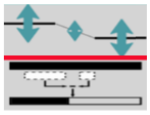
5 - S29 SEARCH Seam LINE width+GREY Gradient

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.

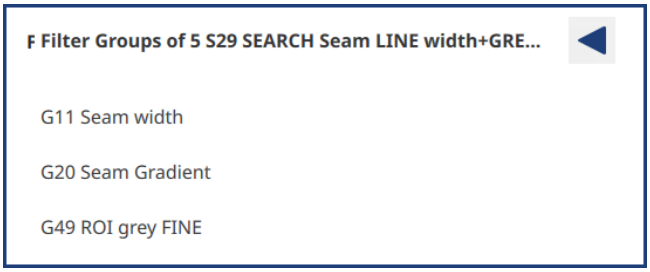
Icon



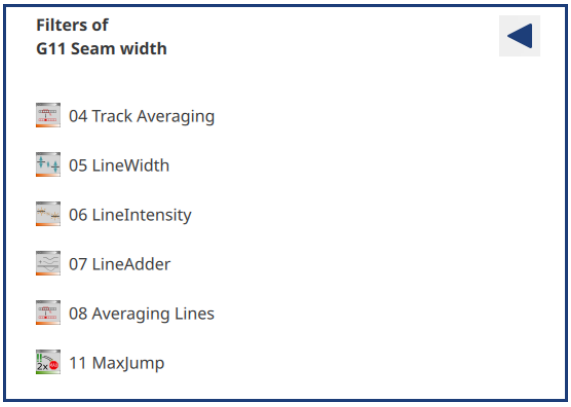
5 S29 SEARCH Seam LINE width+GREY Gradient

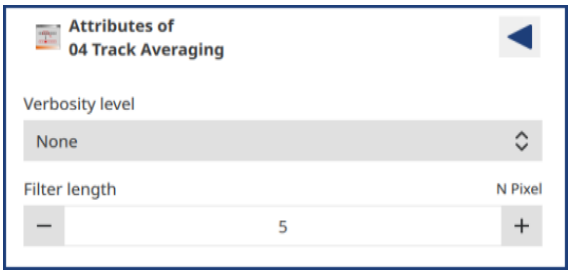
Search seam borders left and right

Parameters

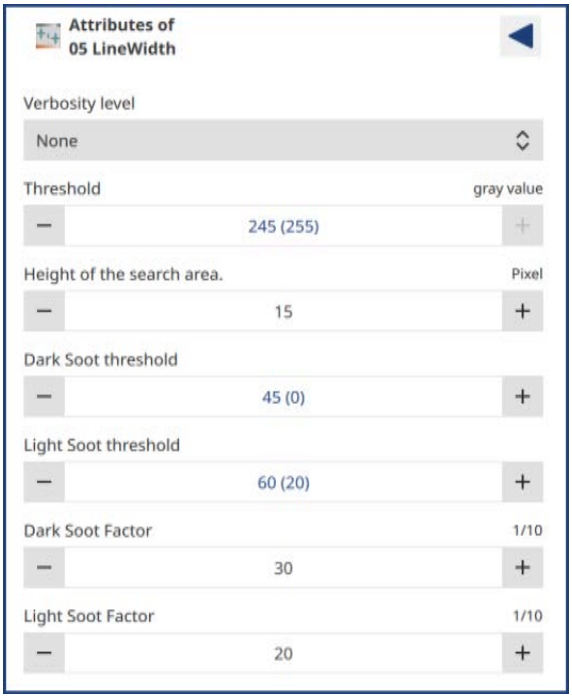


G11 Seam width

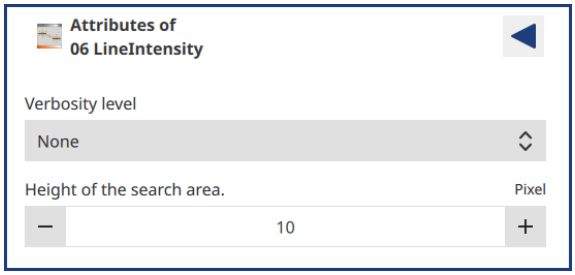




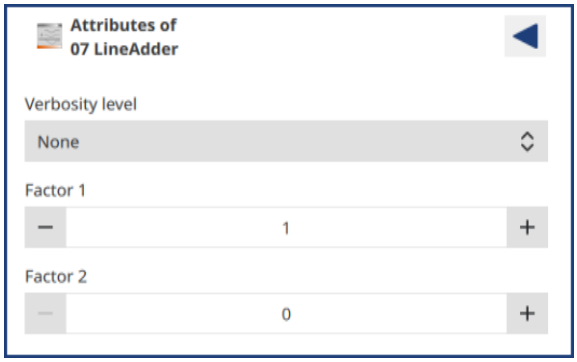
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	Number of pixels in X direction, used for averaging the brightness in order to define the next point of the laser line. [Pixel]



