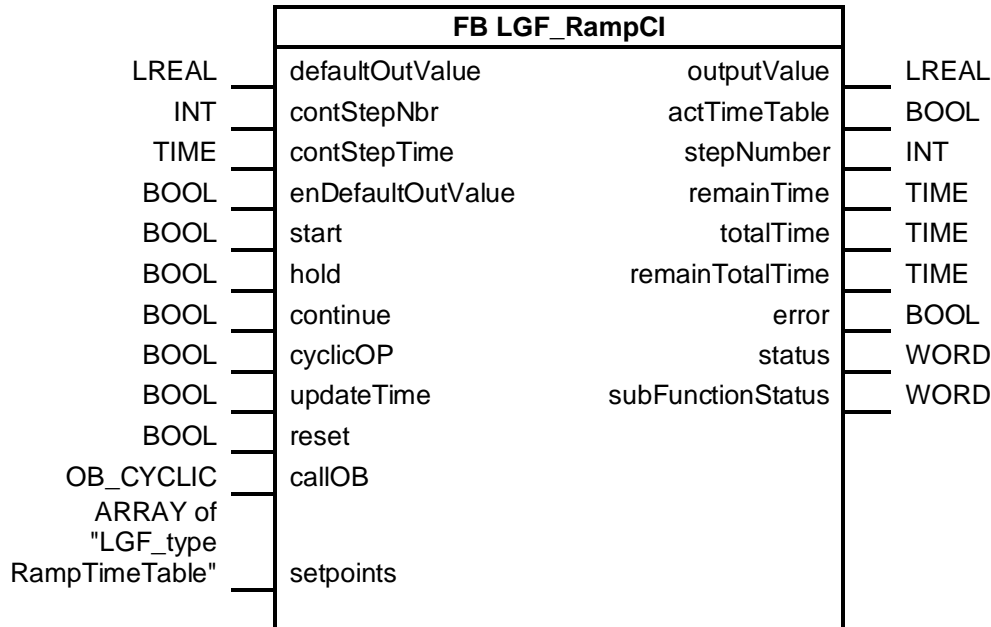


## LGF\_RampCI

### Short description

This block generates a speed curve based on an interpolation point table. Linear interpolation occurs between the points within the prescribed time.

### Block



### Input parameters

Parameters	Data type	Description
defaultOutValue	LREAL	Value for pre-assignment of the output variable
contStepNbr	INT	Number of the next interpolation point for continuing
contStepTime	TIME	Remaining time to continue to the interpolation point "contStepNbr"
enDefaultOutValue	BOOL	Preassigning "defaultOutValue" to output variable
start	BOOL	Run down the interpolation point table
hold	BOOL	Hold current value on the output
continue	BOOL	Continuing
cyclicOP	BOOL	Repeat interpolation point table cyclically
updateTime	BOOL	Update time values
reset	BOOL	Restart
callOB	OB_CYCLIC	Calling cyclic interrupt OB
setpoints	ARRAY of "LGF_typeRampTimeTable"	Interpolation point table. You can find information on the data type "LGF_typeRampTimeTable" under the item "Global data" .

## Output parameters

Parameters	Data type	Description
outputValue	LREAL	Output variable
actTimeTable	BOOL	The interpolation point table will be edited.
stepNumber	INT	current interpolation point number (interpolation point that is approached)
remainTime	TIME	Remaining time until reaching the next interpolation point
totalTime	TIME	Total time
remainTotalTime	TIME	Total remaining time
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 #7000	Initial value	Restart has been executed.
16#7001	First call	Rising edge "start".
16#7002	Subsequent call	Input "cyclicOP" set.
16#8200	OB on input "calIOB" is not configured / present.	Interconnect the constant name of a configured cyclic interrupt OB at the input "calIOB".
16#8201	Low array limit < 0	The array with the interpolation points must start with the index 0.
16#8400	Error in "QRY_CINT" command.	Check the error code in "subFunctionStatus"

### 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.

## Global data

Together with the block, you automatically receive the PLC data type "LGF\_typeRampTimeTable", which is composed of the parameters "outVal" for the value of a base point and "time" for the time, until the next base point is reached. The declaration takes place in a one-dimensional array of the data type "LGF\_typeRampTimeTable" beginning with the index 0. The array is created in a global data block and then passed to the module "LGF\_RampCI".

setpoints	Array[0..9] of "typeTimeTable"	
setpoints[0]	"typeTimeTable"	
outVal	Real	1.0
time	Time	t#5s
setpoints[1]	"typeTimeTable"	
outVal	Real	5.0
time	Time	t#3s
setpoints[2]	"typeTimeTable"	
setpoints[3]	"typeTimeTable"	

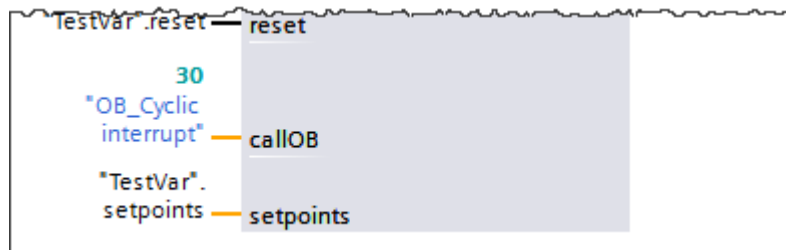
The parameter "time" of the last interpolation point must be parameterized with 0s, since there is no longer any successor interpolation point.

## Principle of operation

With this block, speed curves can be executed on the basis of parameterized interpolation points; in each call cycle values are output according to a schedule, and interpolation takes place between the interpolation points.

