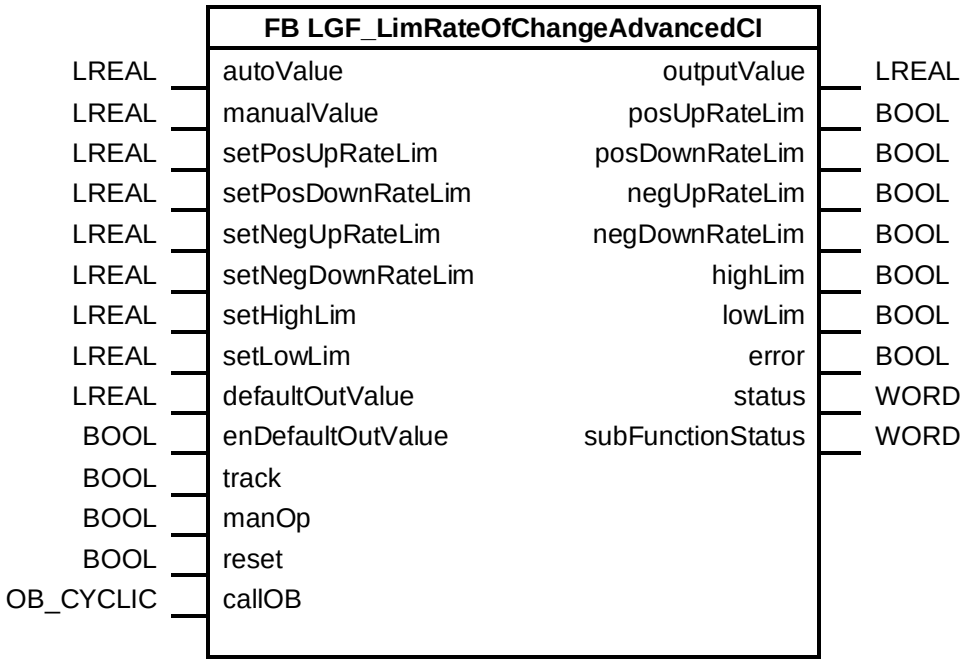
LGF_LimRateOfChangeAdvancedCl

Short description

The block LGF_LimRateOfChangeAdvanced limits the rate of change of an input variable. Jump functions become ramp functions. In addition, the block has various operating modes.

Block



Input parameters

Parameters	Data type	Description
autoValue	LREAL	Process variable (jump function)
manualValue	LREAL	Value in manual mode
setPosUpRateLim	LREAL	Rate of change per second for the rising ramp in the positive value range
setPosDownRateLim	LREAL	Rate of change per second for the falling ramp in the positive value range
setNegUpRateLim	LREAL	Rate of change per second for the rising ramp in the negative value range
setNegDownRateLim	LREAL	Rate of change per second for the falling ramp in the negative value range
setHighLim	LREAL	High limit
setLowLim	LREAL	Low limit
defaultOutValue	LREAL	Value for pre-assignment of the output variable
enDefaultOutValue	BOOL	Preset output value (outputValue = defaultOutValue)
track	BOOL	Input variable switching/tracking (outputValue = autoValue)
manOp	BOOL	Manual mode (outputValue = manualValue)
reset	BOOL	Restart
callOB	OB_CYCLIC	Calling cyclic interrupt OB

Output parameters

Parameters	Data type	Description
outputValue	LREAL	Output variable
posUpRateLim	BOOL	Rise limitation in positive range tripped
posDownRateLim	BOOL	Fall limitation in positive range tripped
negUpRateLim	BOOL	Rise limitation in negative range tripped
negDownRateLim	BOOL	Fall limitation in negative range tripped
highLim	BOOL	High limit tripped
lowLim	BOOL	Low limit tripped
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.

Status and error displays

status	Meaning	Remedy / notes
16#0000	No error	-
16#8200	Error: “setHighLim” < “setLowLim”	The high limit “setHighLim” must be greater than the low limit “setLowLim”.
16#8202	Negative rate of change.	The parameter for the change rate must not be negative.
16#8600	Error in “QRY_CINT” command.	Check the error code in “subFunctionStatus”
16#8601	OB on input “callOB” is not configured / present.	Interconnect the constant name of a configured cyclic interrupt OB at the input “callOB”.

Note The status of called commands is output in “subFunctionStatus”. In this case, the output value in “status” indicates which command caused the error. In this case, refer to the TIA Portal Online Help section for information on the respective commands.

Principle of operation

For the positive/negative value range, two rates of change in each case for the ramp (rising and falling values) can be parameterized. The following operating modes can be selected via control inputs:

- Restart
- Pre-assigning an output
- Normal operation (automatic)
- Switch through controlled variable (manual)
- Tracking

The output variable can be limited through two parameterizable limits. An active limitation of the rate of change of a ramp, as well as an active limitation of the output variable are reported via outputs.

The time interval of the calling cyclic interrupt OB is determined by interconnecting the calling cyclic interrupt OB at the input parameter “callOB”.

Restart

At restart “reset = TRUE”, the output “outputValue” is reset to 0.0. If “enDefaultOutValue = TRUE” is set, “defaultOutValue” is output. All signal outputs are set to FALSE.

