LinMot®

Sinoide Application SW

Documentation of the Sinoide Application SW

- **E1100 / B1100 Drive Series**

Sinoide Application SW

User Manual

Document Version 3.20 / Whp, August 2018

TABLE OF CONTENT

System Overview

This user Manual describes the Sinoide Application SW functionality of the LinMot E1100 / B1100 drives.

1.1 References

Ref	Title	Source
1	Installation_Guide_E1100.pdf	www.linmot.com
2	Installation_Guide_B1100.pdf	www.linmot.com
3	Usermanual_LinMot-Talk_4.pdf	www.linmot.com

The documentation is distributed with the LinMot-Talk configuration software or can be downloaded from the Internet from the download section of our homepage.

1.2 Definitions, Items, Shortcuts

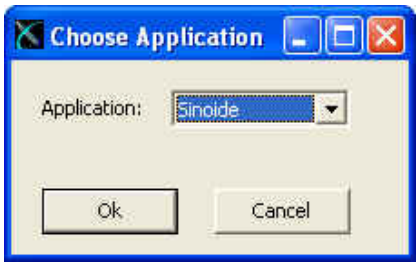
Shortcut	Meaning
LM	LinMot linear motor
OS	Operating system (Software)
MC (SW)	Motion Control (Software)
Intf	Interface (Software)
Appl	Application (Software)
VAI	VA-Interpolator (Max velocity limited acceleration position interpolator)
Pos	Position
Vel	Velocity
Acc	Acceleration
Dec	Deceleration
UPID	Unique Parameter ID (16 bit)

1.3 Data types

Type	Range/Format	Num of bytes
Bool	Boolean, False/True	1/8
Byte	0..255	1
Char	ASCII	1
String	Array of char last char = 00h	X
SInt16	-32768..32767	2
UInt16	0..65535	2
SInt32	-2147483648..2147483647	4
UInt32	0..4294967295	4

2 Installation on Drive

For installing the Sinoide firmware on the drive, start the LinMot-Talk software and press the install firmware button . Choose the file “Firmware_Buildxxxxxxxx.sct” and press “Open”. The wizard will guide you through the installation. When asking for the application software choose “Sinoide”



Press ok and follow the rest of the wizard.

3 Sinoide Functionality

The Sinoide Application SW is a MC Motion Command Interface extension, with the Sinoide functionality. Additional the Autostart application is included.

3.1 Overview Motion Commands

Master ID	Sub ID	E1100	B1100	Description
3Eh	0h	X	X	Sin VA Go To Pos
	1h	X	X	Sin VA Increment Demand Pos
	4h	X	X	Sin VA Go To Pos From Actual Pos
	6h	X	X	Sin VA Increment Actual Pos
	Ah	X	X	Sin VA Go To Pos On Rising Trigger Event
	Bh	X	X	Sin VA Increment Demand Pos On Rising Trigger Event
	Ch	X	X	Sin VA Go To Pos On Falling Trigger Event
	Dh	X	X	Sin VA Increment Demand Pos On Falling Trigger Event
3Fh	0h	X	X	Bestehorn VAJ Go To Pos
	1h	X	X	Bestehorn VAJ Increment Demand Pos
	2h	X	X	Bestehorn VAJ 16 Bit Go To Pos
	4h	X	X	Bestehorn VAJ Go To Pos From Actual Pos
	6h	X	X	Bestehorn VAJ Increment Actual Pos
	Ah	X	X	Bestehorn VAJ Go To Pos On Rising Trigger Event
	Bh	X	X	Bestehorn VAJ Increment Demand Pos On Rising Trigger Event
	Ch	X	X	Bestehorn VAJ Go To Pos On Falling Trigger Event
	Dh	X	X	Bestehorn VAJ Increment Demand Pos On Falling Trigger Event

3.2 Detailed Motion Command Description

3.2.1 Sin VA Go To Pos (3E0xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3E0xh: Sin VA Go To Pos	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

Half period sine motion profile, regarding the limitations of maximal acceleration and maximal velocity.

