

## LGF\_SimpleSmoothingFB/LGF\_SimpleSmoothingFC

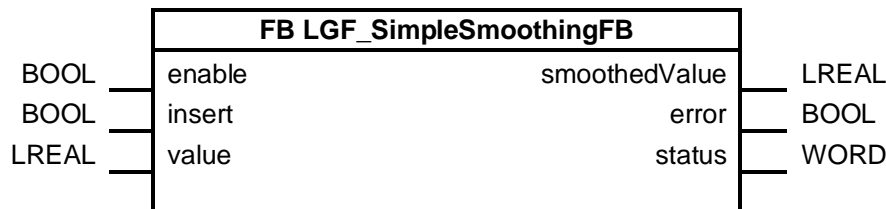
### Short description

The simplest form of smoothing a sequence of measured values is to calculate the linear mean value by three points.

The block is implemented as a function and as a function block.

| Function (FC)   | Function block (FB)  |
|---|--|
| The function calculates the linear mean value acyclically.<br>The function reads an array that is smoothed. N-2 smoothed measured values can be calculated from N measured values. Therefore, the output array in the index (0) and index (N) contains the value 0. | The function block calculates the linear mean value cyclically.<br>The function block reads-in a value with each positive edge on the "insert" input. As soon as three values have been read in, the block calculates a smoothed value and outputs it. |

### Function block (FB)



### Input parameters

| Parameters | Data type | Description  |
|------------|-----------|--|
| enable     | BOOL      | Activates the block. As long as enable is "TRUE", the block can accept values on the parameter "value".                  |
| insert     | BOOL      | Accepts the value at the input "value" at positive edge and outputs a "smoothedValue" if three values have been read in. |
| value      | LReal     | Value that is to be included in the smoothing.   |

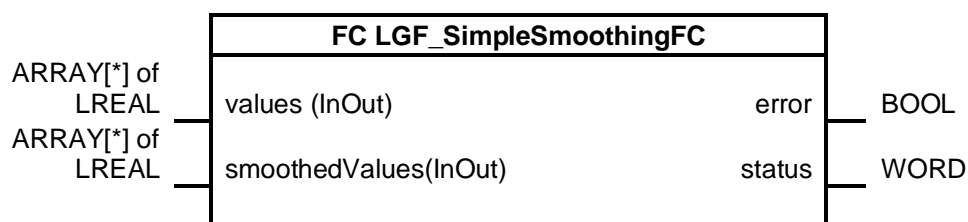
### Output parameters

| Parameters    | Data type | Description  |
|---------------|-----------|--|
| smoothedValue | LREAL     | The smoothed values.   |
| error         | BOOL      | FALSE: No error<br>TRUE: An error occurred during the execution of the FB.                         |
| status        | WORD      | 16#0000-16#7FFF: Status of the FB,<br>16#8000-16#FFFF: Error identification (see following Table). |

## Status and error displays

| status   | Meaning                   | Remedy / notes  |
|----------|---------------------------|---|
| 16#0000  | No error                  | Processing was completed successfully   |
| 16 #7000 | Block is not being edited | The block waits for activation through the parameter "enable".  |
| 16#7001  | First FB call.            | -   |
| 16#7002  | Processing is active.     | Subsequent call of the FB   |
| 16#7010  | Too few values            | The block requires three values to calculate a smoothed value. Transfer additional values with a positive edge on the "insert" input. |

## Function (FC)



## Input/output parameters (InOut)

| Parameters     | Data type         | Description                                      |
|----------------|-------------------|--|
| values         | ARRAY[*] of LREAL | Values that are to be included in the smoothing. |
| smoothedValues | ARRAY[*] of LREAL | The smoothed values.                             |

## Output parameters

| Parameters | Data type | Description  |
|------------|-----------|--|
| error      | BOOL      | FALSE: No error<br>TRUE: An error occurred during the execution of the FB.                         |
| status     | WORD      | 16#0000-16#7FFF: Status of the FB,<br>16#8000-16#FFFF: Error identification (see following Table). |

## Status and error displays

| status  | Meaning             | Remedy / notes   |
|---------|---------------------|--|
| 16#0000 | No error            | Processing was completed successfully  |
| 16#8400 | Too few values      | The block requires three values to calculate a smoothed value. Increase the size of the array at the input parameter "values". Adapt the array on the output parameter "smoothedValues" to the new size. |
| 16#8401 | Unequal array sizes | The arrays "values" and "smoothedValues" must have the same size.  |

## Principle of operation

The block calculates the smoothed values using the following formula:

$$\overline{y(n)} = \frac{y(n-1) + y(n) + y(n+1)}{3}$$

The calculated value is output or the calculated values are output at output "smoothedValue".

Based on this formula, the FC cannot calculate values for the elements 0 and N.

## Further information on libraries in TIA Portal:

- Topic page libraries  
<https://support.industry.siemens.com/cs/ww/en/view/109738702>
- Guideline on Library Handling  
<https://support.industry.siemens.com/cs/ww/en/view/109747503>
- Programming Guideline for S7-1200/1500 in chapter "Libraries"  
<https://support.industry.siemens.com/cs/ww/en/view/81318674>
- Programming Styleguide  
<https://support.industry.siemens.com/cs/ww/en/view/81318674>