FAQ COMBIVIS studio 6

KEB_CamAxisControl instructions FAQ No.0016

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Content

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Introduction

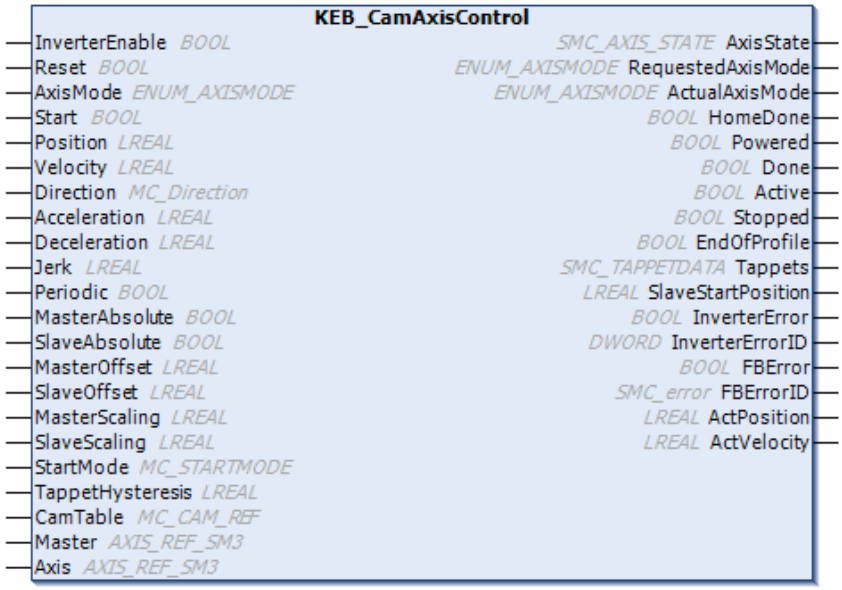
This document gives a general overview of the KEB_CamAxisControl function block. General terms and behaviour will be explained.

General description

The KEB_CamAxisControl function block allows the user to control a SoftMotion Drive in various modes using a single function block:

- Velocity
- Absolute Positioning
- Relative Positioning
- Set Position
- Homing
- Caming

This function block is part of the KEB_SMC_Utility library.
The KEB_CamAxisControl function block is an extension of the KEB_SingleAxisControl block.
It contains all the features of the above-mentioned block plus the Phasing mode.
For further information about these modes please see FAQ Document KEB_SingleAxisControl.

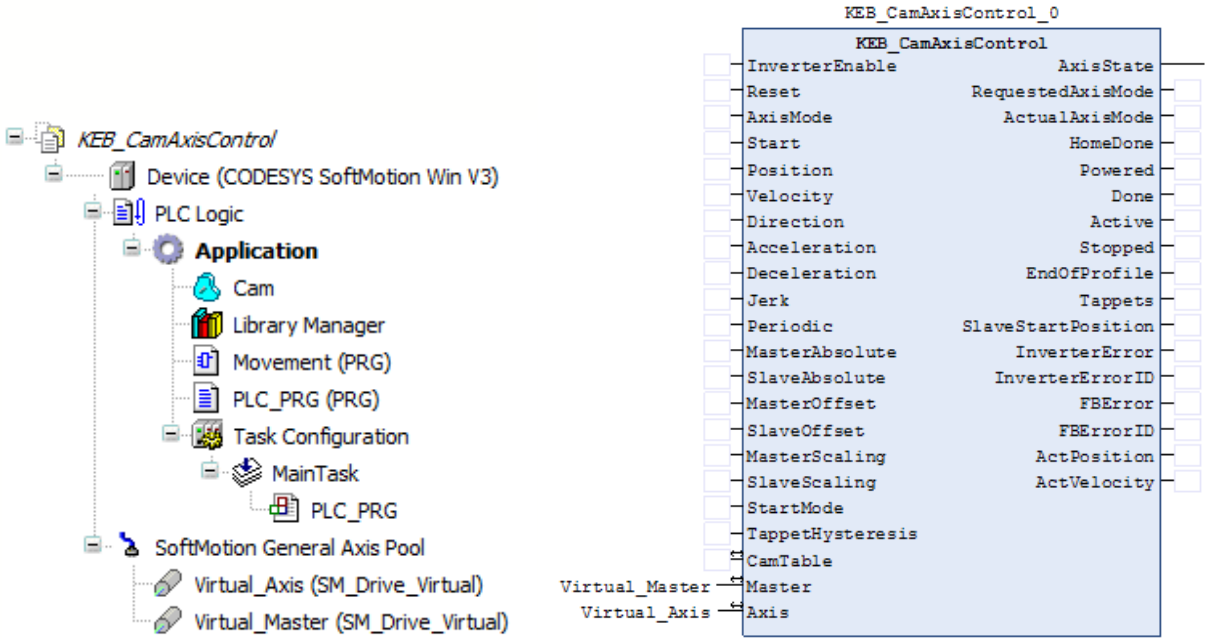


Restrictions

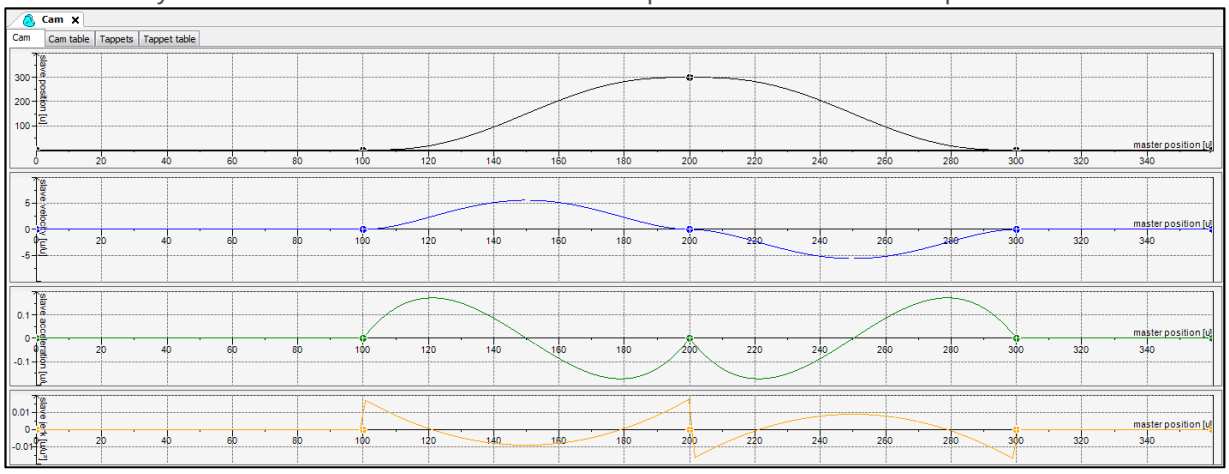
This function block can be used with Pro/Advanced Drive only. In fact, it needs two AXIS_REF_SM3 structure as input variable, **Master** and **Axis** Axis, structure that is automatically created when a SoftMotion Drive is added in the project.

