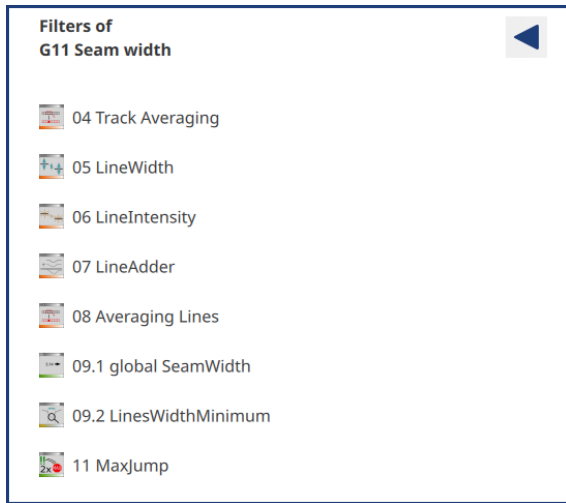
- **Icon**
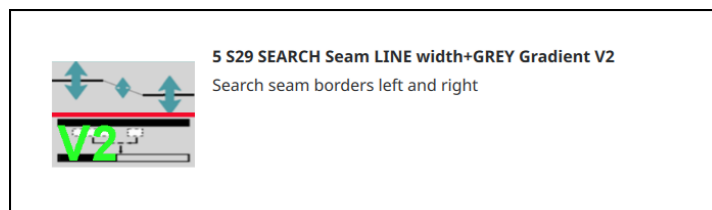
- **Parameters**
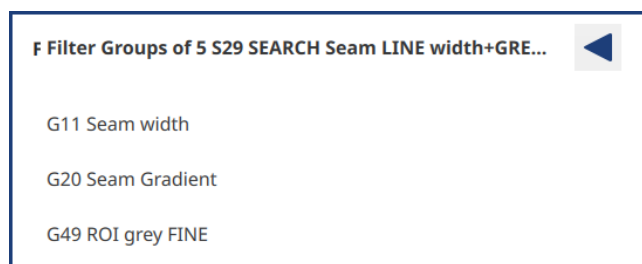
G11 Seam width

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

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Threshold	Minimum grey scale value for an image pixel that it's defined to belong to the laser line. [Greylevel]
Height of the search area	Upwards and downwards laser line search area (vertical). Height of the search area = 30 means: 30 pixels upwards and also 30 pixels downwards from a straight line between the laser line start points. [Pixel]
Dark Soot threshold	Limit value for dark grime. If the mean value for the brightness, measured in an area 20 - 70 pixels above, respectively 20 - 70 pixels below the straight line, and 50 pixels wide through the start points, does not exceed this value, there is dark grime lying on the steel sheet in this area. [Greylevel]
Light Soot threshold	Limit value for light grime. If the mean value for the brightness, measured in an area 20 - 70 pixels above, respectively 20 - 70 pixels below the straight line, and 50 pixels wide through the start points, does not exceed this value, but is higher than " Dark Soot threshold", there is light grime lying on the steel sheet in this area. [Greylevel]
Dark Soot Factor	Factor for widening up the found line width when having dark grime (in 1/10th).
Light Soot Factor	Factor for widening up the found line width when having light grime (in 1/10th).

Attributes of
06 LineIntensity

Verbosity level

None

Height of the search area.   Pixel

10

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Height of the search area	Upwards and downwards laser line search area (vertical). Height of the search area = 10 means: 10 pixel upwards and also 10 pixel downwards from a straight line between the laser line start points. [Pixel]

Attributes of
07 LineAdder

Verbosity level

None

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

Attributes of
08 Averaging Lines

Verbosity level

None

Filter length   N Pixel

10

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	The laser line width values are filtered to get a smoother curve. [Pixel]

Attributes of
09.1 global SeamWidth

Number

200.000

Parameter	Comment
Number	The "expected" seam width for this algorithm. The real seam width will be searched and set in "20 Seam Gradient". [Pixel]

Attributes of
09.2 LinesWidthMinimum

Verbosity level

None

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

Attributes of
**11 MaxJump**

Start image number

2

Maximum jump width

100

Max. diff. Change

50

AddOn per image

20

Parameter	Comment
Start image number	The image number, when the filter becomes active. Value must be 2 or bigger, because at least one value must exist for the filter.
Maximum jump width	Max. allowed (horizontal) change of the seam border **positions**. If the difference on the left side positions and/or the right side positions is bigger, the old left/right position values are used. [Pixel]

