

The background features a blue grid with technical diagrams. A prominent diagram shows a coordinate system with a vertical axis labeled  $X_0$  and a diagonal line. Another diagram shows a curved arrow pointing upwards and to the right. The overall aesthetic is technical and professional.

**TECNOTION**  
THE LINEAR MOTOR COMPANY

*Advantages of direct drives in positioning systems*

1. About us
2. Linear motor: Basics
3. Why choose a linear motor?
4. Applications





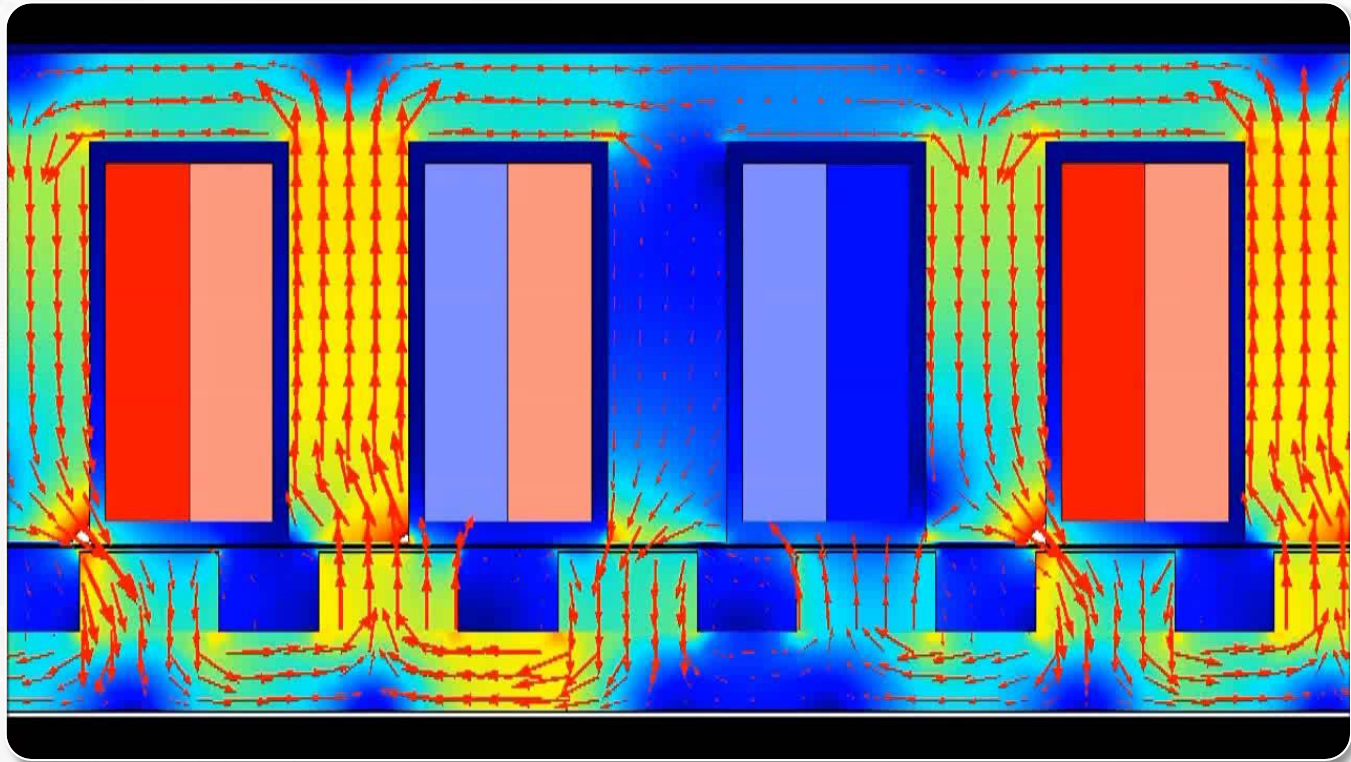
- Specialized in linear motors
- Former part of Philips
- More than 25 years of experience
- Worldwide 210 employees
- Turnover approx. 45,000,000 Euro
- Headquarters in Almelo/The Netherlands
- Branches in Germany, Poland, USA & Korea
- Production facilities in The Netherlands & China

