

# HYUNDAI ELEVATOR THE EL

/ ULTRA HIGH SPEED ELEVATOR

Prestige technology

Core advantage

08

14



# Elevate to The Exclusive Leader

Hyundai Elevator

The sole elevator is for a building of unrivaled height.

THE EL, an ultra high speed elevator that enables you to experience the most advanced technologies and class, achieves previously unimagined heights and unfolds a new reality before your eyes.

> THE EL, realizing more unique greater value, offers you new technologies, for the environment and safety.

THE EL: The Exculsive Leader

The overwhelming performance of THE EL that is proven by its "world's first, world's best" records.

THE EL embodies the meanings 'the only' and 'unrivaled', and aims to become the only ultra high speed elevator in its class.







Aerodynamic
DESIGN

3-phase motor x 3Set
MULTI
MOTOR

World Best 1,080 mpm

PRESTIGE TECHNOLOGY

01



# The fastest speed in the world

#### Ultra high speed, nine-phase synchronous motor

THE EL has the heart of a fault tolerance design, a nine-phase multi-motor that is a three sets combination of three-phase synchronous motors. Even if there is a problem with some parts, the elevator remains fully operational, improving safety and service.

#### Noise, Vibration, Harshness (N.V.H) technology

The streamlined capsule structure, which minimizes air resistance, and the vibration control system remove even the slightest noise and vibration, offering a comfortable, smooth riding experience.

#### Atmospheric pressure controller

By controlling atmospheric pressure fluctuations caused by altitude change, the controller minimizes ringing in the ears. This enables a comfortable riding experience even inside an ultra high rise building.

### The Hyundai Asan Tower, an ultra high speed elevator test tower

The Hyundai Asan Tower has the world's fastest elevator, with a speed of 18mps [1,080mpm]. Here, the safety and reliability of ultra high speed elevators are proven in an environment that is most similar to an ultra high rise building. The Hyundai Asan Tower is opening a new horizon in the development of the world's top-notch elevator systems.

THE EL I 09



SMART TECHNOLOGY

02



# The next generation of intelligent operating system

#### IBS (Intelligent Building System)

IBS creates a smart spatial culture in connection with the building's security and management system. You can receive high-quality services based on IT convergence technologies within a top-class building.

#### Destination selecting system (Destination floor reservation system)

This is a system where you register your destination floor at a landing and the most appropriate elevator is automatically serviced. This enables maximum operational efficiency.

#### Artificial intelligence-based group control system

Artificial intelligence-based analysis of traffic volume enables estimation of future traffic volume and patterns and necessary preparations. Optimal group management is allowed, leading to efficient control of elevator operations.

#### Remote monitoring system

Remote monitoring of the elevator operation status all across the nation 24/7 prevents breakdowns and accidents.

Intelligent Cutting-edge security and management system

Building System

iGC-3000 GROUP CONTROL SYSTEM

Reduces waiting time and energy Destination SELECTING Consumption







77.5% RECYCLE ENERGY
Energy use improved by reuse of electricity

GREEN TECHNOLOGY

03



# "A" class Energy Efficiency

# First in the world to receive a grade of A from Tüv, German Institute

Energy efficiency rating (VDI 4707 Part1) involves giving international certification after assessing an elevator's operation time, energy consumption, and average operation distance. THE EL became the first in the world to receive the A class(the best-in-class system) in the ultra high speed elevator (600mpm) category.

#### Energy recycling inverter

THE EL has a energy recycling inverter, which reuses energy that is generated during operation, resulting in increased energy efficiency of up to 77.5%. There is no charging or braking resistance area, which minimizes the emission of carbon. THE EL features leading green technology.

#### Ultra lightweight, ultra slim green technology

The permanent magnet synchronous motor of THEEL has an ultra slim and lightweight design, resulting in reduced machine room construction costs. It also consumes 25% less energy compared to induction motors.