Max. diff. Change	Maximum allowed change of the (horizontal) **distance** of the two values, which is the seam width. If the change is bigger, the old left/right seam position values are used. [Pixel]
AddOn per image	If one or both seam border positions exceed the allowed "Maximum jump width" or the position distance exceeds the "Max. diff. Change", the actual values of "Maximum jump width" and "Max. diff. Change" are both increased by "AddOn per image". If both seam border positions and the change of the position distance are all OK, the value for "Maximum jump width" and "Max. diff. Change" are both reset to their given parameter values. [Pixel]

G20 Seam Gradient
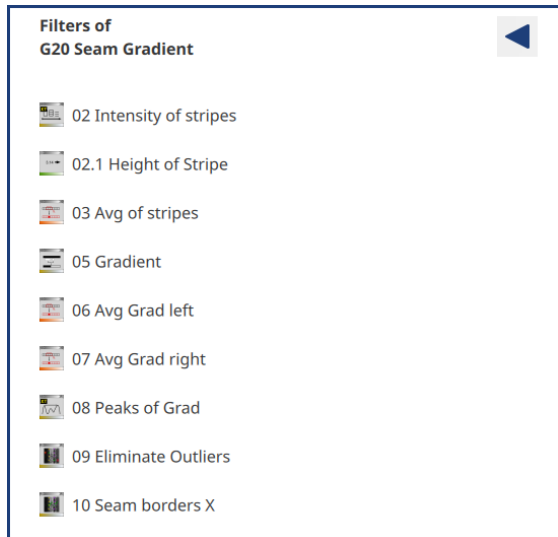
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

Attributes of
02.1 Height of Stripe ◀

Number

30.000

Parameter	Comment
Number	Number of lines in the image that are compressed to stripes for the seam detection. The higher the value the more lines are taken for the compressing. [Pixel]

Attributes of
03 Avg of stripes ◀

Verbosity level

None ⬍

Filter length   N Pixel

5

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	The noisier the brightness is, the higher this parameter must be selected (1 - 100). This smoothens the brightness in every stripe before further processing. [Pixel]

Attributes of
05 Gradient ◀

Verbosity level

None ⬍

Filter radius off seam   N pixel

5

Filter radius on seam   N pixel

10

Gradient type   N pixel

Dark seam ⬍

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

Filter radius off seam	The noisier the brightness is, the higher this parameter must be selected (1 - 100). This smoothens the brightness in every stripe before further processing. Value is for the stripe part **outside** the seam. [Pixel]
Filter radius on seam	The noisier the brightness is, the higher this parameter must be selected (1 - 100). This smoothens the brightness in every stripe before further processing. Value is for the stripe part **inside** the seam. [Pixel]
Gradient type	How to check gradients at seam border: • **Absolute** = don't care if the seam intensity is higher or smaller than the blanks intensity • **Dark seam** = the intensity in the seam is expected to be smaller than the intensity outside on the blanks • **Bright seam** = the intensity in the seam is expected to be bigger than the intensity outside on the blanks

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	The noisier the brightness is, the higher this parameter must be selected (1 - 100). This eliminates too small intensity changes. Value for the left seam side. [Pixel]

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

Filter length	The noisier the brightness is, the higher this parameter must be selected (1 - 100). This eliminates too small intensity changes. Value for the right seam side. [Pixel]

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Left gradient threshold	Minimum brightness gradient in one stripe that is taken and, in order to detect the seam rim, must be surpassed. Separately for the left side. [Greylevel]
Right gradient threshold	Minimum brightness gradient in one stripe that is taken and, in order to detect the seam rim, must be surpassed. Separately for the right side. [Greylevel]

Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Variance factor	Allowed distance of the point's position that the position is used. Otherwise it's position is replaced through the 'mean position'.

Attributes of
10 Seam borders X ◀

Verbosity level

None ⬍

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

G49 ROI grey FINE

Filters of
G49 ROI grey FINE ◀

   01.1 Offset left

   01.2 Offset right

   02 Min width

   03 ROI grey FINE

Attributes of
01.1 Offset left ◀

Number

75.000

Parameter	Comment
Number	Fix offset of left 'ROI fine' border leftward away from left seam rim. [Pixel]

Attributes of
01.2 Offset right ◀

Number

75.000

Parameter	Comment
Number	Fix offset of right 'ROI fine' border rightward away from the right seam rim. [Pixel]

Parameter	Comment
Number	Min. found seam width for further calculations. If the found seam width is smaller the left/right ROI borders are equally stretched to reach the required min. width. [Pixel]