Hint:

You need another FB (e.g. KEB_SingleAxisControl) to control the **Master** axis.
The adjustment for the **Virtual_Master** and **Virtual_Axis** are *Modulo.*



Furthermore you need a cam table which describe the position from the **Axis** depend on the **Master**.



KEB_CamAxisControl

Variables

Input

Name	Type	Comment
InverterEnable	BOOL	As long as this variable is TRUE, the drive is switched on.
Reset	BOOL	Reset Drive or FunctionBlock errors
AxisMode	ENUM_AXISMODE	AM_DEFAULT = 0 AM_VELOCITY = 1 AM_POSITIONINGABSOLUTE = 2 AM_POSITIONINGRELATIVE=4 AM_SETPOSITION = 6 AM_HOMING = 7 AM_CAMING = 8
Start	BOOL	Run/Stop Drive in AxisMode Function
Position	LREAL	Target position for the motion (technical unit [units])
Velocity	LREAL	Value of the target velocity (not necessarily to be reached) [units/s]
Direction	MC_Direction	This enumeration provides the desired direction; only relevant for rotating axes (modulo-axis). Supported values depending of AxisMode: -1 = negative 0 = shortest (seen from the current position) 1 = positive 2 = current (current direction) 3 = fastest (direction, which would finish movement as fast as possible)
Acceleration	LREAL	Desired acceleration (increasing energy of the motor) [units/s²]
Deceleration	LREAL	Desired deceleration (decreasing energy of the motor) [units/s²]
Jerk	LREAL	Maximum magnitude of the jerk [units/s³] (ignored for ramptype trapez)
Periodic	BOOL	periodic/ non-periodic CAM.
MasterAbsolute	BOOL	CAM refers to absolute/ relative master position.
SlaveAbsolute	BOOL	CAM refers to absolute/ relative slave position.
MasterOffset	LREAL	additional offset on master position
SlaveOffset	LREAL	additional offset on slave position
MasterScaling	LREAL	General scale factor for master axis. MasterScaling>1 effects that the CAM will be processed more quickly (i.e. compressed), if <1, it will be stretched
SlaveScaling	LREAL	General scale factor for slave axis. SlaveOffset>1 effects that the slave makes a bigger movement (CAM gets stretched); at <1 it will be compressed.

Input

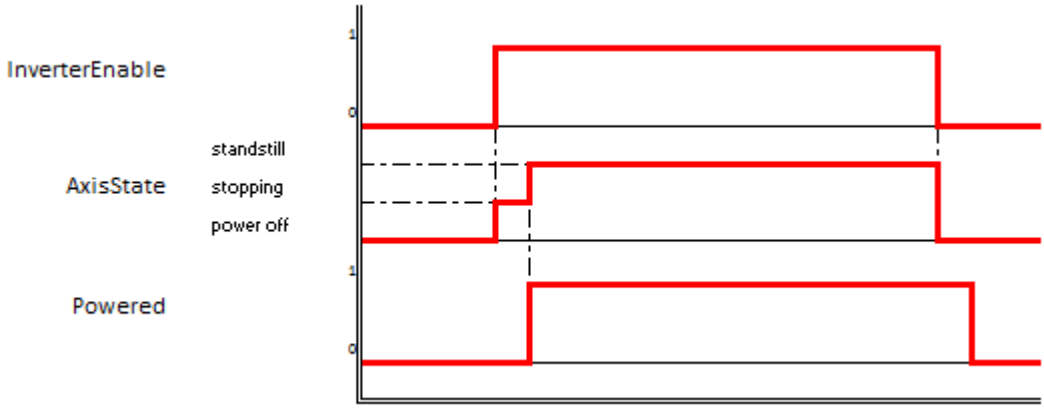
Name	Type	Comment
StartMode	MC_STARTMODE	(absolute/relative/ramp_in/ramp_in_pos/ramp_in_neg) (Default: absolute) CAM either is started relative (relative) to the current position or absolutely (absolute) to this, or with slow ramping in (ramp_in), in positive (ramp_in_pos) or negative (ramp_in_neg) direction.
TappetHysteresis	LREAL	Width of the hysteresis band around the tappets
CamTable	MC_CAM_REF	Description of the CAM
Master	AXIS_REF_SM3	Master axis
Axis	AXIS_REF_SM3	Controlled/Slave axis

Output

Name	Type	Comment
AxisState	SMC_AXIS_STATE	0: power_off 1: errorstop 2: stopping 3: standstill 4: discrete_motion 5: continuous_motion 6: synchronized_motion 7: homing
RequestedAxisMode	ENUM_AXISMODE	Shows requested axis mode
ActualAxisMode	ENUM_AXISMODE	Shows actual axis mode
HomeDone	BOOL	TRUE indicates that if homing is done
Powered	BOOL	As long as this variable is TRUE, the drive is switched on
Done	BOOL	TRUE indicates that the movement is on
Active	BOOL	TRUE indicates that the drive is moving
Stopped	BOOL	TRUE indicates that the drive is not moving
EndOfProfile	BOOL	Indicates the end of a CAM. At periodic CAMS this output will be pulsed
Tappets	SMC_TAPPETDATA	Tappet output. The particular tappet positions finally will be evaluated by the SMC_GetTappetValue module.
SlaveStartPosition	LREAL	Slave position according to cam and actual master position ++only valid in axismode caming++
InverterError	BOOL	TRUE indicates drive error
InverterErrorID	DWORD	Use GetInvStateD function to get a STRING errormessage
FBError	BOOL	TRUE indicates FunctionBlock error
FBErrorID	SMC_error	Use SMC_ErrorString function to get a STRING errormessage
ActPosition	LREAL	Actual position [units]
ActVelocity	LREAL	Actual velocity [units/s]

InverterEnable

To switch ON the drive, **InverterEnable** must be set to *TRUE*. Once *TRUE,* **AxisState** goes to *standstill* (after a brief moment in *stopping*), then **Powered** is set to *TRUE*. Now the drive is ready.
Once **Powered** is *TRUE* one can select an operational mode, insert the inputs and start the FB.
At the end of every operation, to switch OFF the drive, **InverterEnable** must be set to *FALSE.*
AxisState goes to *power off*, then **Powered** is set to *FALSE*.