# Linear motor: Basics



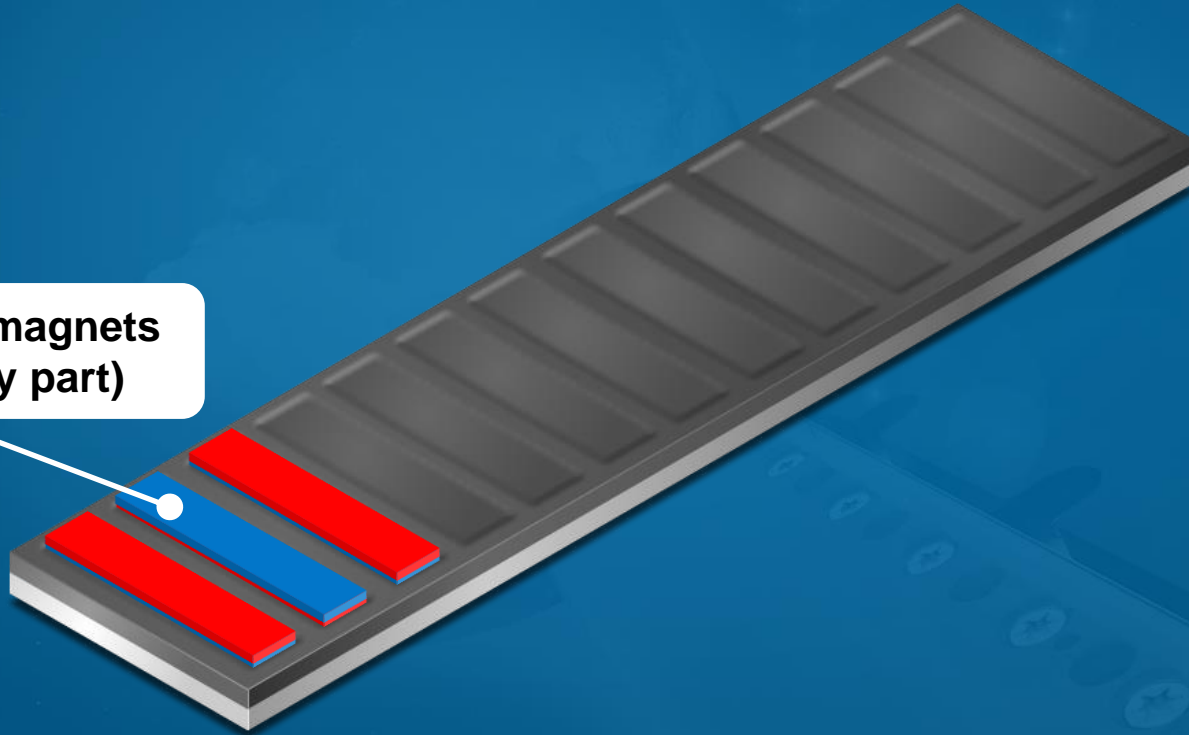
Quelle: Wikipedia

# Linear motor

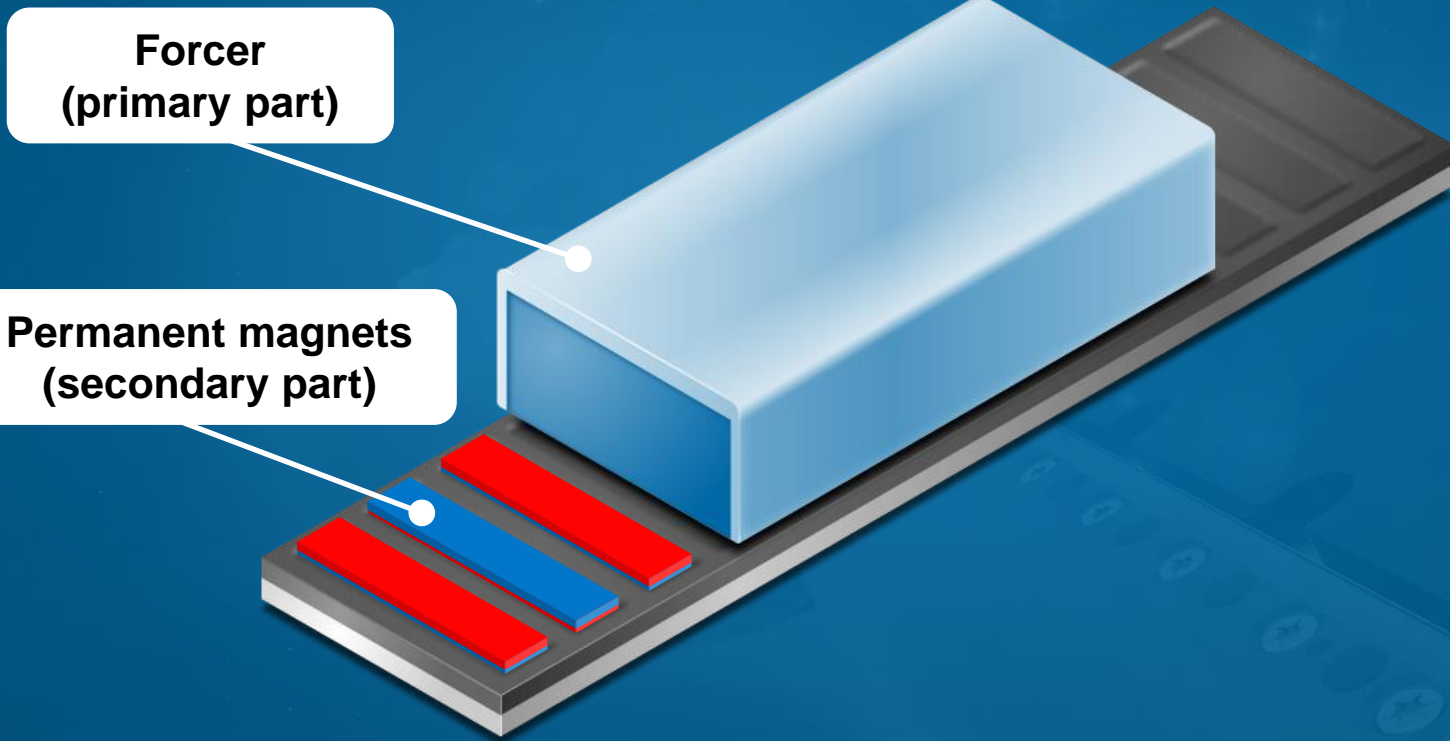




Permanent magnets  
(secondary part)