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

- **Measured values for plotter**

- **Subgraphs interface**

IN bridges   **OUT bridges**

image	Img	image	ROI preSeam
	ROI line		
	ROI grey	value	ROI preSeam X
			ROI preSeam Y
Line	Line		ROI preSeam W
			ROI preSeam H
value	ROI grey X		ROI preSeam valid
	ROI grey Y		Seam pos left
	ROI grey W		Seam pos right
	ROI grey H		
	ROI grey valid		

Graph block diagram
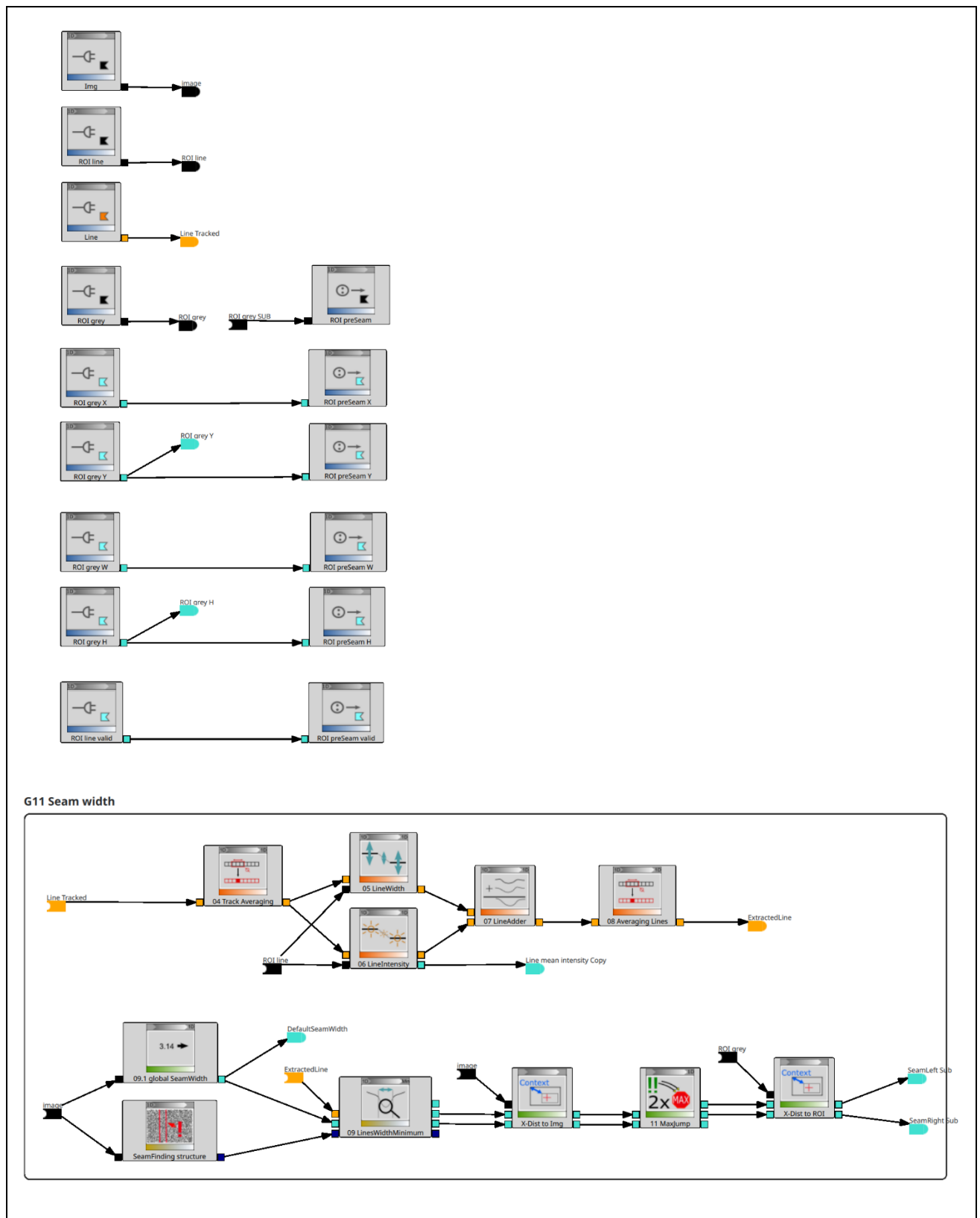
G20 Seam Gradient

G49 ROI grey FINE

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