Modes

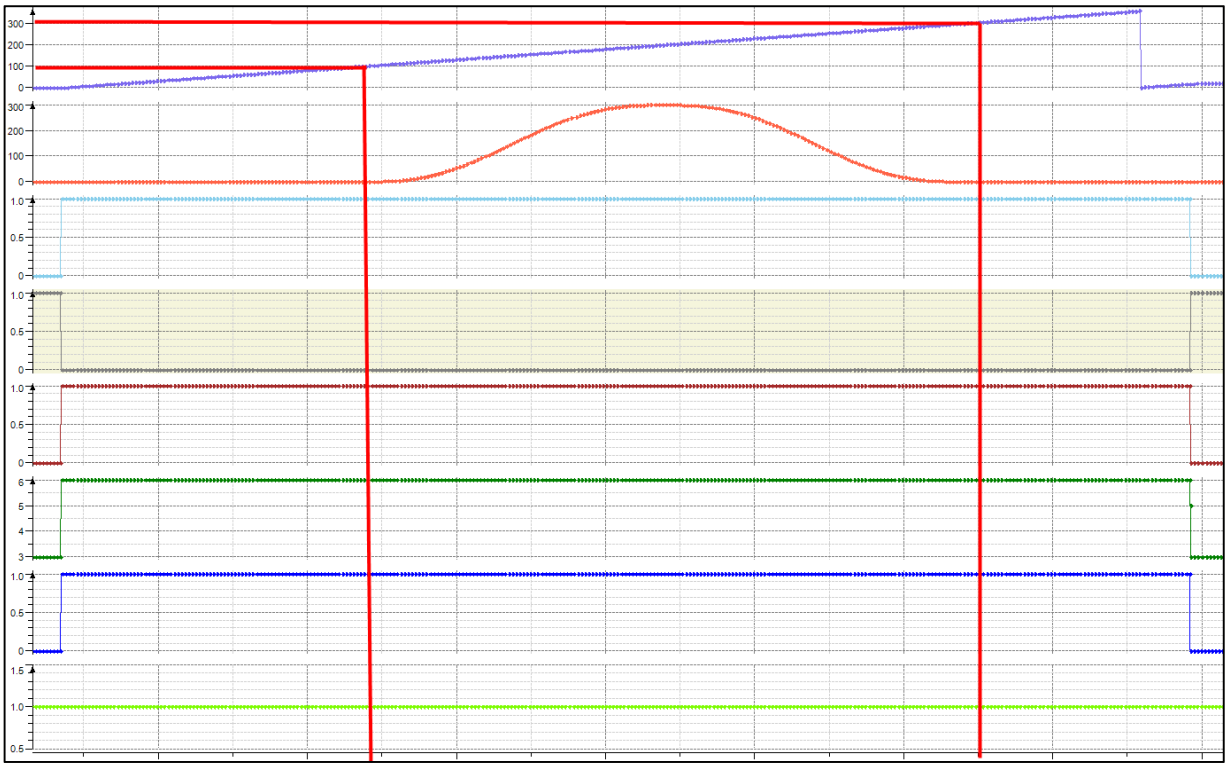
8: Caming

By setting variable **AxisMode** to 8 the drive will be controlled in caming mode. In this mode it is mandatory to set **Acceleration** and **Deceleration** values (although **Velocity** will not affect the caming behaviour).

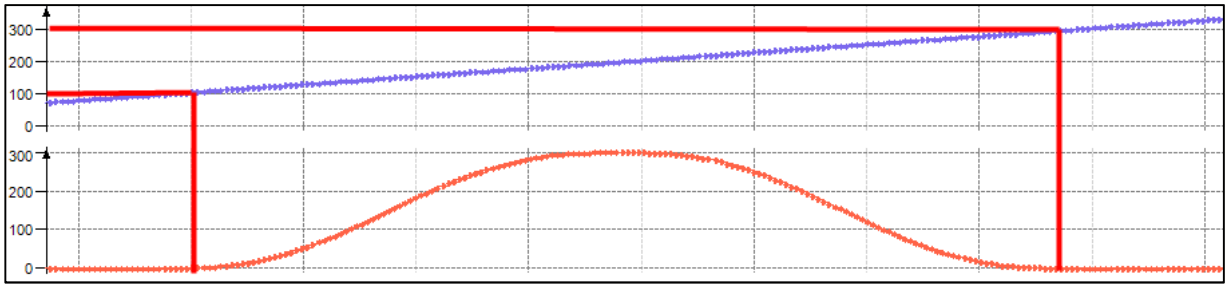
Acceleration and **Deceleration** values will affect the behaviour of Slave Axis when it tries to reduce the gap with the Master.

As seen in the following diagrams, bit **Done** goes *TRUE* when **ActPosition** of Slave Axis reaches **ActPosition** of Master Axis. After that, Slave behaviour depends only by the Master.