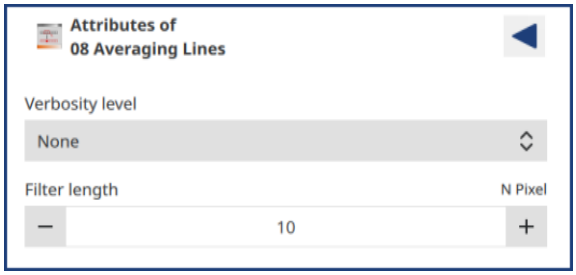
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Threshold	Minimum grey scale value for an image pixel that it's defined to belong to the laser line. [Greylevel]
Height of the search area	Upwards and downwards laser line search area (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).



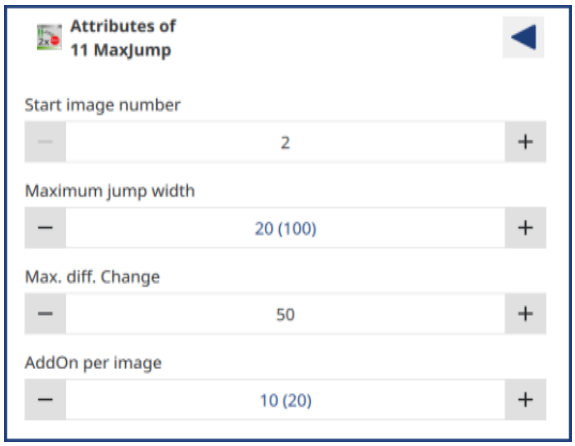
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Height of the search area	Upwards and downwards laser line search area (vertical). Height of the search area = 30 means: 30 pixels upwards and also 30 pixels downwards from a straight line between the laser line start points. [Pixel]



Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Factor 1	Factor 1 0 = not used 1 = used
Factor 2	Factor 2 0 = not used 1 = used

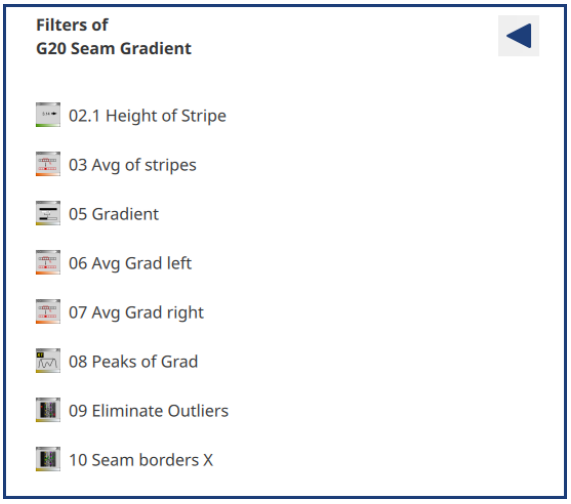


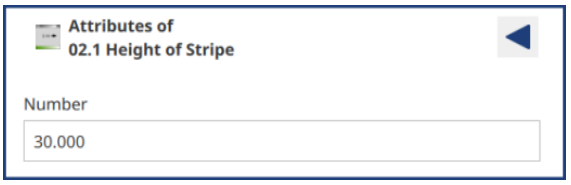
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	The laser line width values are filtered to get a smoother curve. [Pixel]



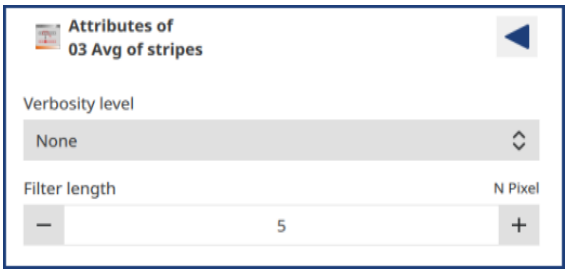
Parameter	Comment
Start image number	The image number, when the filter becomes active. Value must be 2 or bigger, because at least one value must exist for the filter.
Maximum jump width	Max. allowed (horizontal) change of the seam border **positions**. If the difference on the left side positions and/or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