3.2.2 Sin VA Increment Demand Pos (3E1xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3E1xh: Sin VA Increment Demand Pos	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

Half period sine motion profile, regarding the limitations of maximal acceleration and maximal velocity. The new Target Position value will be determined by the firmware. It is calculated by adding the Position Increment argument to the Demand Position value (relative move). The command execution starts immediately when the command has been sent.

3.2.3 Sin VA Go To Pos From Actual Pos (3E4xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3E4xh: Sin VA Go To Pos From Actual Pos	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

Half period sine motion profile, regarding the limitations of maximal acceleration and maximal velocity. The command execution starts immediately when the command has been sent. This command should be used if the Actual Position does not match with the current Demand Position value, but it can be assumed that the motor stands still (Actual Velocity assumed to be zero, e.g. because the motor stands on a hard stop). This can happen after a Press command, where the actual motor position is defined through external conditions and the motor could not and had not to follow the demand position. By starting this command, the former accepted difference between Actual Position and Demand Position can be eliminated.

3.2.4 Sin VA Increment Actual Pos (3E6xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3E6xh: Sin VA Increment Actual Pos	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

Half period sine motion profile, regarding the limitations of maximal acceleration and maximal velocity. The new Target Position value will be determined by the firmware. It is calculated by adding the Position Increment argument to the Actual Position value (relative move). The command execution starts immediately when the command has been sent.

3.2.5 Sin VA Go To Pos On Rising Trigger Event (3EAxh)

Name	Byte Offset	Description	Type	Unit
Header	0	0EAxh: Sin VA Go To Pos On Rising Trigger Event	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

This command defines a new sine motion command (see description of command 'Sin VA Go To Pos (3E0xh)'. The command will be started on each rising edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Sin VA motion on the rising trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

3.2.6 Sin VA Increment Demand Pos On Rising Trigger Event (3EBxh)

Name	Byte Offset	Description	Type	Unit
Header	0	3EBxh: Sin VA Increment Demand Pos On Rising Trigger Event	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

This command defines a new Sin VA motion command (relative move, see description of command 'Sin VA Increment Demand Pos (3E1xh)'). The command will be started on each rising edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Sin VA motion on the rising trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

3.2.7 Sin VA Go To Pos On Falling Trigger Event (3ECxh)

Name	Byte Offset	Description	Type	Unit
Header	0	0ECxh: Sin VA Go To Pos On Falling Trigger Event	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

This command defines a new Sin VA motion command (see description of command 'Sin VA Go To Pos (3E0xh)'). The command will be started on each falling edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Sin VA motion on the falling trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

3.2.8 Sin VA Increment Demand Pos On Falling Trigger Event (3EDxh)

Name	Byte Offset	Description	Type	Unit
Header	0	3EDxh: Sin VA Increment Demand Pos On Falling Trigger Event	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2

This command defines a new Sin VA motion command (relative move, see description of command 'Sin VA Increment Demand Pos (0E1xh)'). The command will be started on each falling edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Sin VA motion on the falling trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

3.2.9 Bestehorn VAJ Go To Pos (3F0xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3F0xh: Bestehorn VAJ Go To Pos	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

Bestehorn Motion Profile, regarding the limitations maximal jerk, acceleration and maximal speed.

3.2.10 Bestehorn VAJ Increment Demand Pos (3F1xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3F1xh: Bestehorn VAJ Increment Demand Pos	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

Bestehorn Motion Profile, regarding the limitations maximal jerk, acceleration and maximal speed. The new Target Position value will be determined by the firmware. It is calculated by adding the Position Increment argument to the Demand Position value (relative move). The command execution starts immediately when the command has been sent.

3.2.11 Bestehorn VAJ 16 Bit Go To Pos (3F2xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3F2xh: Bestehorn VAJ 16 Bit Go To Pos	UInt16	-
1. Par	2	Target Position	SInt16	Scaled
2. Par	4	Maximal Velocity	UInt16	Scaled
3. Par	6	Acceleration	UInt16	Scaled
4. Par	8	Jerk	UInt16	Scaled

Bestehorn Motion Profile, regarding the limitations maximal jerk, acceleration and maximal speed. With 16 bit motion parameters: UPID 1455h for Position, UPID 1456 for Maximal Velocity, UPID 1457h for Acceleration and UPID 1458h for Jerk Scaling.