Case 1: Start Master and Axis depends the cam

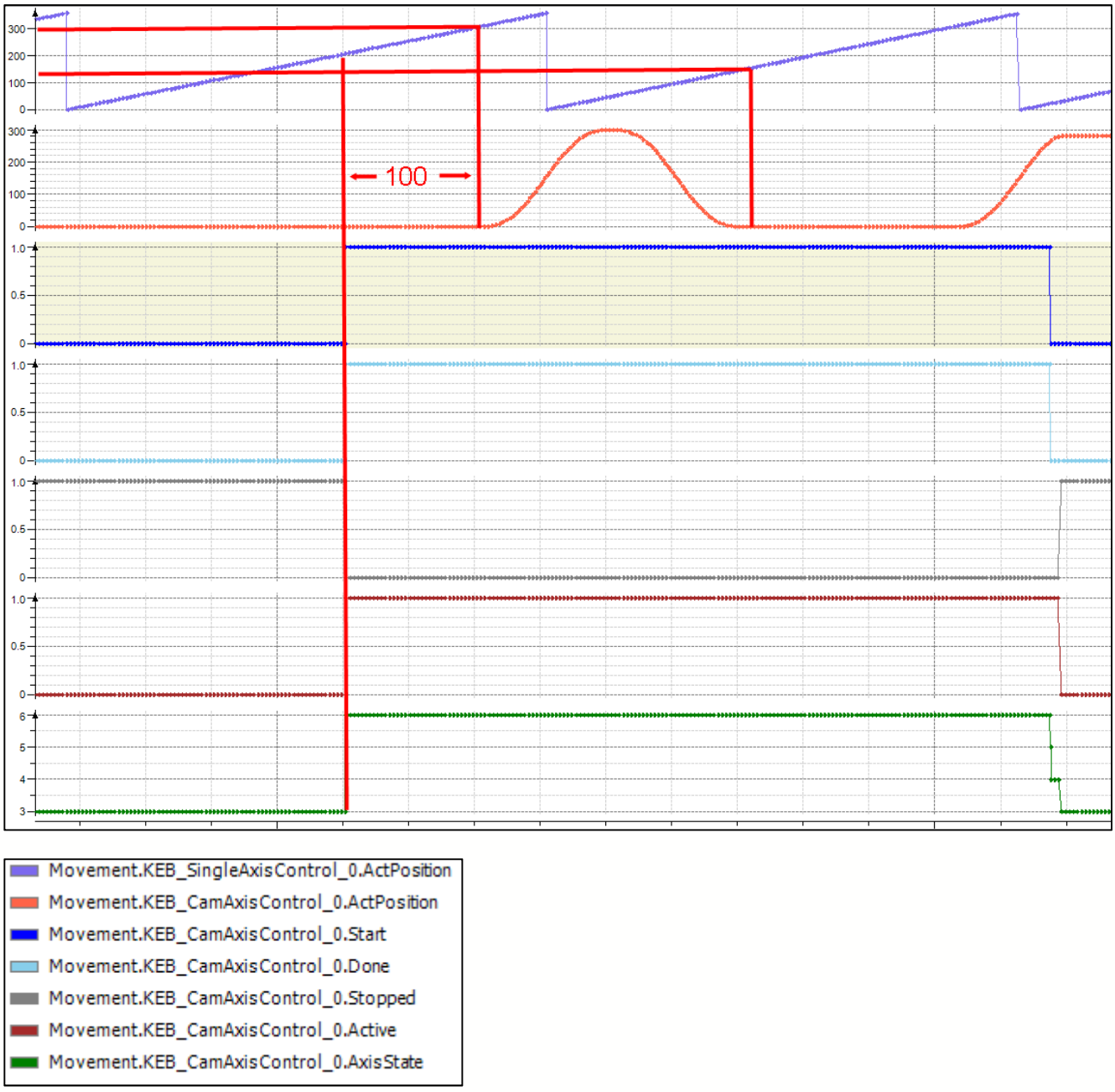


Zoom on cam curve

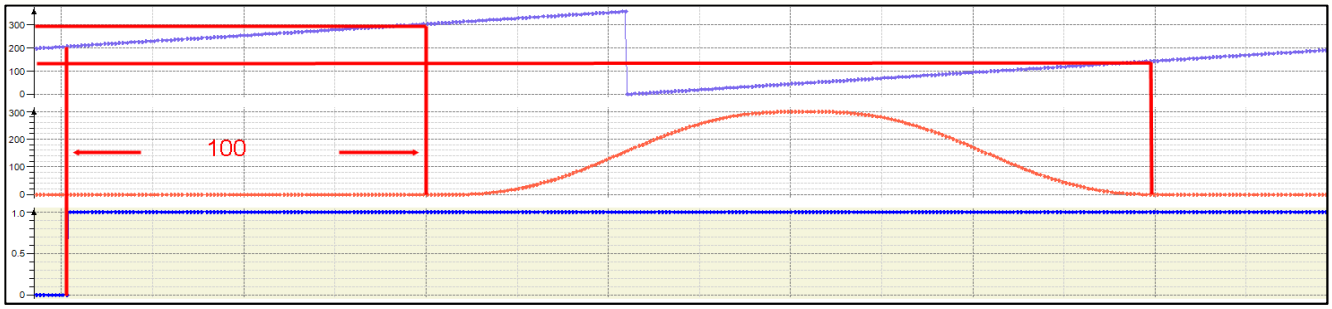


Case 2: MasterAbsolute set to FALSE

The **Axis** refers the Cam relative to the **Master**. (KEB_SingleAxiscontrol.ActPosition). The slave position (KEB_CamAxiscontrol.ActPosition) is shifted by 100.

