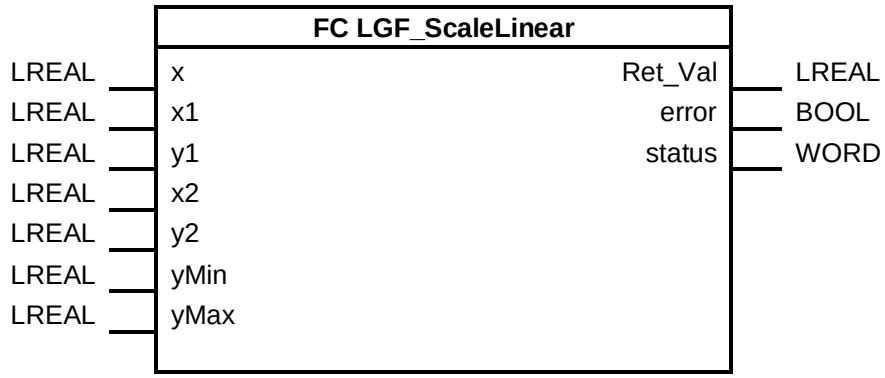
LGF_ScaleLinear

Short description

This function scales an input variable via a linear straight line equation.

Block



Input parameters

Parameters	Data type	Description
x	LREAL	Input value to be scaled.
x1	LREAL	Point 1 (P_1) of the linear function.
y1	LREAL	
x2	LREAL	Point 2 (P_2) of the linear function.
y2	LREAL	
yMin	LREAL	Lower limit value of the output.
yMax	LREAL	High limit value of the output.

Output parameters

Parameters	Data type	Description
Ret_Val	LREAL	Output value, scaled.
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).

Status and error displays

Status	Meaning	Remedy
16#0000	No error.	-
16#8200	Lower limit value “yMin” is greater than high limit value “yMax”.	Select low limit below the high limit.
16#6001	Output value limited to yMin	-
16#6002	Output value limited to yMax	-

Principle of operation

The function linearly scales an input variable (e.g. an analog input value) to a specific output variable (e.g. level).

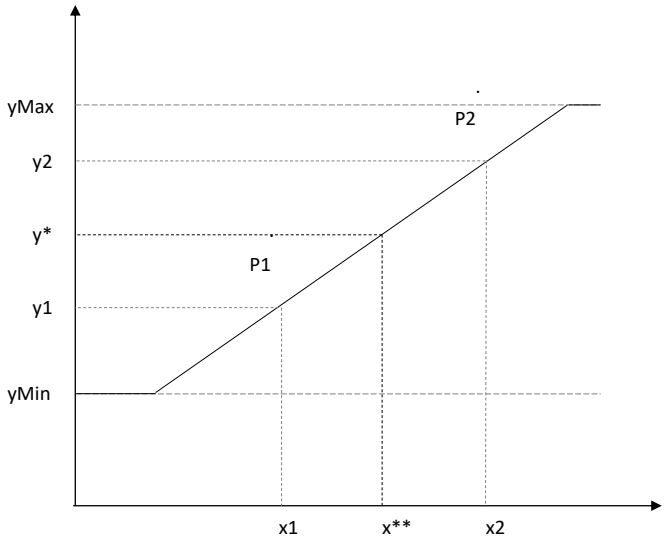
To determine the output variable, the following linear equation is used in the function:

$$y = \frac{y_2 - y_1}{x_2 - x_1} \cdot (x - x_1) + y_1$$

The straight line is described by the two points, P_1 and P_2. You specify the points as a Cartesian coordinate system using x and y coordinates.

Note If the values of the parameters “x1” and “x2” are the same, the value of “y1” is output on output “y”.

By specifying “yMin” and “yMax” you can restrict the calculated value of “y” to a range limited at top and bottom. Thus you avoid override and underride ranges.



*) resulting scaled value
**) scaleable value

Example

A signal from 4 to 20 mA is applied on an analog input module. This signal is converted to the CPU internal value from 0 to 27648 to measure a level. 0 corresponds to a level of 0.0 m and 27648 to a level of 1.7 m.

The block must then be parameterized as follows:

- x1 = 0; y1 = 0.0 (P1)
- x2 = +27648; y2 = 1.7 (P2)
- yMin = 0.0
- yMax = 1.7

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