

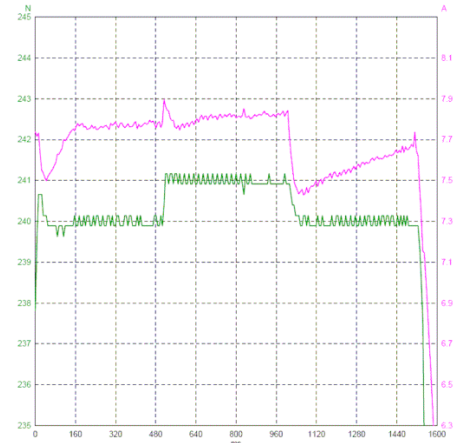
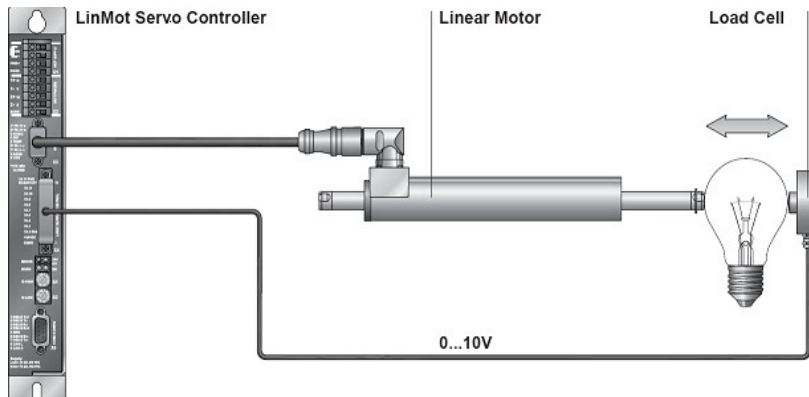
Technology Function Force Control

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The technology function "Force Control" for LinMot servo drive series B1100, C1100, C1200, C1400, E1100, E1200 and

Introduction

E1400 offers a closed loop force control with down to 0.1N resolution. Closed loop force control permits to apply a constant force with high precision over the whole stroke range independent from the actual position. As the applied force is measured by a load cell and directly controlled by the servo drive, side effects like friction, slip-stick effects and temperature changes will not influence the resulting force applied to the object.



Servo drives B1100, C1100, C1200, C1400, E1100, E1200 or E1400 with force control technology function. The force applied to the object is generated by the linear motor and measured in the load cell. The applied force measured in the load cell is directly fed back to the servo drive.

Applied force (green) and motor current (pink) in a closed loop force control application during an increasing of the force set value from 240N to 241N

Motion Commands

The following new motion commands are available:

VAI Go To Pos With Higher Force Ctrl Limit (380xh)

Moves to the defined target position, if the measured force reaches the defined value the drive switches to the force control mode with Target Force = Force Limit. To change back to position control mode use motion command VAI Go To Pos From Act Pos And Reset Force Control (381xh)!

VAI Go To Pos From Act Pos And Reset Force Control (381xh)

Reinstalls the position control mode and moves to the defined target position

Force Ctrl Change Target Force (382xh)

This command could be used to change the target force during the force control mode. This command activates the force control mode if not active.

VAI Go To Pos With Higher Force Ctrl Limit And Target Force (383xh)

Moves to the defined target position, if the measured force reaches force limit the drive switches to the force control mode with Target Force = Target Force. To change back to position control mode use motion command VAI Go To Pos From Act Pos And Reset Force Control (381xh)!

VAI Go To Pos With Lower Force Ctrl Limit (384xh)

Moves to the defined target position, if the measured force reaches the defined value, the drive switches to the force control mode with Target Force = Force Limit. To change back to position control mode use motion command VAI Go To Pos From Act Pos And Reset Force Control (381xh)!

VAI Go To Pos With Lower Force Ctrl Limit And Target Force (385xh)

Moves to the defined target position, if the measured force reaches the defined value, the drive switches to the force control mode with Target Force = Target Force. To change back to position control mode use motion command VAI Go To Pos From Act Pos And Reset Force Control (381xh)!

VAI Go To Pos From Act Pos And Reset Force Control Set I (386xh)

Reinstalls the position control mode and moves to the defined target position. The I part of the position controller is set to the last force control current.

VAI Increment Act Pos And Reset Force Control Set I (387xh)

Reinstalls the position control mode and moves to the incremented target position. The I part of the position controller is set to the last force control current.