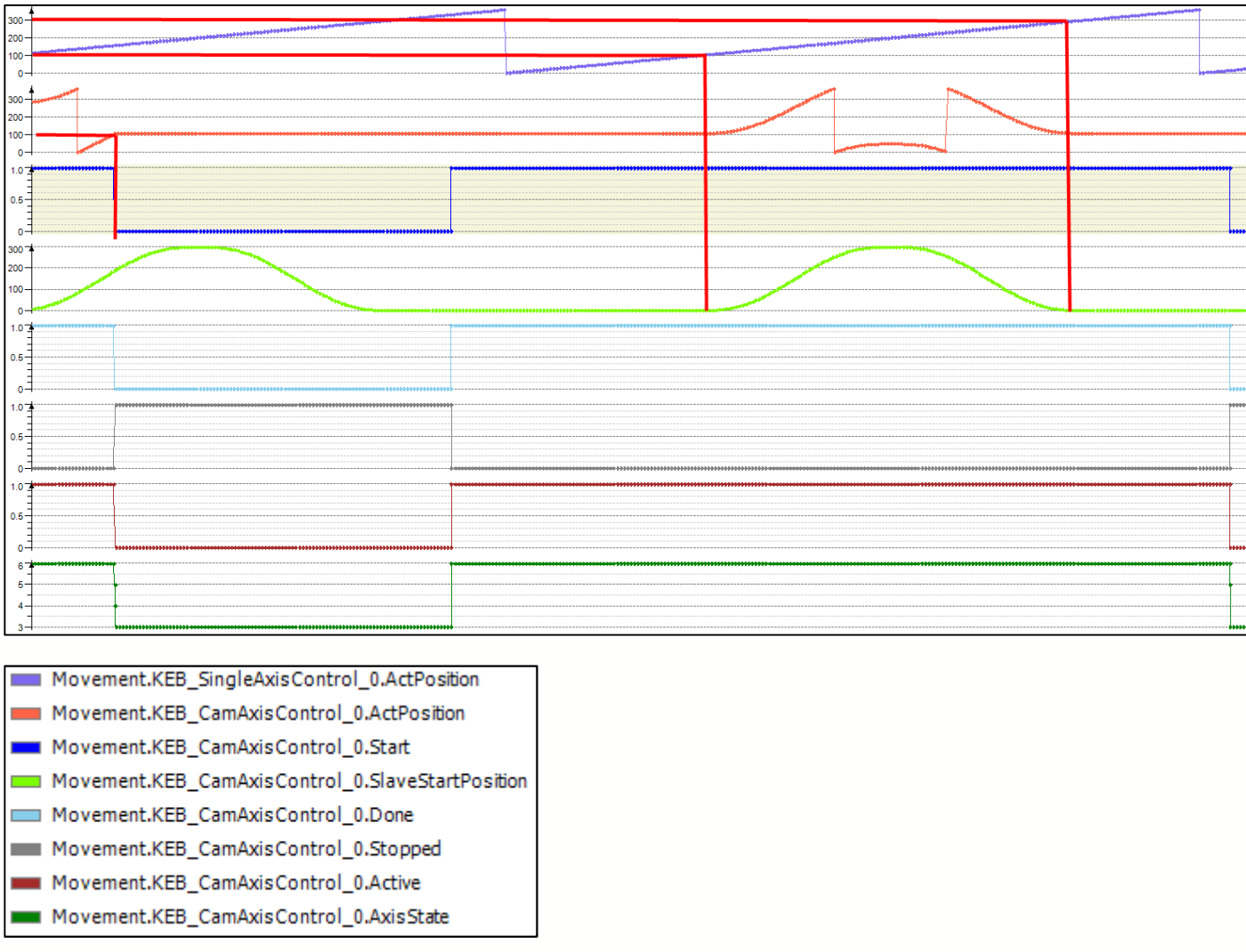


Zoom on cam cruve

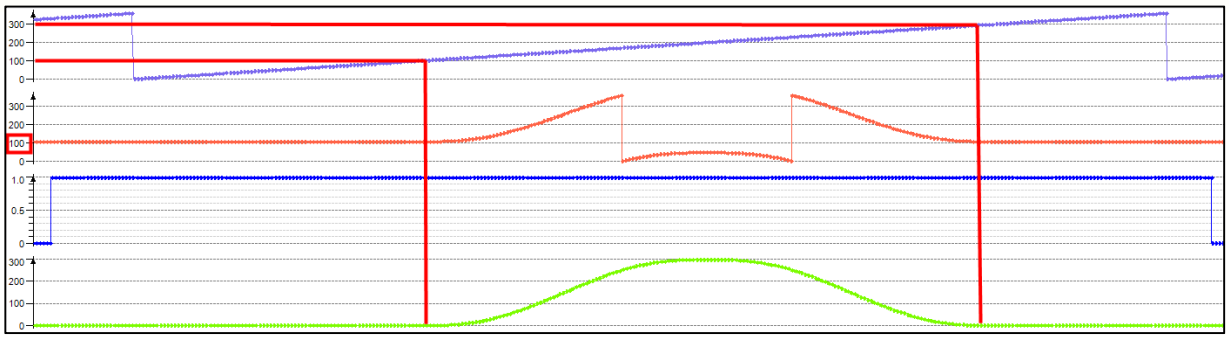


Case 3: SlaveAbsolute set to FALSE

The **Axis** refers the Cam relative to the current slave position (KEB_CamAxiscontrol.ActPosition). The slave position is set to 100 by settings **Start** to *FALSE*. With **Start** to *TRUE* the **Axis** refers the Cam with an offset from 100.