#### Green process

Hyundai Elevator develops environmental-friendly elevators for customer satisfaction through a design and material development process that reduces environmental pollution. Hyundai Elevator is continually developing low electricity-consuming products and reducing the amount of materials used in the production process in line with customers' 'well-being' demands, thereby taking the lead in environment-friendly technologies.

THE ELL I 13



#### ENTRANCE

Landing Door STS Bead Blast

Jamb Flush Type, STS Bead Blast

LED Lighting

(Arrival Announcement System)

Hall Button Destination Selecting System

(Box Type)
Hall Lantern HLS-750

STS Bead Blast

Acryl Lens, LED Lighting

#### CAR DESIGN

Ceiling Barrisol, LED Lighting

STS Mirror 3S Vibration

Car Wall Marble (THASSOS)

3 Form Bear Grass (SEA WEED/19T) LED Lighting System

STS Mirror 3S Vibration

Car Door STS Mirror 3S Vibration

Operating Swing Panel
Panel Micro Push Button

Handrail STS Bead Blast, LED Lighting

Flooring Marble (THASSOS)

STS Hairline (5T)







Information Display System (Car Wall)



Hall Lantern



Arrival Announcement System



Ceiling



Handrail



Operating Panel Button



### ENTRANCE

Landing Door Bonded Metal (Delta/Bronze)
Ti-Bronze 3S Vibration

High Glossy Coating

Jamb 200TYPE, Down Light Ti-Bronze 3S Vibration

High Glossy Coating

Hall Button Destination Selecting
System (Box Type)

Hall Lantern STS Bead Blast

Half Mirror Acryl LED Lighting

#### CAR DESIGN

Ceiling Ti-Bronze Bead Blast

LED Indirect Lighting

Car Wall Marble (BROWNTINI)

3 Form Bear Grass (NIA) LED Lighting

Car Door 3 Form Bear Grass (NIA)

Ti-Bronze Bead Blast

Operating Swing Panel
Panel Micro Push Button

Handrail Ti-Bronze Hairline 1 Pipe

Flooring Marble

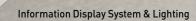
(BOTTICINO, BROWNTINI)