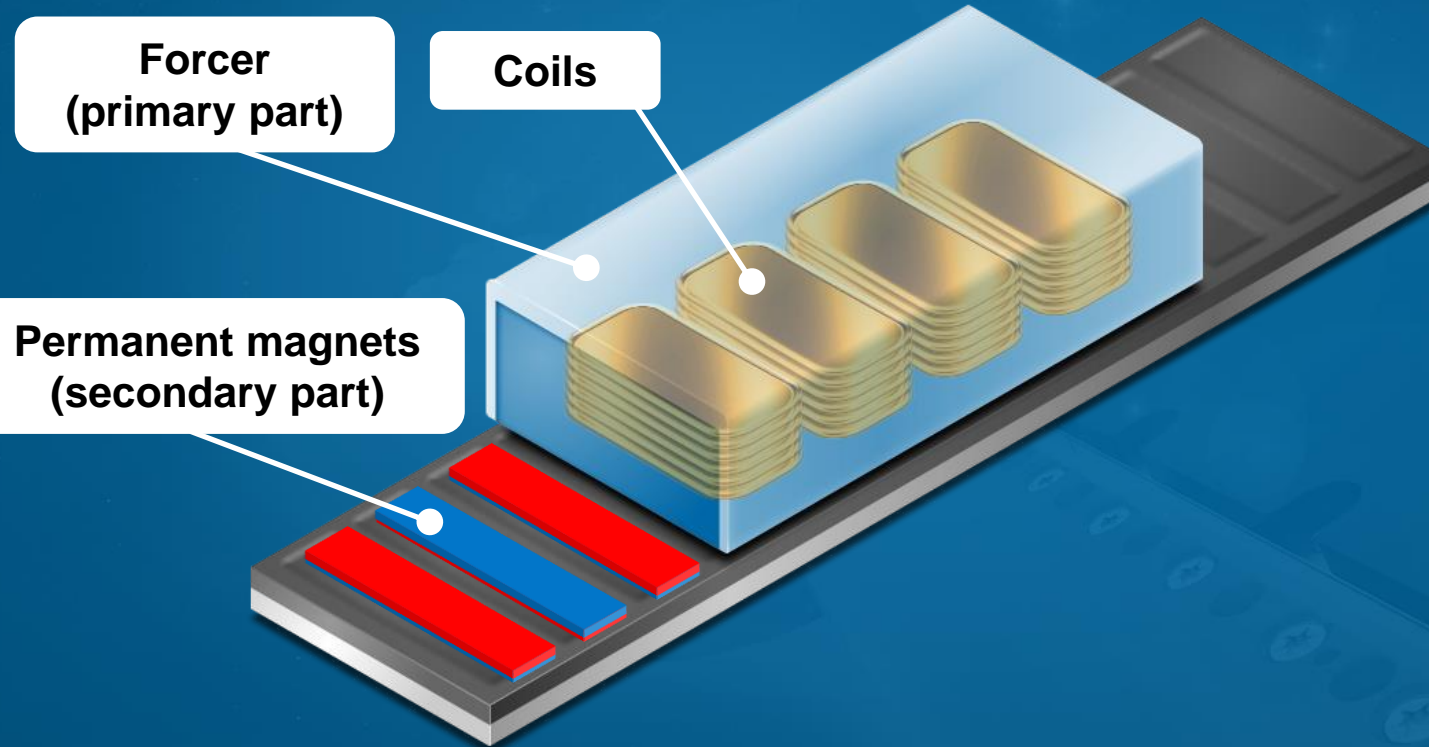


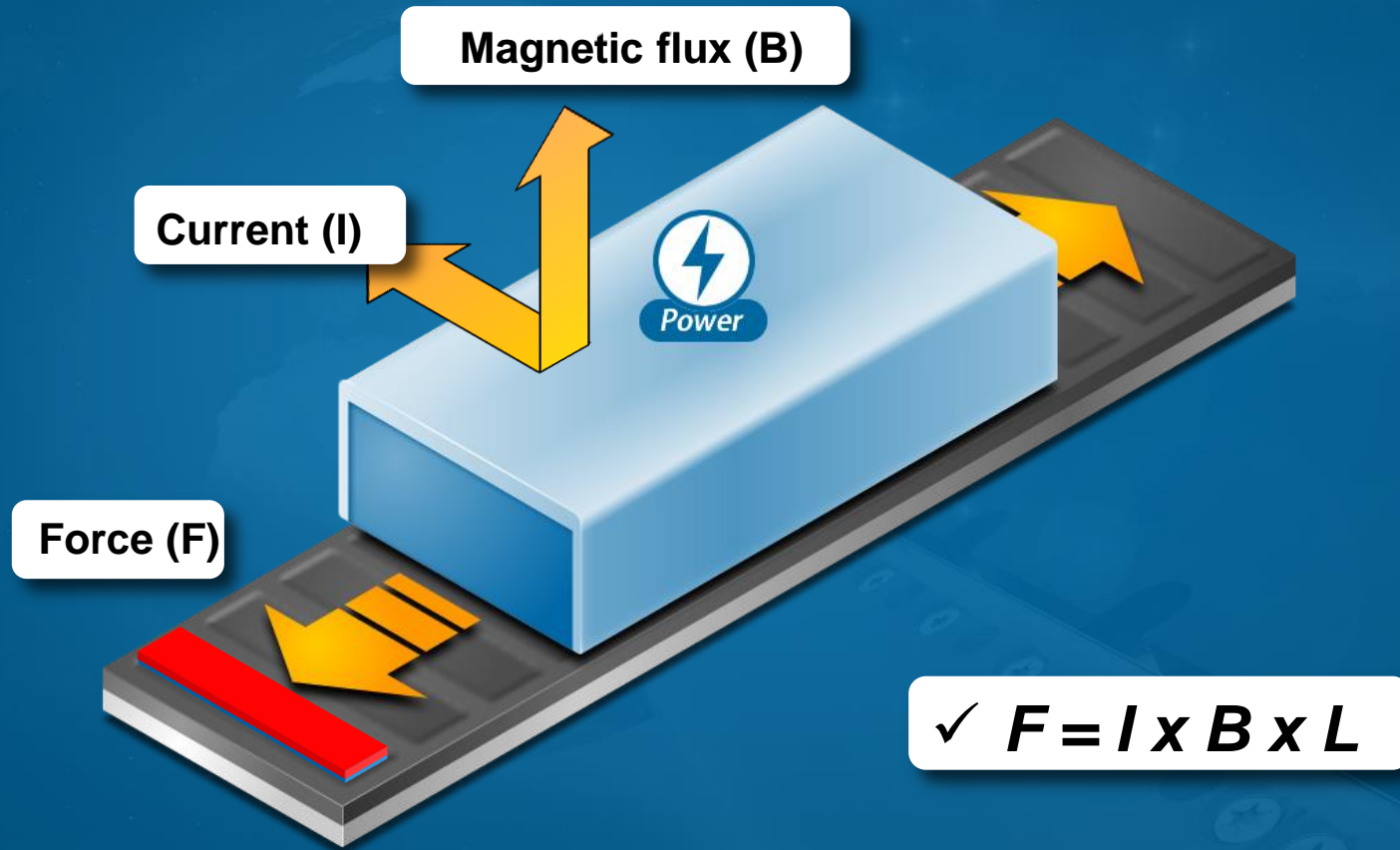




**Forcer  
(primary part)**

**Permanent magnets  
(secondary part)**







**Iron core  
linear motors**



**Ironless  
linear motors**