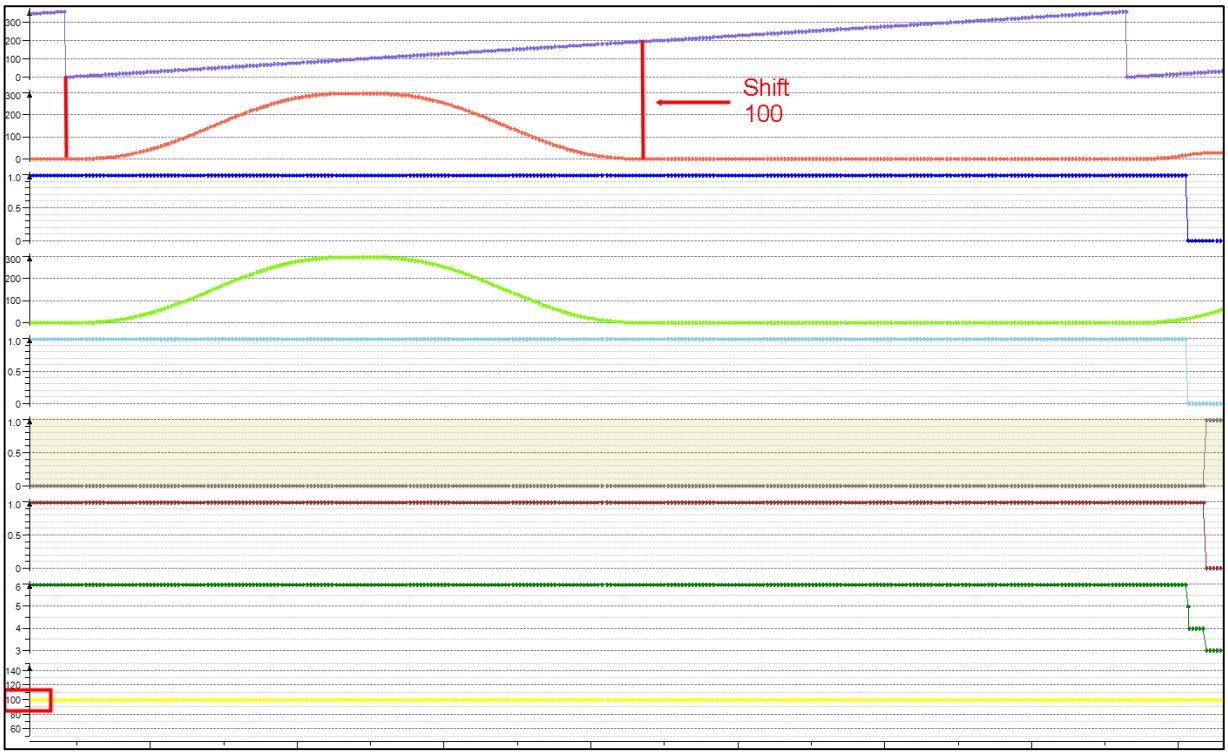


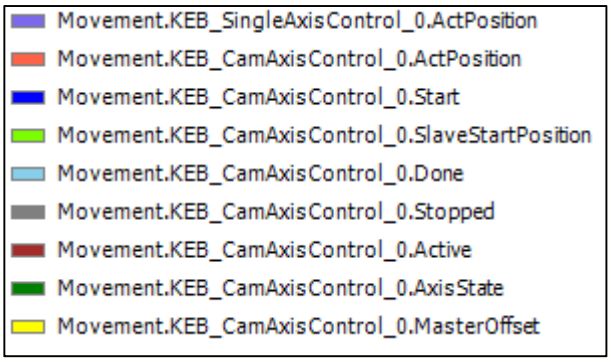
Zoom on cam curve



Case 4: MasterOffset set to 100

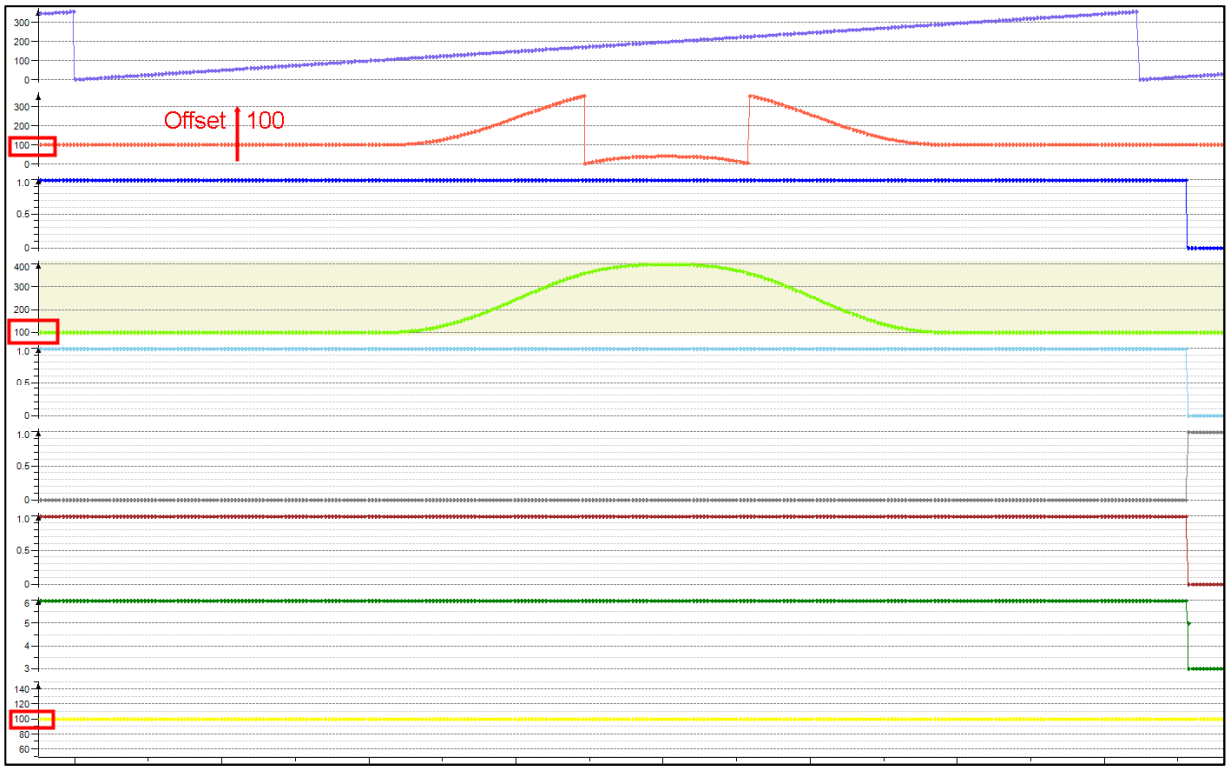
The **Axis** is shifted with the value **MasterOffset**.

