



## *In control of the situation*

Positioning with Inverter Drives 8400

Precisely tailored to your application



**Lenze**

# Positioning | with frequency inverters

Positioning applications have traditionally been handled with servo drives. Yet together with asynchronous motors, Lenze frequency inverters in the 8400 range are often a technically and economically attractive alternative. The 8400 StateLine and HighLine demonstrate this every day in practice with convincing results. Handling devices, rotary and lifting units, variable speed drives, intermittent drives and conveyor belts are just a few examples of proven applications.

## One real-life example

### 8400 HighLine positioning the welding bar in a packaging machine



#### Task

To revise an existing machine concept with reversing position cycle in response to more stringent market requirements.

#### Aims:

- ▶ To increase the maintenance intervals
- ▶ To reduce the mechanical load
- ▶ To improve flexibility
- ▶ To take machinery safety standards into account

This application is traditionally handled using classic servo technology.

#### Lenze solution with frequency inverter technology

- ▶ 8400 HighLine with preconfigured point-to-point positioning
- ▶ Integrated safety according to EN 61800-5-2
- ▶ Standard asynchronous motor with speed feedback

#### Results

- ▶ Significant reduction in mechanical wear thanks to S-shaped motion profiles
- ▶ Process brake no longer needed due to position control in the inverter
- ▶ Increased system flexibility through freely configurable positioning travel profiles (quick recipe adjustment)
- ▶ Compliance with machinery safety standard
- ▶ Cost-effective due to use of frequency inverter instead of servo technology
- ▶ Additional increase in machine throughput

### Advantages of the solution with Inverter Drives 8400

- ▶ Integrated positioning function in standard drive – no additional hardware or software needed
- ▶ Takes strain off PLC
- ▶ Simple commissioning of the positioning axis – parameter setting instead of programming
- ▶ Everything comes from one single source: complete drives with inverter-optimised motor, gearbox and prepared cables from the Lenze L-force portfolio

# Rightsized | the positioning portfolio 8400

## An overview of positioning functions

The StateLine, HighLine and TopLine models in the 8400 series guarantee application-based drive solutions with consistent handling. This also applies to your positioning tasks. Whether switch-off positioning or point-to-point positioning with and without feedback – everything is already integrated.

The positioning axes are each set to your individual application by the graphic and application-specific input screens of the PC software L-force Engineer. Parameter setting, commissioning and diagnostics are incredibly simple.

## Switch-off positioning

The 8400 StateLine model is more than capable of handling simple positioning, in which movement takes place to a switch-off sensor (such as a limit switch) as the target, even without feedback. The frequency inverter takes care of all sensor management duties, also including pre-limit switches for introduction of creep speeds. Speeds of up to 20 cycles per minute can generally be reached. Typical applications include conveying belts and rolling gate drives, machines with fixed switch-off positions.

## Point-to-point without feedback

Usage without feedback is also possible in applications with up to 15 variable positions and a need for average dynamic performance and accuracy. This reduces installation expenses and costs. In typical applications, accuracy of approximately  $10^\circ$  is achieved on the motor shaft, with typical frequencies of up to 60 cycles per minute. Examples of this are dosing drives, palletisers or feed units.

## Point-to-point with feedback

The positions can be approached absolutely or relatively. The inverter manages the positioning here. This allows both linear and rotary positioning axes to be easily and cost-effectively implemented.

### Scaled positioning with Inverter Drives 8400

The Inverter Drives 8400 StateLine, HighLine and TopLine open up new opportunities for cost-optimised scaling of your machine ranges – which we call Rightsizing.

In typical applications, the 8400 HighLine is used in connection with a standard asynchronous motor with HTL encoder. This allows accuracy of one increment to be achieved on the motor shaft, which corresponds to accuracy of  $0.05^\circ$  on the motor shaft when using a 2048 impulse generator. Frequencies of up to 180 cycles per minutes can generally be achieved here. Typical applications include cross-cutting units, rotary and lifting units.

When there are tight requirements in terms of dynamic performance and accuracy, the 8400 TopLine is ideal choice. This allows up to 300 cycles per minute to be achieved.



8400 StateLine



8400 HighLine



8400 TopLine

# Technical data | Inverters for positioning applications

Positioning functions and properties	StateLine C	HighLine C	TopLine C
	Switch-off positioning	Point-to-point positioning	Point-to-point positioning
Automatic holding brake control	●	●	●
Quick stop (QSP) with adjustable ramp time	●	●	●
Integrated function blocks for arithmetic and logical functions	●	●	●
Adjustable torque limitation	●	●	●
Adjustable jerk limitation when accelerating/decelerating (S-shaped ramps)	●	●	●
Manual jog (inching mode)		●	●
Retracting limit switch		●	●
Manual or automatic homing via selectable homing option		●	●
Travel profile restart, online		●	●
Up to 15 configurable positioning travel profiles		●	●
Position specifications in increments/physical units		●	●
Limit position monitoring		●	●
Following error monitoring		●	●
Linking and automatic following of travel profiles		●	●
Changing speed and acceleration during positioning process (override)		●	●
Absolute and relative positioning		●	●
Fast position detection via mark sensor, e.g. for residual path positioning (touch probe)		●	●
Operation with synchronous motors			●

		StateLine C	HighLine C	TopLine C
Performance data	Mains: 1 AC 230/240 V	0.25 ... 2.2 kW		0.55 ... 2.2 kW
	Mains: 3 AC 400/500 V	0.37 ... 45.0 kW		
	Overload current	150 % (60 s); 200 % (3 s)		
Operating conditions	Operating temperature	-10°C ... 55°C; (derating over 45 °C: 2.5 %/K)		
	Transport	-25°C ... 70°C		
	Storage	-25°C ... 60°C		
	Enclosure	IP20		
Interfaces	Memory module	●	●	●
	L-force diagnostics interface	●	●	●
	Diagnostic LEDs	●	●	●
	On-board CANopen (1000 kbps)	●	●	●
	DIP switch for CANopen (address, baud rate, bus termination)	●	●	●
	Slot for communication module	●	●	●
	DC-bus connection (400 V types)	●	●	●
	Integrated brake chopper	●	●	●
	External 24 V supply	●	●	●
	PTC/thermal contact input	●	●	●
	"Controller enable" digital input	●	●	●
	Programmable digital inputs (DI <sub>n</sub> )	4	7	7
	Encoder or frequency input (DI1, DI2)	10 kHz	200 kHz	200 kHz
	Additional frequency input (DI6, DI7)	–	10 kHz	10 kHz
	Relay output AC 250 V/3 A, DC 24 V/2 A ... 240 V/0,16 A	Changeover contact	Changeover contact	Changeover contact
	Digital outputs (50 mA)	1	3	3
	2.5 A digital output with integrated spark suppressor	–	●	●
	Analog inputs: 0 ... +/-10 V, 0/4 ... 20 mA	1	2	2
	Analog inputs: 0 ... +/-10 V, 0/4 ... 20 mA	1 (0...10 V)	2	2
	Resolver input			●
Multiple encoder input (TTL 500 kHz, SinCos, Hiperface®, SSI)			●	
Axis bus (for cross communication, synchronisation)			●	