3.2.12 Bestehorn VAJ Go To Pos From Actual Pos (3F4xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3F4xh: Bestehorn VAJ Go To Pos From Actual Pos	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

Bestehorn Motion Profile, regarding the limitations maximal jerk, acceleration and maximal speed. The command execution starts immediately when the command has been sent. This command should be used if the Actual Position does not match with the current Demand Position value, but it can be assumed that the motor stands still (Actual Velocity assumed to be zero, e.g. because the motor stands on a hard stop). This can happen after a Press command\c where the actual motor position is defined through external conditions and the motor could not and had not to follow the demand position. By starting this command, the former accepted difference between Actual Position and Demand Position can be eliminated.

3.2.13 Bestehorn VAJ Increment Actual Pos (3F6xh)

Name	Byte Offset	Description	Type	Unit
Header	0	3F6xh: Bestehorn VAJ Increment Actual Pos	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

Bestehorn Motion Profile, regarding the limitations maximal jerk, acceleration and maximal speed. The new Target Position value will be determined by the firmware. It is calculated by adding the Position Increment argument to the Actual Position value (relative move). The command execution starts immediately when the command has been sent.

3.2.14 Bestehorn VAJ Go To Pos On Rising Trigger Event (3FAxh)

Name	Byte Offset	Description	Type	Unit
Header	0	3FAxh: Bestehorn VAJ Go To Pos On Rising Trigger Event	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

This command defines a new Bestehorn motion command (see description of command Bestehorn VAJ Go To Pos (3F0xh)'). The command will be started on each rising edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Bestehorn motion on the rising trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

3.2.15 Bestehorn VAJ Increment Demand Pos On Rising Trigger Event (3FBxh)

Name	Byte Offset	Description	Type	Unit
Header	0	3FBxh: Bestehorn VAJ Increment Demand Pos On Rising Trigger Event	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

This command defines a new Bestehorn motion command (relative move\c see description of command Bestehorn VAJ Increment Demand Pos (3F1xh)'). The command will be started on each rising edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Bestehorn motion on the rising trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

3.2.16 Bestehorn VAJ Go To Pos On Falling Trigger Event (3FCxh)

Name	Byte Offset	Description	Type	Unit
Header	0	3FCxh: Bestehorn VAJ Go To Pos On Falling Trigger Event	UInt16	-
1. Par	2	Target Position	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

This command defines a new Bestehorn motion command (see description of command Bestehorn VAJ Go To Pos (3F0xh)'). The command will be started on each falling edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Bestehorn motion on the falling trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

