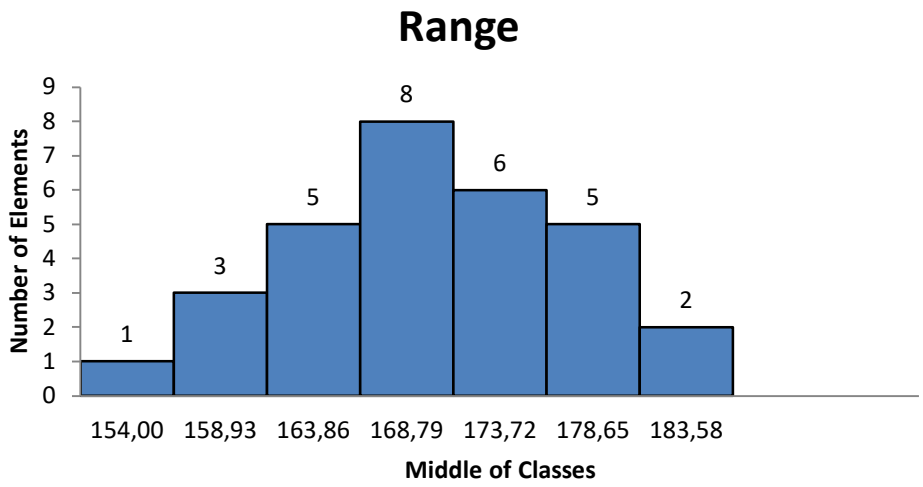
LGF_Histogram_LReal

Short description

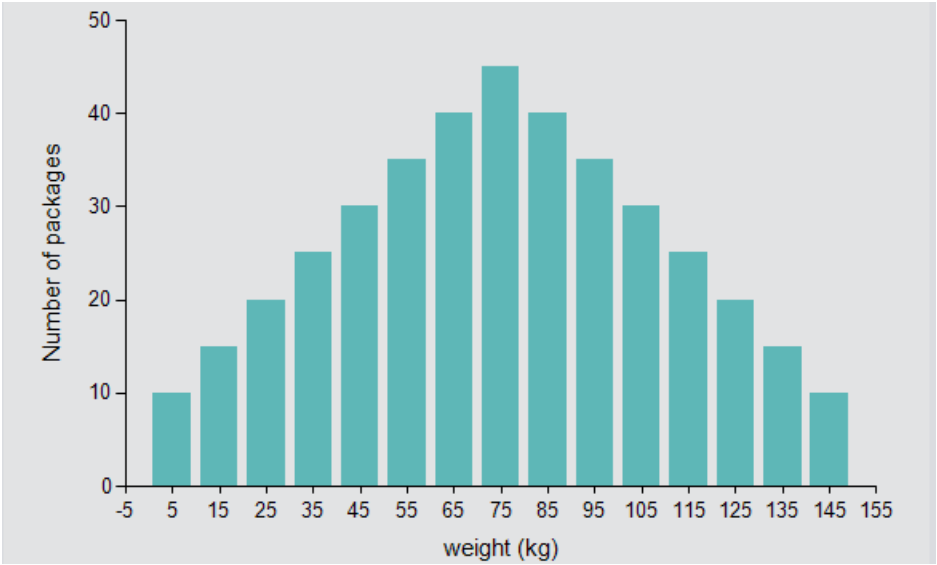
The histogram shows the frequency distribution of a sample by class. A class describes a value interval in which the individual frequencies are added together. After specifying the number of classes, the class width and the respective class center are calculated. The number of classes is limited to 15.

The distribution is represented as a rectangle around the class mean with the class width and the cumulated frequency as height.

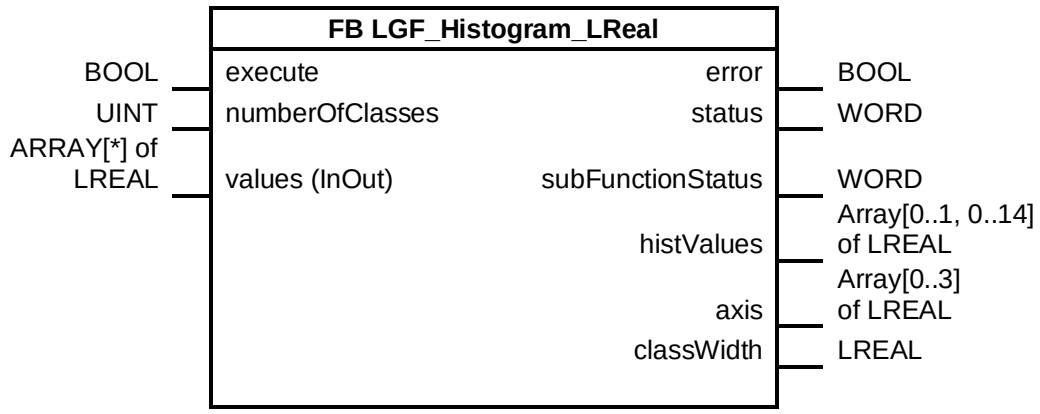


WinCC-Control

To visualize the histogram, Siemens Industry Online Support offers you a .Net Control that you can use in conjunction with WinCC Runtime Professional. You can find the download under the entry ID: 81662739.



Block



Input parameters

Parameters	Data type	Description
execute	BOOL	Activation of the calculation with each positive edge.
numberOfClasses	UINT	Number of desired classes.

Input/output parameters (InOut)

Parameters	Data type	Description
values	ARRAY[*] of LREAL	Array that should be used for calculation.

Output parameters

Parameters	Data type	Description
error	BOOL	FALSE: No error TRUE: An error occurred during the execution of the FB.
status	WORD	16#0000-16#7FFF: Status of the FB, 16#8000-16#FFFF: Error identification (see following Table).
subFunctionStatus	WORD	Status or return value of the called FCs and system blocks.
histValues	ARRAY [0..1, 0..14] of LREAL	Outputs the calculated values in a two-dimensional array. • HistValues[0,0..14] displays the relative frequency of the individual classes. • HistValues[1,0..14] displays the class centers. • If fewer than 15 classes are desired, the array elements that are not required are output with 0.
axis	Array[0..3] of LREAL	Specifies the axis values: • Lower X axis value • Upper X axis value • Lower Y axis value • Upper Y axis value
classWidth	LREAL	Returns the calculated class width.

Status and error displays

status	Meaning	Remedy / notes
16#0000	No error	-
16 #7000	Block is not being edited	-
16#7001	First FB call.	-
16#8600	Error in command “LGF_ShellSort_LReal”.	Check the error code in “subFunctionStatus”. Information concerning this block is provided in the documentation of this block.
16#9101	Incorrect number of classes	Give the parameter “NumberOfClasses” a valid value (1 to 15).

Principle of operation

The block sorts the passed data and calculates the general class width using the passed class count and data range. The block then counts the values that lie within a class. In order to draw a histogram, the block also calculates the necessary X and Y coordinates.

The elements of the passed array “values” are sorted in ascending order by the block. The block “LGF_ShellSort_LReal” is used for sorting.

The number of classes can be specified using the following rule of thumb:

$Number\ of\ Classes = \sqrt{number\ of\ elements}$

e.g. 100 values -> $Number\ of\ Classes = \sqrt{100} = 10$

Formulas

The block uses the following formula to calculate the class width:

$$classWidthh = \frac{max\ - min}{Number\ of\ classes}$$

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