**Vacuum  
linear motors**

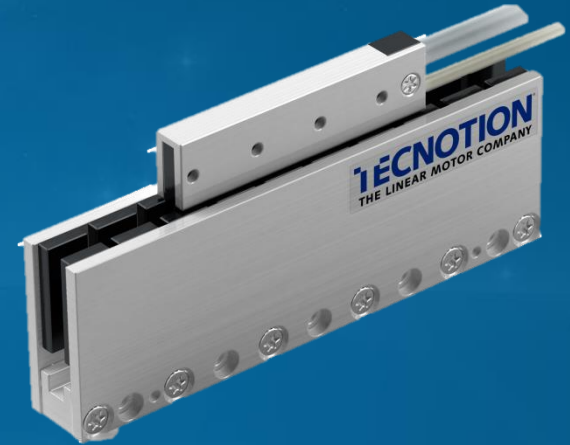


**Torque Motors**



## Iron core linear motors

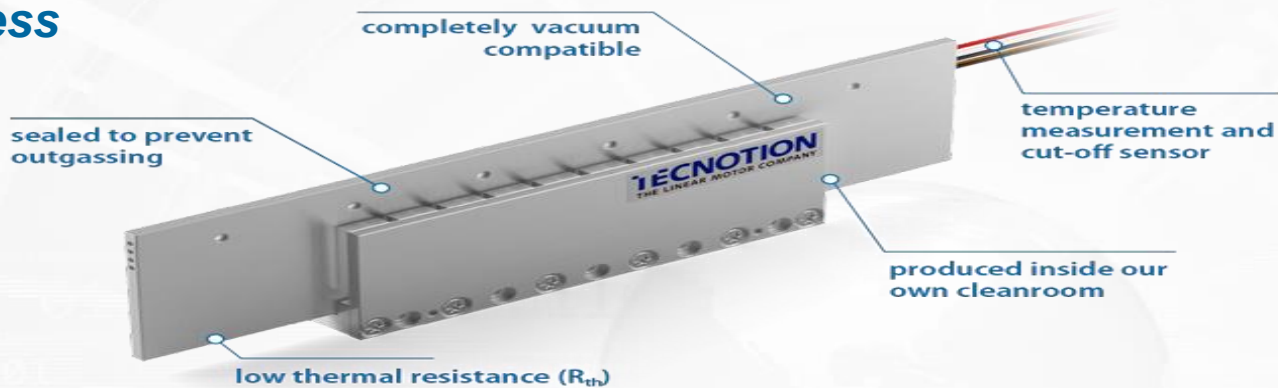
- ✓ High Forces / Masses
- ✓ Velocity up to 12 m/s
- ✓ Costs