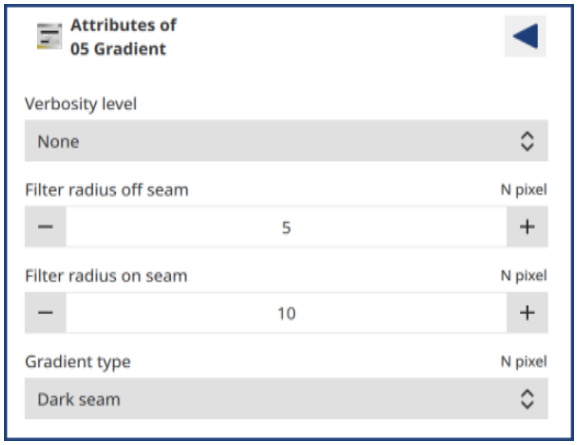




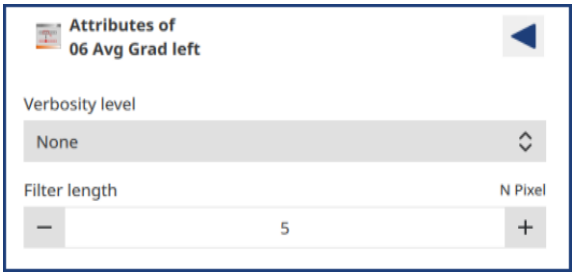
Parameter	Comment
Number	Number of lines in the image that are compressed to stripes for the seam detection. The higher the value the more lines are taken for the compressing. [Pixel]



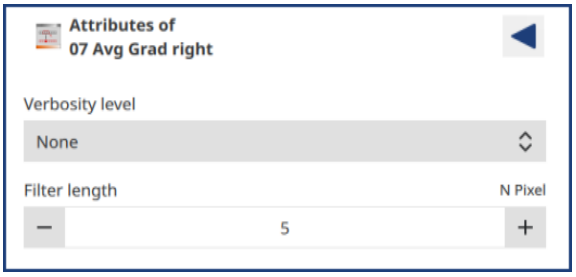
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter length	The noisier the brightness is, the higher this parameter must be selected (1 - 100). This smoothens the brightness in every stripe before further processing. [Pixel]



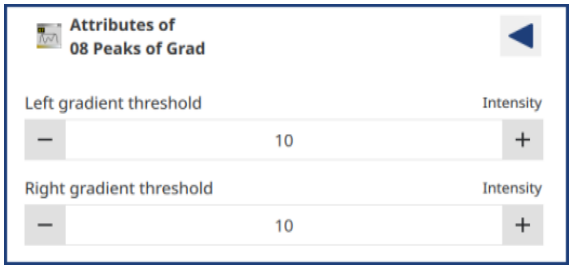
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.
Filter radius off seam	The noisier the brightness is, the higher this parameter must be selected (1 - 100). This smoothens the brightness in every stripe before further processing.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



Parameter	Comment
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]

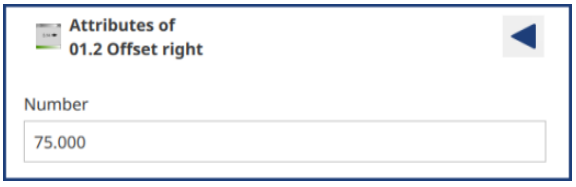
Parameter	Comment
Verbosity level	Selection of verbosity level. Larger verbosity levels offer more overlay information.

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

G49 ROI grey FINE

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

Parameter	Comment
Number	Fix offset of left 'ROI fine' border rightward. [Pixel]



Parameter	Comment
Number	Fix offset of right 'ROI fine' border leftward. [Pixel]