3.2.17 Bestehorn VAJ Increment Demand Pos On Falling Trigger Event (3FDxh)

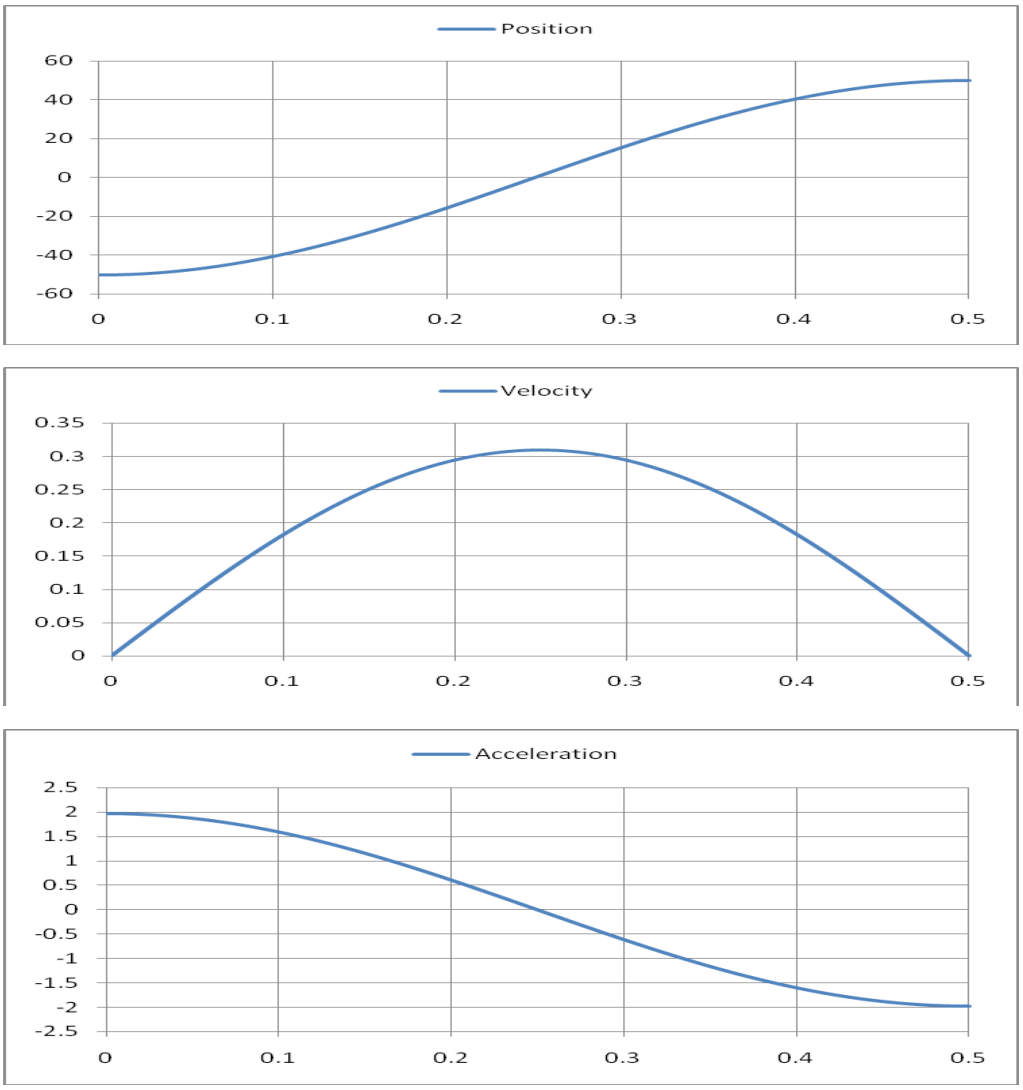
Name	Byte Offset	Description	Type	Unit
Header	0	3FDxh: Bestehorn VAJ Increment Demand Pos On Falling Trigger Event	UInt16	-
1. Par	2	Position Increment	SInt32	0.1 um
2. Par	6	Maximal Velocity	UInt32	1E-6 m/s
3. Par	10	Acceleration	UInt32	1E-5 m/s^2
4. Par	14	Jerk	UInt32	1E-4 m/s^3

This command defines a new Bestehorn motion command (relative move\c see description of command Bestehorn VAJ Increment Demand Pos (3F1xh)'). The command will be started on each falling edge on the Trigger signal. This command is used to synchronize the execution of the motion command to a hardware signal. The command activates the Event Handler (see Status Word bit 8). The Event Handler starts the new Bestehorn motion on the falling trigger event. The Event Handler can be deactivated by using the command 'Clear Event Evaluation (008xh)'. The trigger input must be configured with parameter <UPID>$1039.

4 Setpoint Generation

4.1 Sine VA Motion

The Sine generates a position curve from one position to another due to the parameter values of target position, maximal speed and acceleration. A new target position can only be started when the previous motion was finished.



4.1.1.1 Parameters and Output

The Sine Motion is defined by the following parameters:

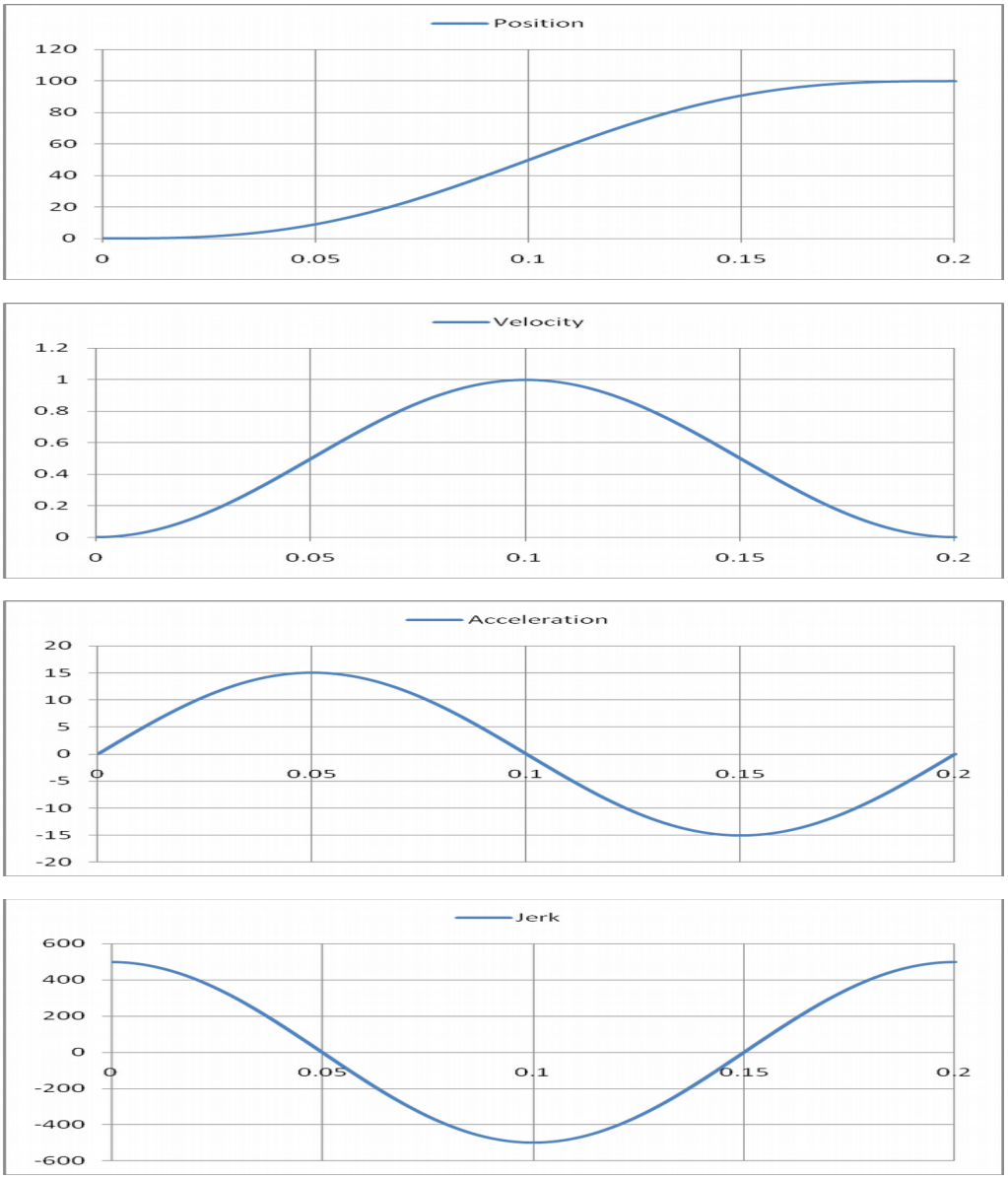
- Target Position [SInt32; 0.1um/s]
- Maximal Speed [UInt32; 1E-6 m/s]
- Acceleration [UInt32; 1E-5 m/s^2]

The Sine Motion generates as outputs:

- Position [SInt32; 0.1um]
- Velocity [SInt32; 1E-6 m/s]
- Acceleration [SInt32; 1E-5 m/s^2]

4.2 Bestehorn VAJ Motion

The Besthorn generates a position curve from one position to another due to the parameter values of target position, maximal speed acceleration and jerk. A new target position can only be started when the previous motion was finished.



4.2.1.1 Parameters and Output

The Bestehorn Motion is defined by the following parameters:

- Target Position [SInt32; 0.1um/s]
- Maximal Speed [UInt32; 1E-6 m/s]
- Acceleration [UInt32; 1E-5 m/s^2]
- Jerk [UInt32; 1E-4 m/s^3]

The Bestehorn Motion generates as outputs:

- Position [SInt32; 0.1um]
- Velocity [SInt32; 1E-6 m/s]
- Acceleration [SInt32; 1E-5 m/s^2]

5 Contact Addresses

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