VAI Inc Act Pos With Higher Force Ctrl Limit and Target Force (388xh)

VAI increment actual position. If the measured force reaches the defined value, the controller switches to the force control mode with Target Force = Target Force. To change back to position control mode use motion command VAI Go To Pos From Act Pos And Reset Force Control (381xh)!

A detailed description of the commands can be found in the "Motion Control SW" manual.

Technical Data

B1100: Analog Input-Signal:

X14.20: 0..10V, 10 Bit Resolution

X14.8/X14.21: Diff Input +/- 10V, 10 Bit Resolution

- C1100: Analog Input-Signal: X4.9: 0..10V, 10 Bit Resolution
X4.10/X4.11: Diff Input +/- 10V, 10 Bit Resolution
- C1200 / C1400: Analog Input-Signal: X4.9: 0..10V, 12 Bit Resolution
X4.10/X4.11: Diff Input +/- 10V, 12 Bit Resolution
- E1100: Analog Input-Signal: X4.4: 0..10V, 10 Bit Resolution
Attention: Input with 4.7 kΩ pulldown resistor
- E1200, E1400: Analog Input-Signal: X4.4: 0..10V, 12 Bit Resolution
Attention: Input with 4.7 kΩ pulldown resistor
X20.3/X20.6: Diff Input +/- 10V, 12 Bit Resolution
- Supported Drives Series: B1100, except for PP drives
E1100, except for MT/MP drives,
C1100, C1200, C1400, E1200, E1400

Installation

This section describes how to activate the force control technology function and how to configure the analog input.

1. Get the access code

Contact your local LinMot-Distributor, see www.linmot.com, to order your access code.
Keep the serial number of your servo drive ready.

2. Input the access code

Open LinMotTalk1100 and login to your drive.
Under **Drive\Set Access Code** the following window will open:

A maximum of four keys can be set on the drive. Under active keys all valid installed keys are listed (key value and access code). A new key can be set by selecting the key name and defining the value and access code. With the write button, the key and access code are written to the drive. As soon as the drive has rebooted (click the activate button) the new key will be active, if the access code fits.

Please note: Access codes are drive specific. They cannot be copied from one drive to another.

3. B1100: Configuration of analog input (X14.20 or X14.8/X14.21)

UPID 633Dh: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Input Selection\

- ▶ Select the input to which the analog force signal is wired.

UPID E33Bh/E33Ch: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Analog Force Feedback Config\

- ▶ Set the force that stands for 0V (in case of X14.20) or -10V (in case of X14.8/X14.21) (UPID E33Bh) and the force that stands for 10 V (UPID E33Ch)

UPID 6338h/6339h/E33Ah: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Force Control Parameters\

- ▶ Set the control parameters.

4. C1100, C1200, C1400: Configuration of analog input (X4.9 or X4.10/X4.11)

UPID 150Fh: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Input Selection\

► **Select the input to which the analog force signal is wired.**

UPID 1501h/1502h: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Analog Force Feedback Config\

► **Set the force that stands for 0V (in case of X4.9) or –10V (in case of X4.10/X4.11) (UPID 1501h) and the force that stands for 10 V (UPID 1502h)**

UPID 1505h/1508h/1507h: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Force Control Parameters\

► **Set the control parameters.**

5. E1100: Configuration of analog input

UPID 150Fh: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Input Selection\

► **Select Analog Input On X4.4**

UPID 1501h/1502h: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Analog Force Feedback Config\

► **Set the force that stands for 0V (UPID 1501h) and the force that stands for 10 V (UPID 1502h)**

UPID 1505h/1508h/1507h: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Force Control Parameters\

► **Set the control parameters.**

6. E1200, E1400: Configuration of analog input (X4.4 or X20.3/X20.6)

UPID 150Fh: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Input Selection\

► **Select the input to which the analog force signal is wired.**

UPID 1501h/1502h: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Analog Force Feedback Config\

► **Set the force that stands for 0V (in case of X4.4) or –10V (in case of X20.3/X20.6) (UPID 1501h) and the force that stands for 10 V (UPID 1502h)**

UPID 1505h/1508h/1507h: Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Force Control Parameters\

► **Set the control parameters.**

7. Connect the analog signal from the load cell with the selected input.

8. Use the force control motion commands within your application.

9. If necessary the force control parameters have to be tuned.

Parameters\Motion Control SW\Protected Technology Functions\Analog Force Feedback Control\Force Control Parameters

Ordering Information

Motion Control SW		
Article	Description	Part No.
TF-1100-Force-Control	Technology Function Force Control	0150-2503