## Ironless linear motor

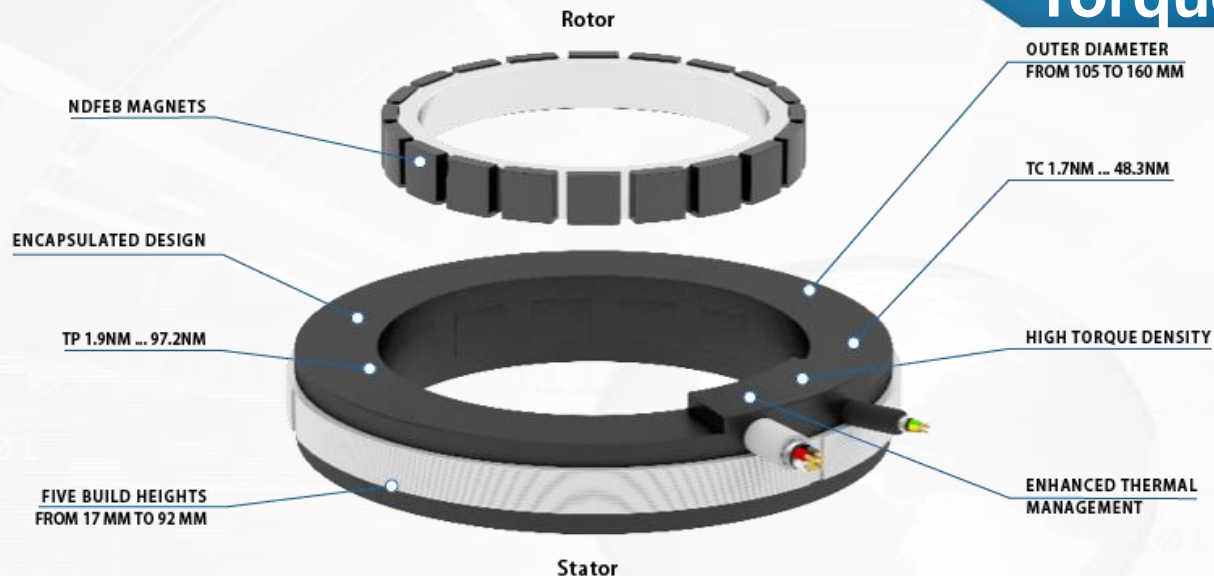
- ✓ Dynamics
- ✓ Velocity up to 18 m/s
- ✓ No cogging

### Iron less



### Iron core





DIRECT DRIVE



HIGHEST TORQUE DENSITY  
IN THE MARKET



LOW COGGING VALUE,  
LOW THD



LOW STATOR AND  
ROTOR MASS



# Torque motors

What is a torque motor?



# Torque motors

Price ↑

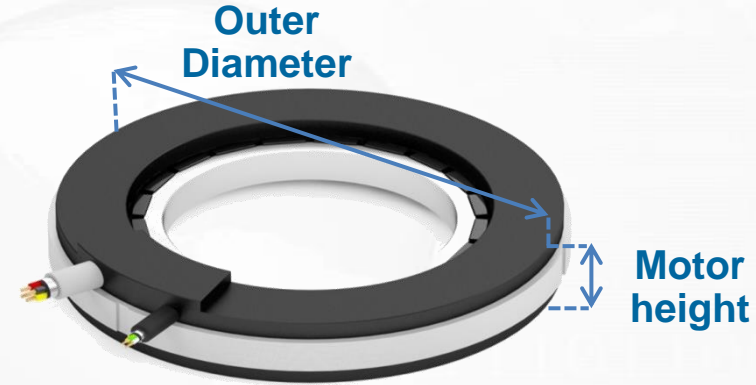
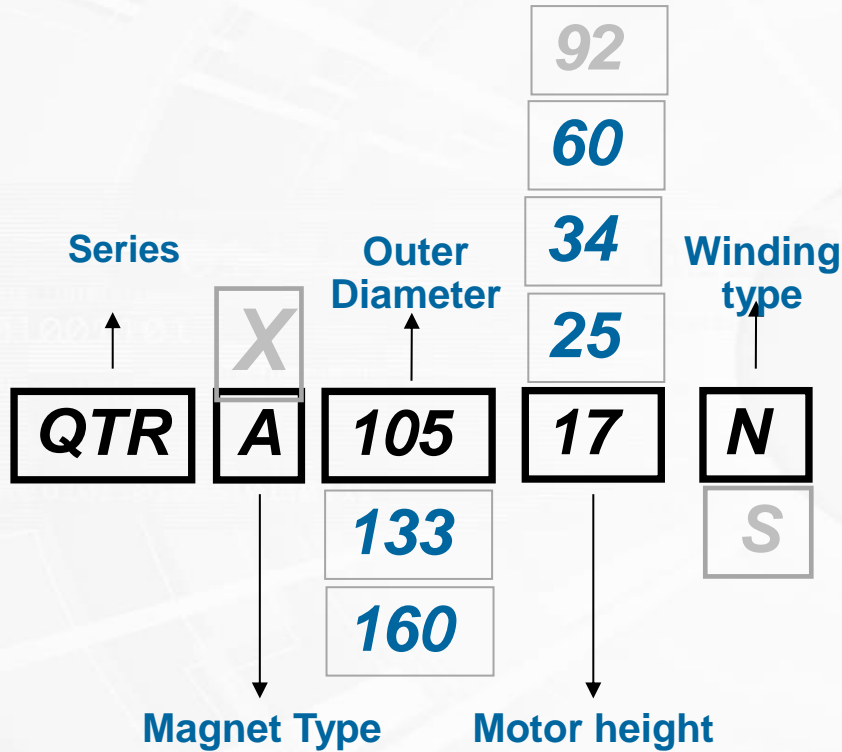
|             |              |
|-------------|--------------|
| Foot print  | Foot print   |
| Labour time | Labour time  |
| Mechanics   | Mechanics    |
| Encoder     | Encoder      |
| Coupling    |              |
| Gear box    |              |
| Servo       | Torque motor |