Pre-assigning an output

If “enDefaultOutValue = TRUE” is set, the value at “defaultOutValue” is output. When changing from TRUE to FALSE, “outputValue” is ramped from “defaultOutValue” to “autoValue”. When changing from FALSE to TRUE, the output “outputValue” immediately jumps to “defaultOutValue”.

Normal operation

The ramps are straight lines of limitation and are based on a rate of change per second; if, for example, the parameter “setPosUpRateLim = 10.0” is assigned, then at a sampling time of 1 s/100 ms/10 ms, 10.0/1.0/0.1 will be added to “outputValue” at each block call, if “autoValue > outputValue”, until “autoValue” is reached.

The limitation of the rate of change can be parameterized in both positive and negative ranges for the increase and decrease.

Parameters	Ramp
setPosUpRateLim	outputValue > 0 and |outputValue| rising
setPosDownRateLim	outputValue > 0 and |outputValue| falling
setNegUpRateLim	outputValue < 0 and |outputValue| rising
setNegDownRateLim	outputValue < 0 and |outputValue| falling

If the ramps are not parameterized (“setPosUpRateLim”, “setPosDownRateLim”, “setNegUpRateLim”, and “setNegDownRateLim” equal 0.0), the output remains at 0.0 and normal operation is disabled.

Tracking

If the input “track = TRUE” is set, the input variable “autoValue” is interconnected directly to the output variable “outputValue”. Thus jumps of the input variable will also be output.

Switch through controlled variable

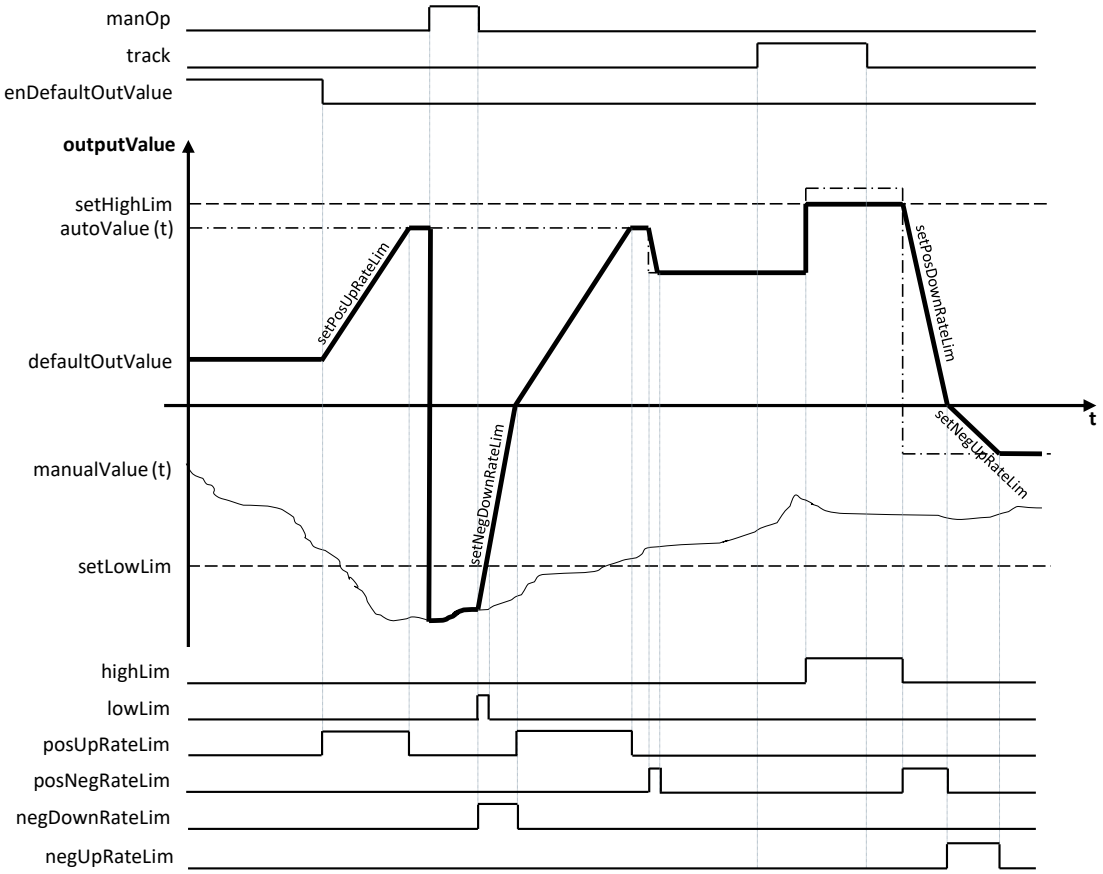
If “manOp = TRUE” is set, the controlled variable “manualValue” is interconnected directly to the output variable “outputValue”.

In this operating mode, the parameterization of the ramps or the high/low limitation of the output variable, and the pre-assignment of the output, are ineffective.

When changing from TRUE to FALSE, the output “outputValue” is ramped again after “autoValue”.

As soon as the value range between the low and high limits is reached, the high and low limits are reactivated.

Functional processes



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