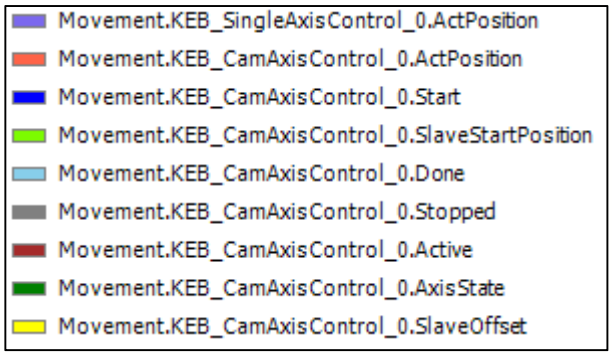




Case 5: SlaveOffset set to 100

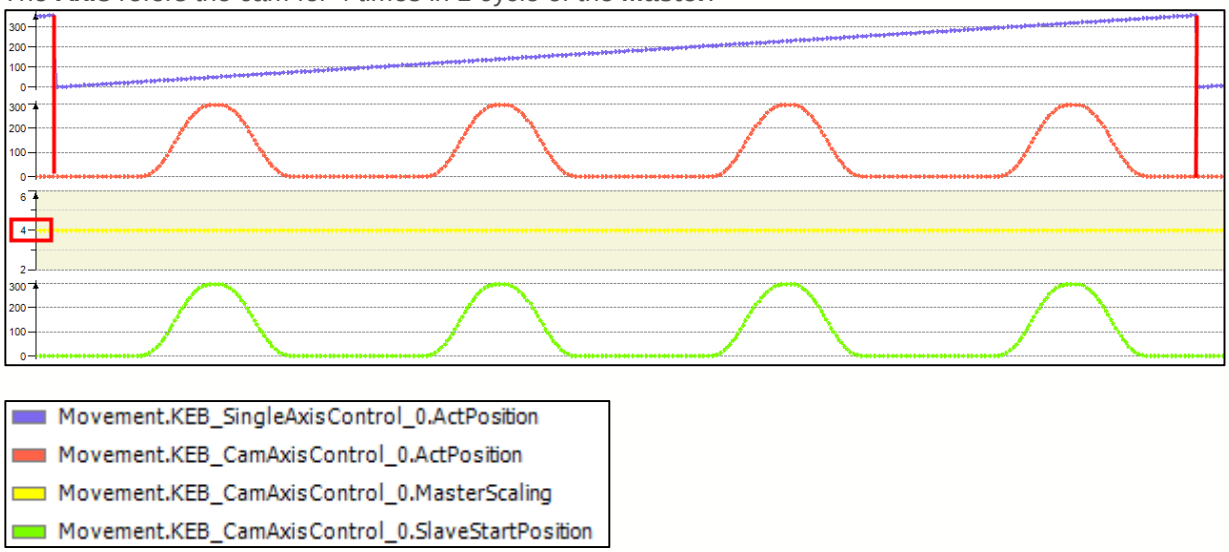
The **Axis** has an offset with the value **SlaveOffset**.





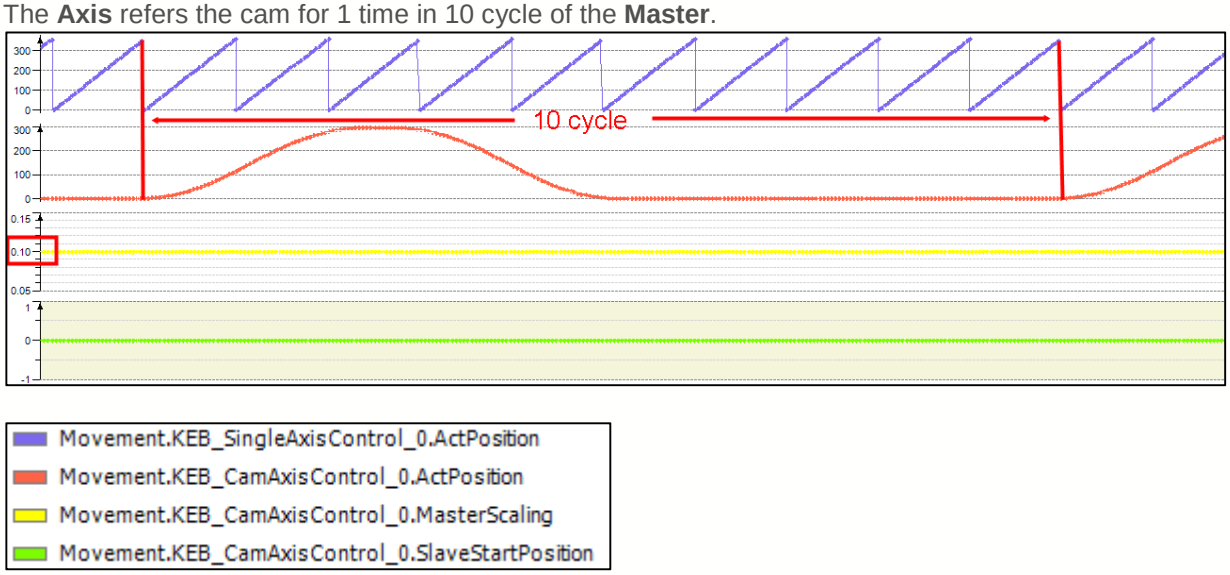
Case 6a: MasterScaling set to 4

The **Axis** refers the cam for 4 times in 1 cycle of the **Master**.



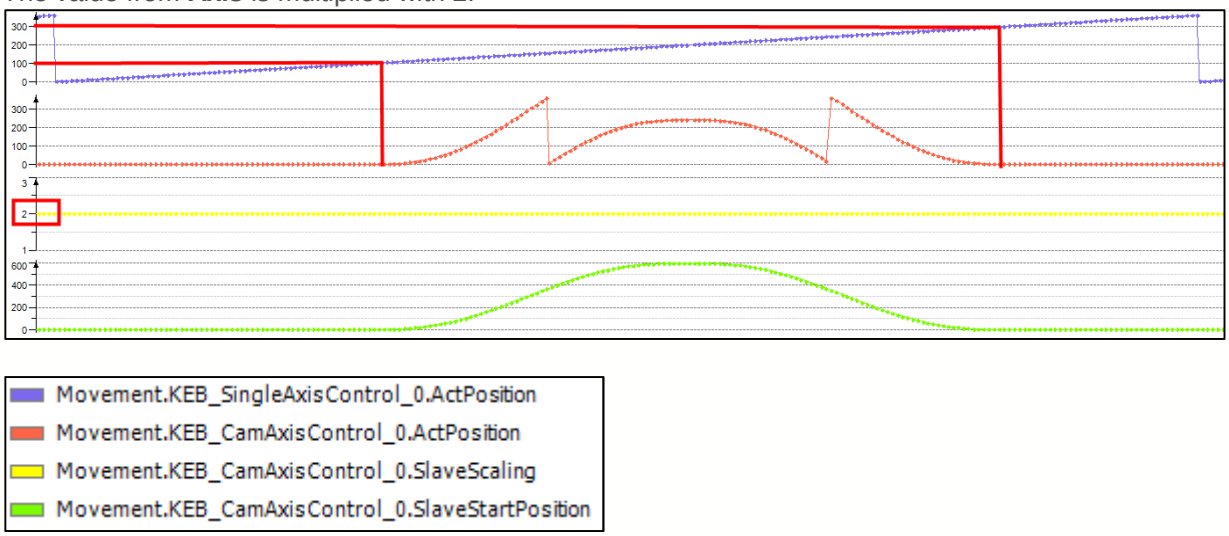
Case 6b: MasterScaling set to 0.1

The **Axis** refers the cam for 1 time in 10 cycle of the **Master**.