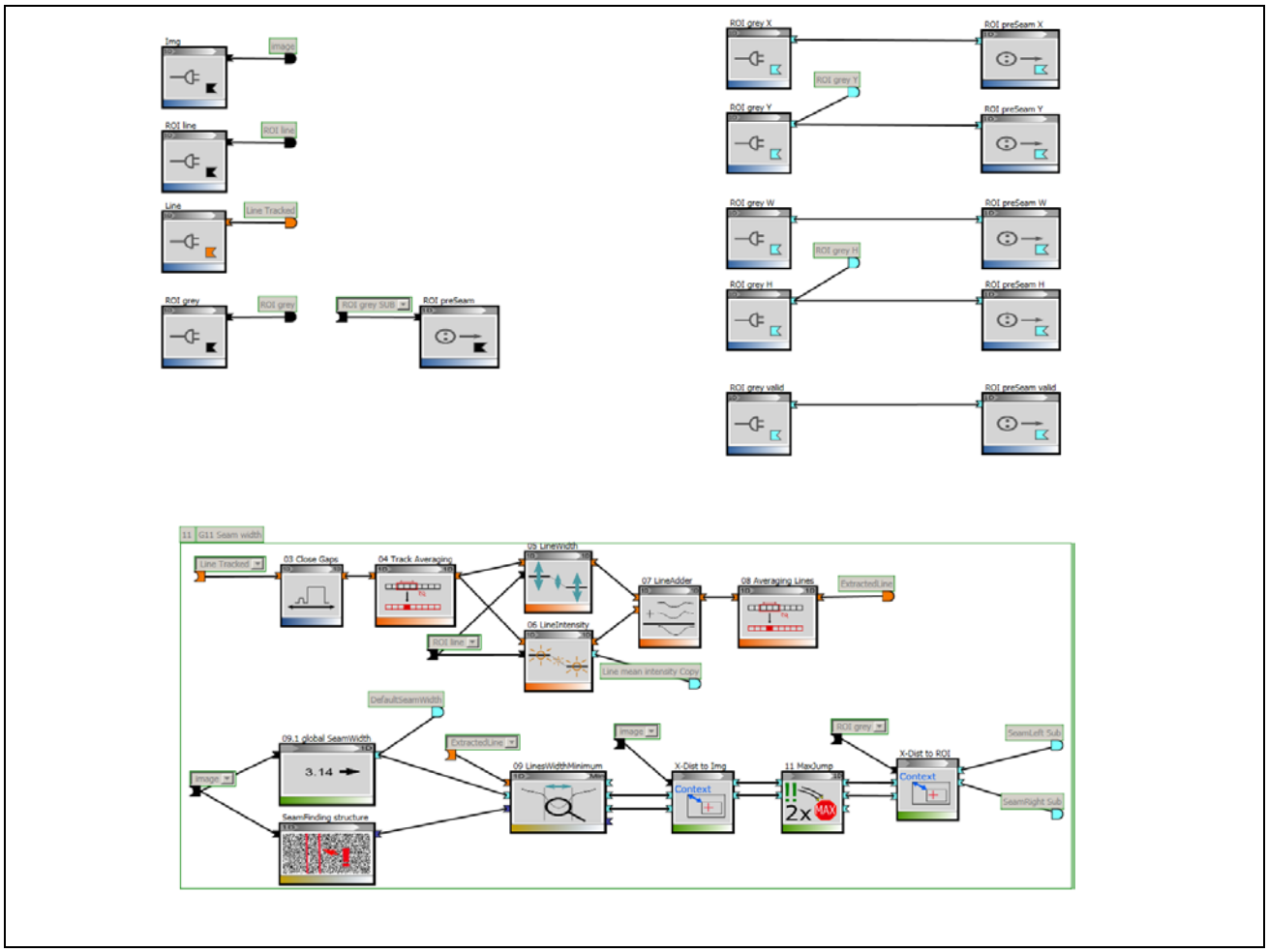
- **Measured values for plotter**

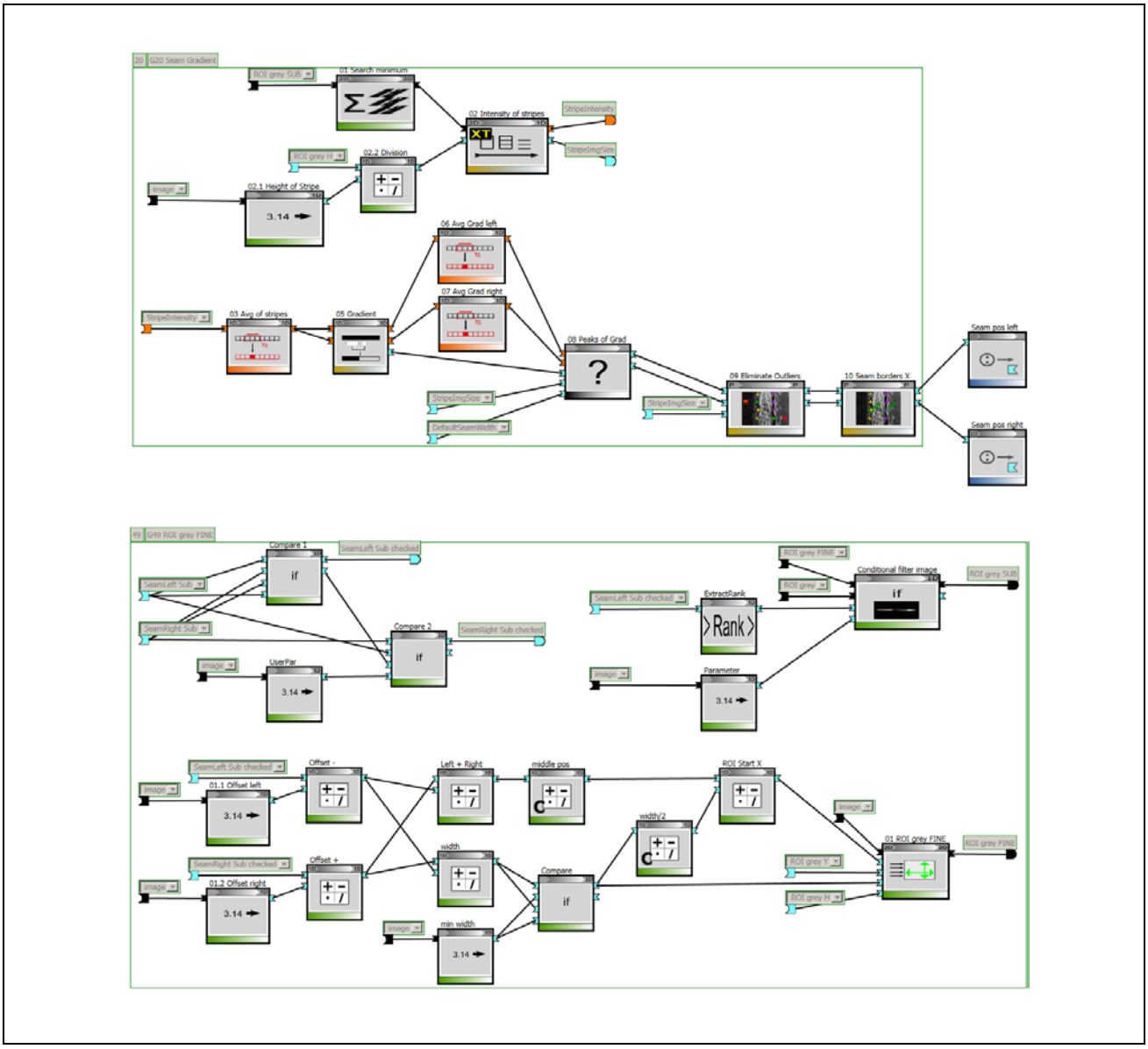
- **Subgraphs interface**

IN bridges **OUT bridges**

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

Graph block diagram




20 G20 Seam Gradient
ROI grey SUB
01 Search maximum
02 Intensity of stripes
StripeIntensity
StripeImgSize
ROI grey H
02.2 Division
image
02.1 Height of Stripe
3.14
06 Avg Grad left
07 Avg Grad right
StripeIntensity
03 Avg of stripes
05 Gradient
08 Peaks of Grad
?
StripeImgSize
DefaultSeamWidth
09 Eliminate Outliers
StripeImgSize
10 Seam borders X
Seam pos left
Seam pos right
49 G49 ROI grey FINE
Compare 1
SeamLeft Sub checked
SeamLeft Sub
if
SeamRight Sub
Compare 2
SeamRight Sub checked
image
UserPar
3.14
ROI grey FINE
ROI grey
Conditional filter image
ROI grey SUB
SeamLeft Sub checked
ExtractRank
Rank
image
Parameter
3.14
SeamLeft Sub checked
Offset -
Left + Right
middle pos
ROI Start X
image
01.1 Offset left
3.14
width/2
image
SeamRight Sub checked
Offset +
width
Compare
01 ROI grey FINE
ROI grey FINE
image
01.2 Offset right
3.14
ROI grey Y
ROI grey H
image
min width
3.14