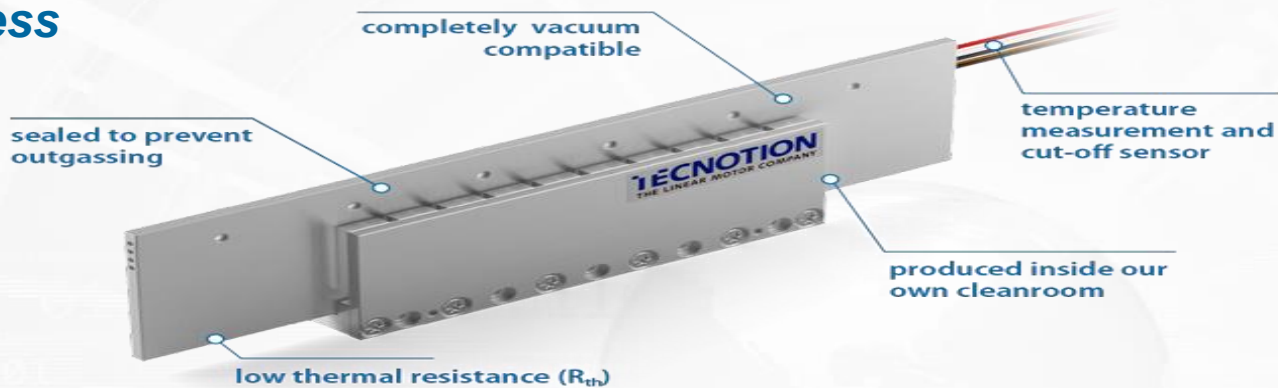


### Torque motor power range





### Iron less



### Iron core



## *Customization guidelines*



### **Degrees of customization:**

1. Connector addition
2. Cable length / special winding
3. Custom tooling (different geometry / cable, cable exit)
4. Complete custom

# Why choose a linear motor?





**Belt**



**Screw**



**Rack & Pinion**



**Linear motor**

**Acc.** 50 m/s<sup>2</sup>

10 m/s<sup>2</sup>

40 m/s<sup>2</sup>

100 m/s<sup>2</sup>

**Precision** ~50µm

5µm

~40µm

< 1µm

# Why choose a linear motor

- High dynamics (acceleration)/ Высокая динамика/ускорение
- High velocity / высокая скорость
- Position accuracy / точность позиционирования
- Flexibility / modular system / гибкость
- Compact design / компактность
- Simple procurement / простота заказа
- Maintenance free / не требует обслуживания ( смазка, обслуживание)
- Low-noise / низкий шум
- Suitable for vacuum / решения для вакуума
- Cleanroom / стерильное помещение на производстве

✓ Acceleration up to 100 m/s<sup>2</sup>

# Why choose a linear motor

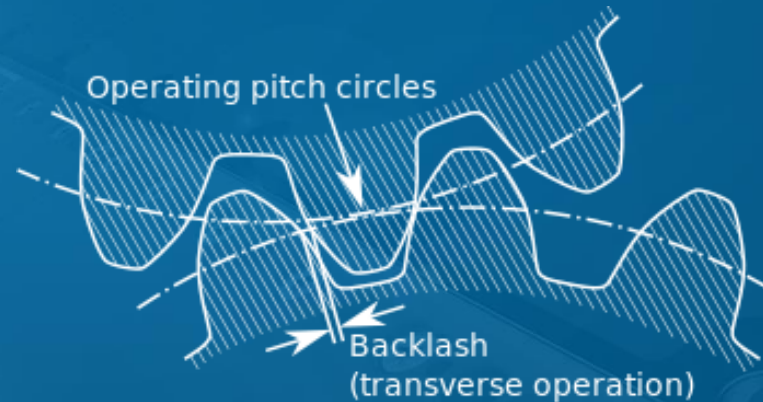
- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom

✓ Velocity up to 18 m/s

# Why choose a linear motor

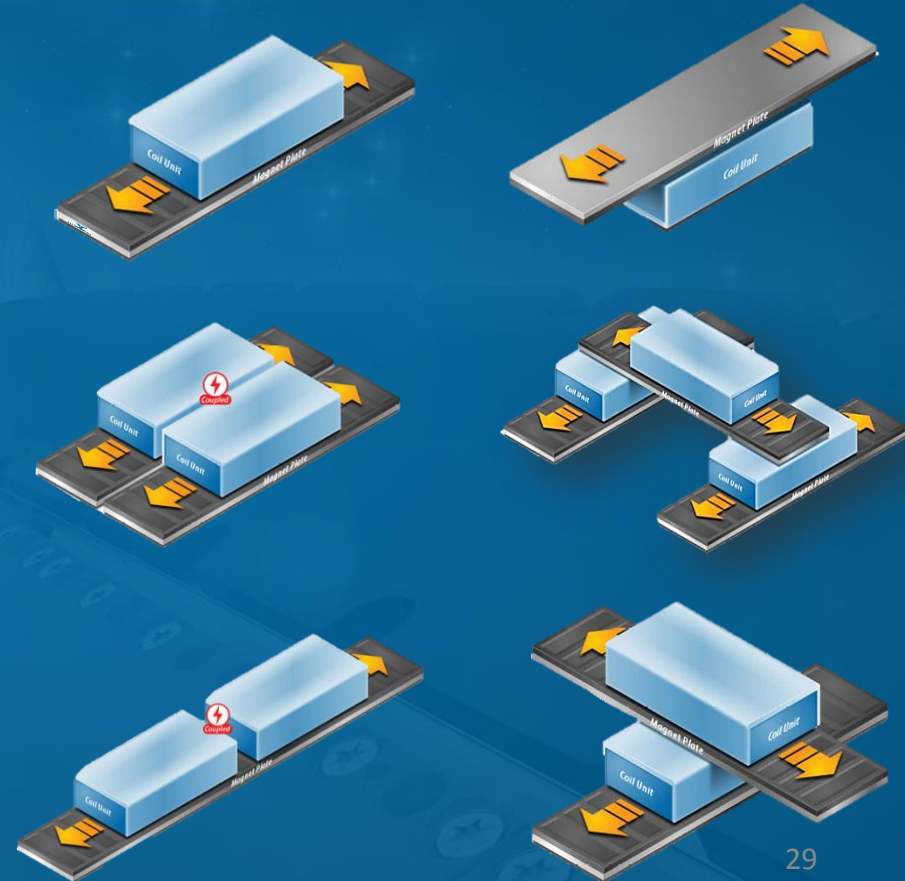
- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom

✓ Possible accuracy < 1  $\mu\text{m}$



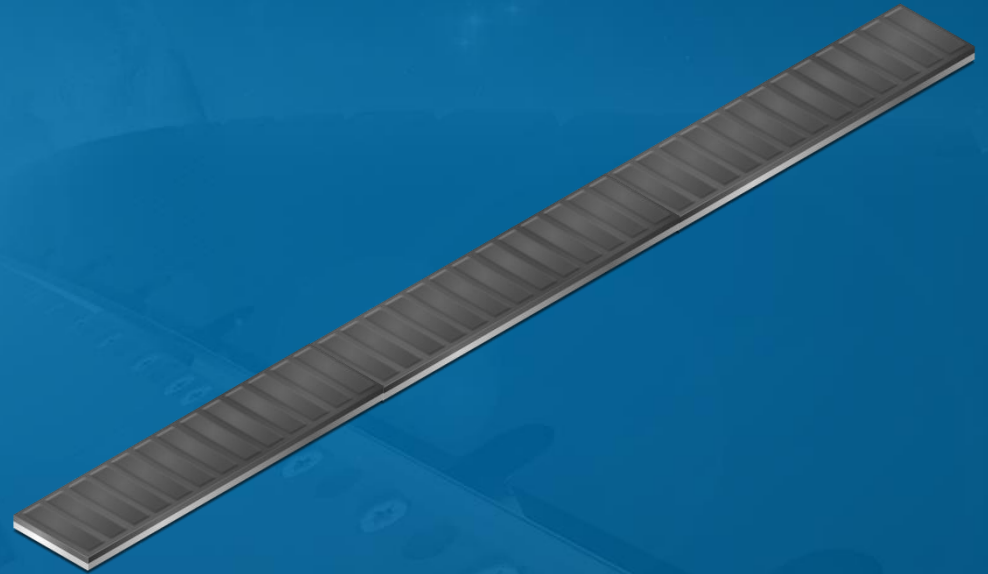
# Why choose a linear motor

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom



# Why choose a linear motor

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom



# Why choose a linear motor

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom

- ✓ No Gearboxes needed
- ✓ No bearings (screw & belt)
- ✓ No couplings



# Why choose a linear motor

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom

✓ Small number of parts

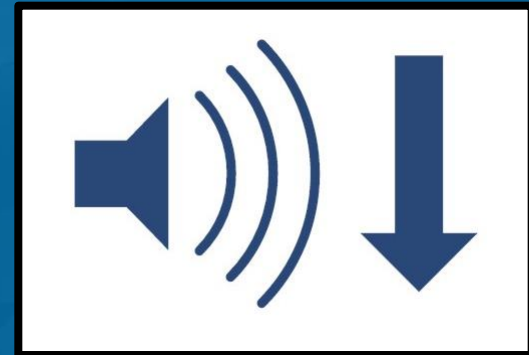
# Why choose a linear motor

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom

- ✓ No wear and tear
- ✓ No lubrication

# Why choose a linear motor

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom



# Why choose a linear motor

TECNOTION

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom

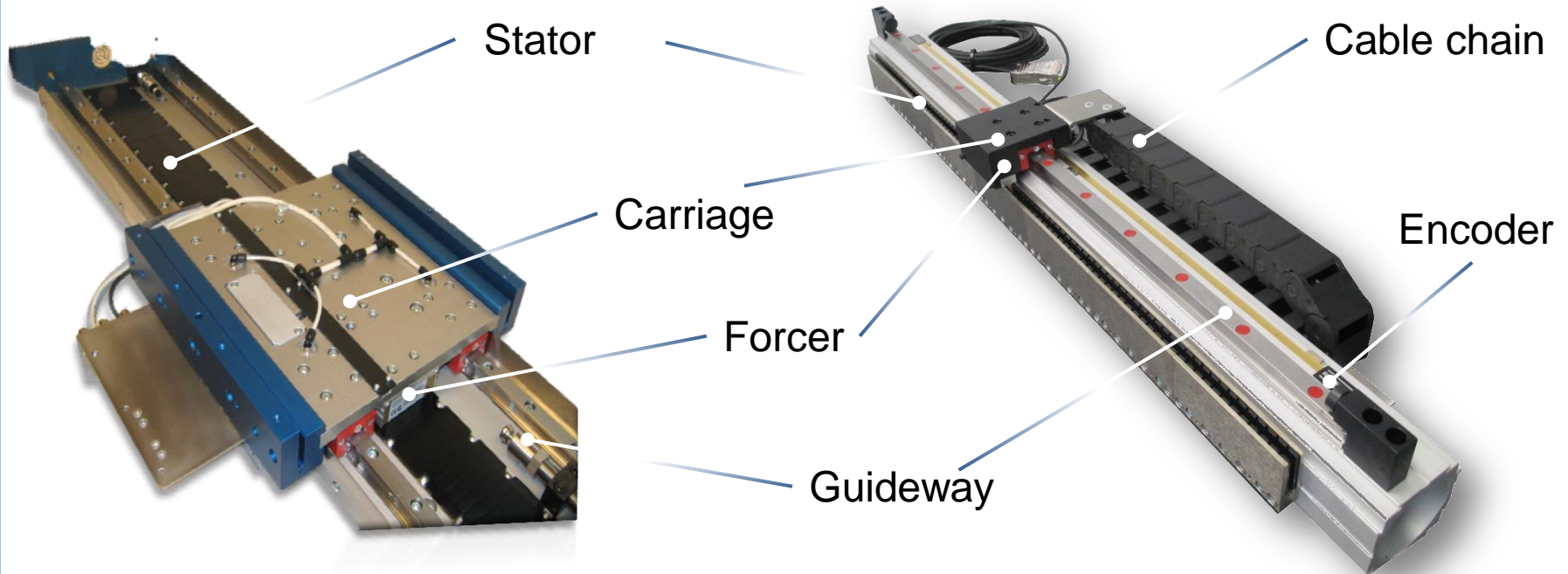
✓ Rated outgassing values up to  $10^{-8}$  mBar



# Why choose a linear motor

- High dynamics (acceleration)
- High velocity
- Position accuracy
- Flexibility / modular system
- Compact design
- Simple procurement
- Maintenance free
- Low-noise
- Suitable for vacuum
- Cleanroom

✓ Up to ISO cleanroom class 1

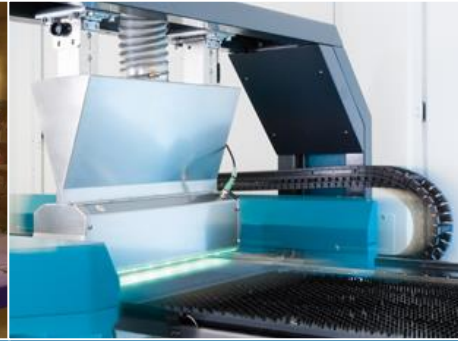


**Ironcore motor**

**Ironless Motor**



Semiconductor



Solar



F.P.D.



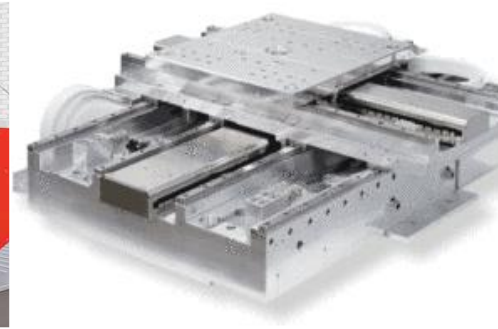
Electronics



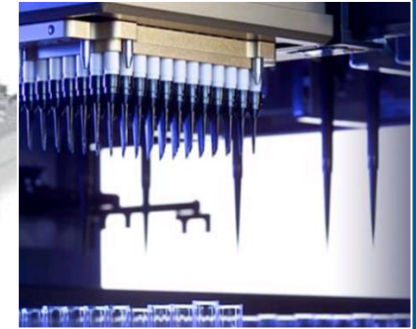
Digital  
Printing



Machine  
Tooling



Vacuum Inspection



Biomedical



# **TÉCNOTION®**

**THE LINEAR MOTOR COMPANY**

**QUALITY AND SERVICE  
DELIVERED WORLDWIDE**