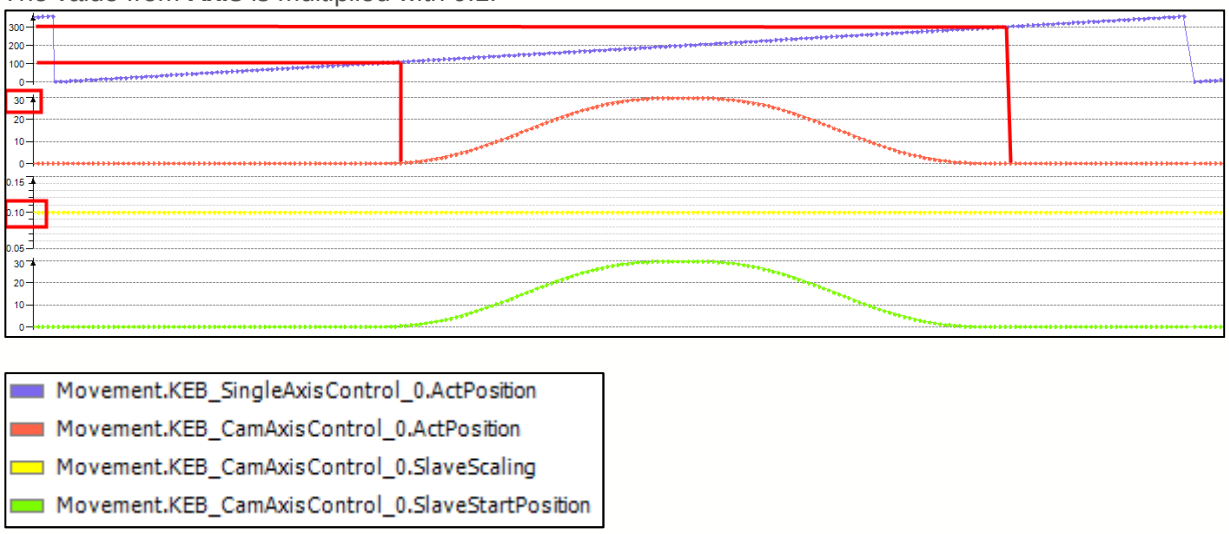
Case 7a: SlaveScaling set to 2

The value from **Axis** is multiplied with 2.



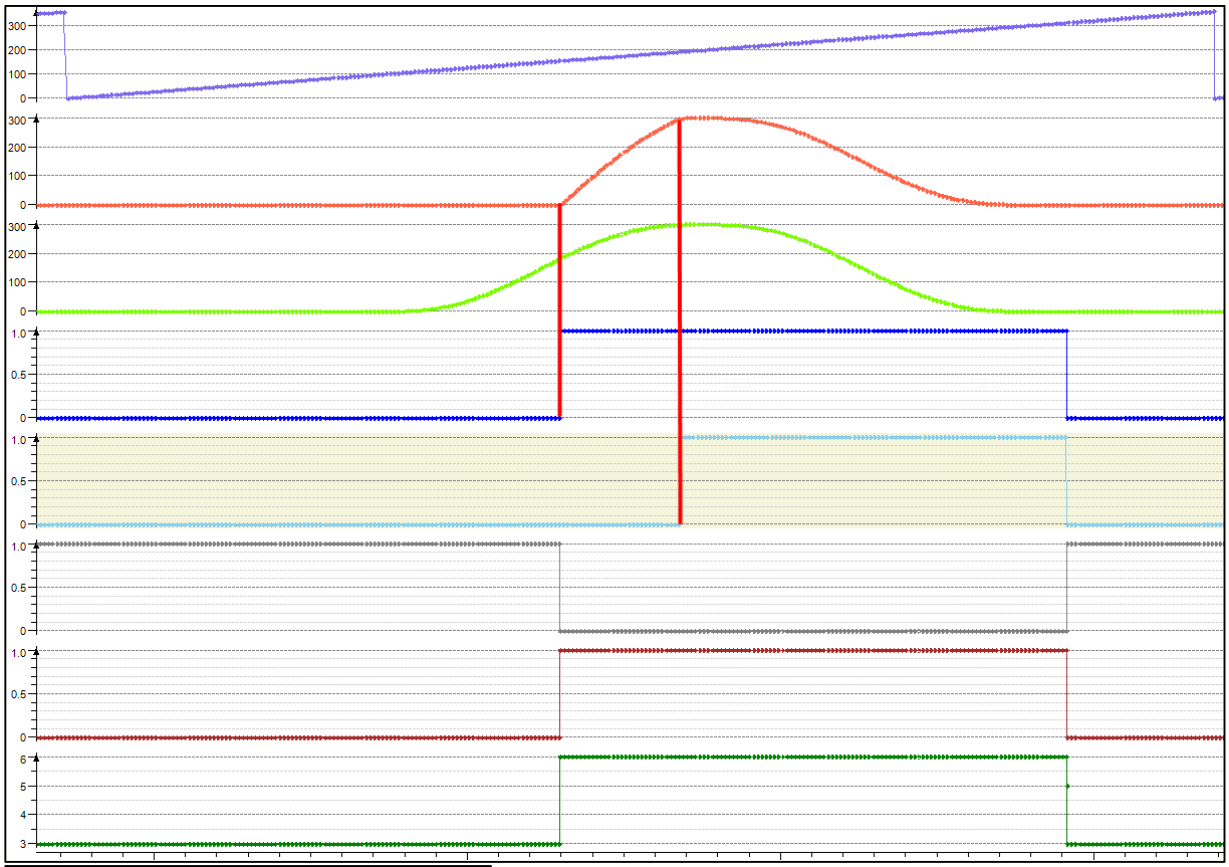
Case 7b: SlaveScaling set to 0.1

The value from **Axis** is multiplied with 0.1.

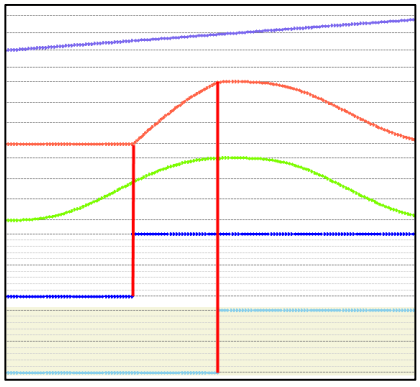


Case8a: StartMode set to e.g. ramp in pos (3)

The value from the **Axis** drives slowly to the target position. The **Axis** arrived the target position if the **Done** is set to *TRUE.*



Zoom on cam curve



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