In each cycle the currently approached interpolation point number "stepNumber", the actual remaining time "remainTime" until reaching the interpolation point, the total time "totalTime," and the total remaining time until reaching the end of the speed curve "remainTotalTime", are output. In addition, the output "actTimeTable" is set if the projected speed curve is currently being output.

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



The following operating modes can be selected via control inputs:

- Restart
- Pre-assigning an output
- Output a speed curve
- Stop processing
- Specify processing step and processing time
- Switch-on cyclic operation
- Update total time and remaining time

## Overview of the operating modes

Operating mode	enDefaultOut Value	start	hold	continue	cyclic OP	updateTime	reset	Output/action
Restart							TRUE ↑	Block is initialized.
Pre-assigning an output	TRUE	TRUE					FALSE	defaultOutValue
Output a speed curve	FALSE	TRUE ↑	FALSE		FALSE		FALSE	outputValue(t); end value is held after processing
Stop speed curve	FALSE	TRUE	TRUE	FALSE			FALSE	current value of outputValue(t) is held
Specify processing step and processing time	FALSE	TRUE	TRUE	TRUE ↑			FALSE	outputValue(old)
			FALSE					Continue with parameterized interpolation point
Switch-on cyclic operation	FALSE	TRUE	FALSE		TRUE		FALSE	outputValue(t); after end of automatic restart
Update total time and remaining time						TRUE ↑	FALSE	Total time and remaining time are updated.

### Restart

The output “outValue” is reset to 0.0 with a rising edge at the input “reset”. With “enDefaultOutValue” = TRUE, “defaultOutValue” is output at output. The total time and total remaining time are updated and output.

### Pre-assigning an output

If the speed curve should begin with a certain output value, then “enDefaultOutValue” must be TRUE. In this case the value “defaultOutValue” is present on the output of the timer. The internal processing of the speed curve continues during this time. If “enDefaultOutValue” changes to FALSE again, interpolation is performed to the currently active calibration point.

### Output a speed curve

With a rising edge at the input “start”, the speed curve is output—as long as “start” is TRUE or until the speed curve is terminated by reaching the last interpolation point. Through a subsequent rising edge the speed curve is output again. In addition, the total time is updated at each switch-on.

### Switch-on cyclic operation

If, in addition to the input “start”, the input “cyclicOP” is also set to TRUE, the speed curve automatically returns to the start point after outputting the last interpolation point value and starts a new cycle.

There is no interpolation between the last interpolation point value and the starting point. The following must apply for a smooth transition: last interpolation point value = start point.

## Stop speed curve

With “hold” = TRUE the value of the output variable (including time processing) is frozen. When resetting “hold” = FALSE, the program continues at the point of interruption or at a parameterized point (see “Defining the processing step and processing time”). The processing time of the speed curve is extended by the holding time “T1\*”.

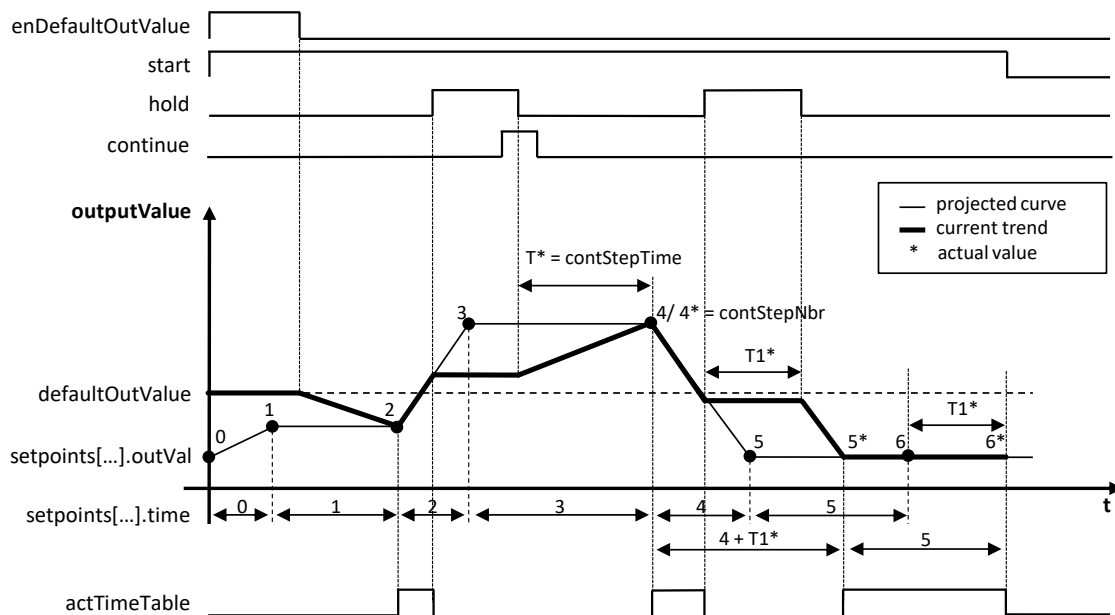
## Specify processing step and processing time

If the input parameter “continue” is set to TRUE for continuation while the speed curve is stopped (“hold” = TRUE), then after the input “hold” has been reset the interpolation point number “contStepNbr” (target interpolation point) will be approached within the time “contStepTime” (interpolation). The total remaining time will be recalculated.

## Updating total time and total remaining time

If values of the interpolation points are changed, the total time and the total remaining time of the speed curve can change. Since calculation of “totalTime” and “remainTotalTime” can significantly increase the processing time of the function block at many interpolation points, the calculation is only executed once with a rising edge on the “updateTime” input.

## 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>