

Ultra-High-Speed Elevator

Ultra-high-speed elevator is an advanced elevator system and control technology designed for fast and safe transportation in high-rise buildings.

Ultra-high-speed elevators shorten the travel time within buildings for residents, enhancing convenience, while also applying energy-efficient systems to reduce operating costs.



▲ The “streamlined capsule cage” of the ultra-high-speed elevator minimizes operating noise.

Issues to Tackle

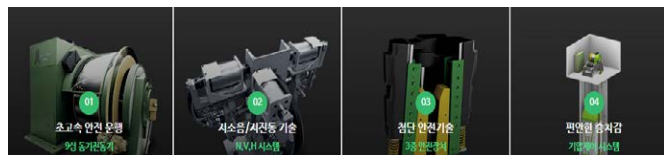
- ☑ Increasing the speed of elevators in high-rise buildings causes discomfort in building movement due to longer waiting times and a higher number of waiting passengers.
- ☑ Moving in high-speed elevators in tall buildings can lead to discomfort, such as tinnitus, ear fullness, and pain, caused by pressure differences.

Expected Benefits

- ☑ Reducing waiting and travel time for users through rapid vertical movement in high-rise buildings.
- ☑ Minimizing elevator operational noise using a streamlined capsule design and resolving tinnitus caused by pressure differences.
- ☑ Improving efficiency and preventing issues through usage analysis and remote monitoring.

💡 Key Services

- Fast travel and quick braking for ultra-high-speed and safe operation based on a 9-phase synchronous motor (three 3-phase synchronous motors combined).
 - * Controlling pressure fluctuations during elevator altitude changes to minimize tinnitus.
 - * Streamlined capsule design and vibration control system minimize air resistance, eliminating noise and vibrations.
- Automatic adjustment of elevator speed and position with real-time monitoring to provide status information (e.g., kiosks, monitors).

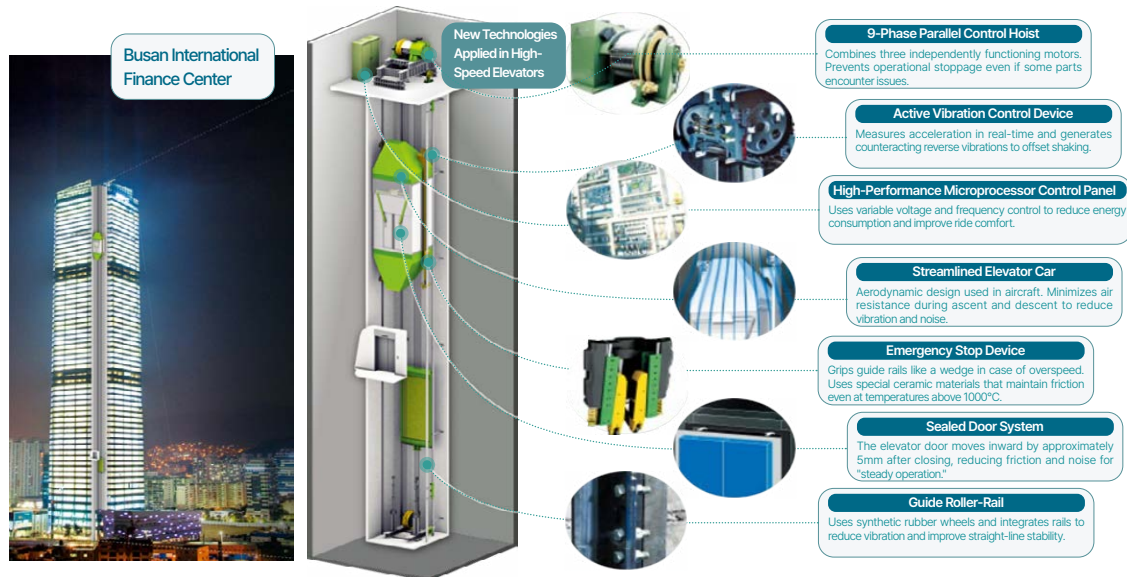


⚙️ Use Cases

- The Busan International Finance Center (BIFC) installed two ultra-high-speed elevators in 2014, capable of traveling at 600 meters per minute, allowing movement from the 1st to the 63rd floor in less than a minute.
- Hyundai Elevator developed the world's fastest ultra-high-speed elevator, reaching a speed of 1,260 meters per minute in 2020, and conducted a test run at 1,080 meters per minute at the Hyundai Asan Test Tower.

Key Components

Configuration



Technology

1. 9-phase synchronous motor for high-speed operation

- Combining three independently operating motors to prevent operation interruption even if some components fail.

POINT Data analysis in GIS-based 3D digital twin (material quantity calculation, construction daily report, etc.).

2. Active vibration control device for shake compensation

- Real-time acceleration measurement to intentionally generate reverse vibrations for shake compensation.

3. High-performance microprocessor control panel that reduces energy consumption

- The variable voltage, variable frequency (VVVF) control system reduces energy consumption and improves ride comfort.

4. The streamlined elevator car structure required for high-speeds

- Aerodynamic design is applied to aircraft to minimize air resistance during ascent and descent, reducing vibration and noise.

5. Emergency stop device

- A special ceramic material is used that maintains friction even at temperatures exceeding 1000°C, with the function of gripping the guide rail like a wedge in case of overspeed.

6. A sealed door system for optimal ride comfort

- A sealed door system with a 5mm gap applied inside the cabin after the elevator door closes, reducing friction and noise for smooth, constant-speed operation, with acceleration and deceleration that are imperceptible.

POINT N.V.H (NOISE, VIBRATION, HARSHNESS) system

7. Guide rollers and rails that reduce vibration and improve straight-line stability

- Installing wheels made of neoprene material and integrated rails.



World's fastest elevator machine (Hyundai Elevator).

- Speed: 1,260 meters per minute (moves 21 meters, or 6 floors, per second).



Technology Companies

HYUNDAI ELEVATOR
www.hyundaelevator.co.kr

