Application range

New technologies for high production equipment require more and more numerically driven movements with extreme performances in acceleration, speed and precision. Conventional systems consisting of a rotating electrical motor and mechanical transmission elements, i.e. gearboxes, belt transmissions or gear rack pinions, can only meet these requirements with great effort.
In many cases, linear direct drive technology is an optimal alternative providing significant benefits including:

- High velocity and acceleration
- Excellent control quality and positioning behavior
- Direct power transfer – no mechanical transmission elements like ball screws, toothed belts or gear
- racks
- Maintenance-free drive (no wearing parts on the motor)
- Simplified machine structure
- High static and dynamic load rigidity

Due to the direct installation into the machine, there are no wearing mechanical components. This means there is a power train with no or minimal backlash and permits very high control qualities with gains in the position control loop (Kv factor) of more than 20 m/min/mm. In conventional electromagnetic systems, positioning tasks with high feed rates or highly accelerated, short stroke movements in quick succession lead to premature wear of mechanical parts and thus to failures and significant costs. In these applications linear direct drives offer decisive advantages. Considering the benefits mentioned above, the following applications are suitable for linear synchronous direct drives:

- High-speed cutting in transfer lines and machining centers
- Grinding of camshafts and crankshafts
- Laser machining
- Precision and ultra-precision machining
- Sheet-metal working
- Material handling, textile and packaging machines
- Free-form surface machining
- Wood working
- Machining of printed circuit boards
- …and many more

Due to a practical combination of motor technology and intelligent digital drive controllers, the linear direct drive technique offers new solutions with significantly better performance. The development status of the synchronous linear technique of NiLAB permits a very high force range. The spectrum of NiLAB synchronous linear actuator technology, which is described below, permits feed drive systems of fraction of N up to 27000 N per motor and speed of 270 m/min.