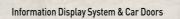




Destination Selecting System



Hall Lantern

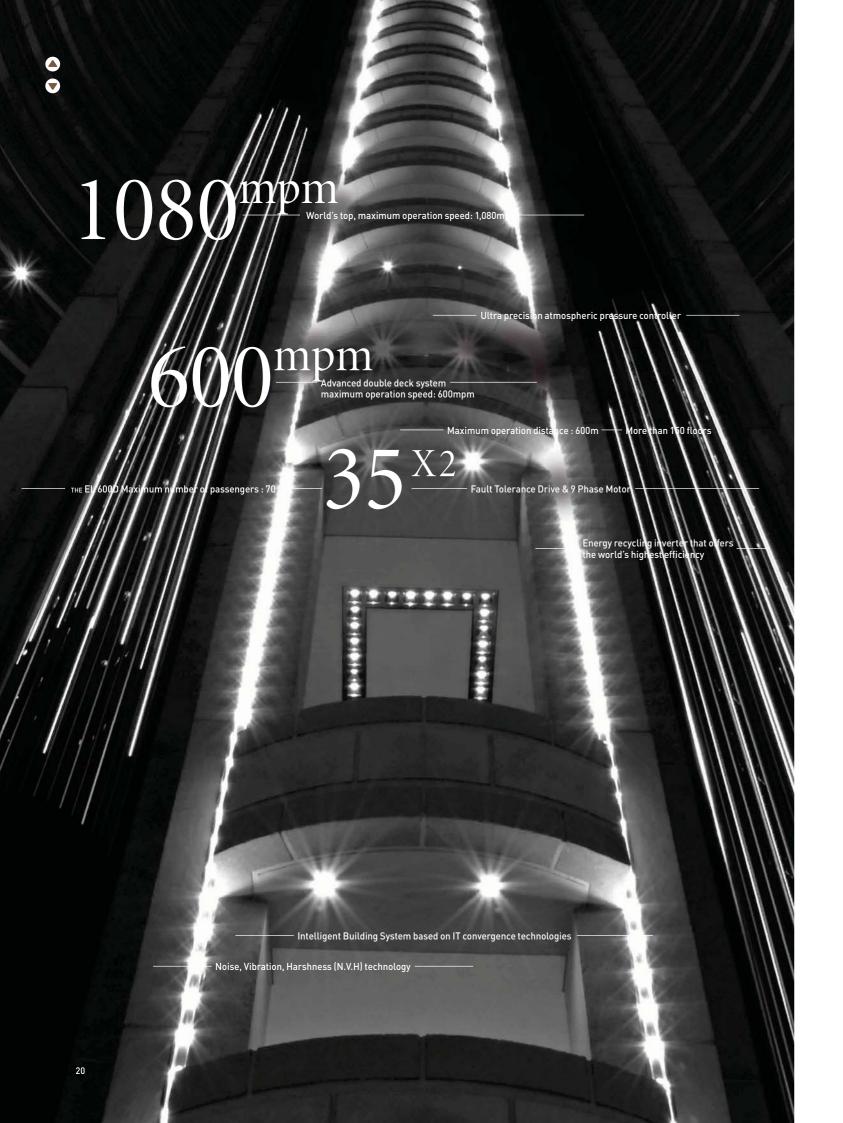


Ceiling

Handrail



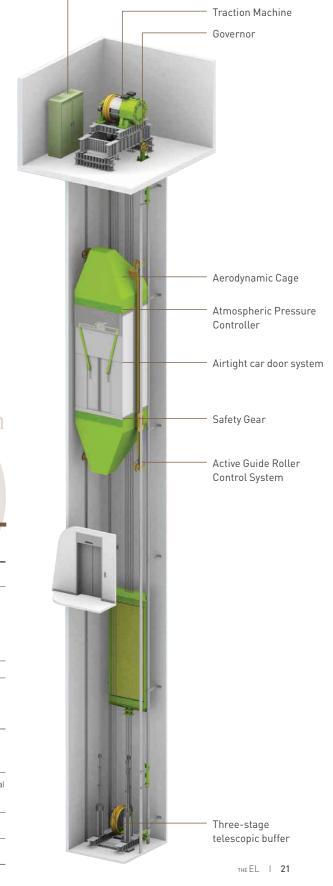
Control Panel





Category

THE EL, an ultra high speed elevator that was created with the world's advanced technologies These technologies result in core advantages of THE EL, providing you with greater value.



Ultra high speed nine-phase Machine structure Fault tolerance function synchronous motor Airtight car door system Low noise, low vibration guide shoe Vibration control system Streamlined capsule cage Emergency stop device Excellent braking performance and Fly ball governor Three-stage telescopic buffer Operation system IBS support system

(Bi-directional video telephony, mobile call, speed gate connection, etc.) Destination Selecting System Artificial intelligence-based group efficiency control system Remote monitoring and video Prevention of crime and emergency

telephony system situations Outstanding enhancement of operational Advanced double deck system

# KEY FEATURES

The ultra high speed nine-phase synchronous motor, which demonstrates the world's most outstanding traction power and is also very compact, a streamlined capsule design, and technologies that minimize noise and vibration... All the things mentioned above are in THE EL.

## TRACTION MACHINE



#### Fault tolerance system

With a design that employs three three-phase permanent magnet synchronous motors in a single frame, the fault tolerance system is a key technology of THE EL that prevents breakdowns or out of service. Even when there is an issue with some parts, the other synchronous motors ensure normal operation.

#### Electro-magnetic field simulation test

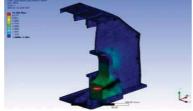
By reviewing safety based on electro-magnetic field simulation and structural analysis, an elevator that is the quietest and has the lowest level of vibration in the world was created to offer greater value.

 $\star$  Torque Ripple of no more than 0.1%, the lowest in the world

#### Hydraulic brake

The high-capacity, hardened hydraulic brake is more compact than a magnetic brake and has excellent braking performance. This also allows for control that is as much as ten times more precise than regular braking.

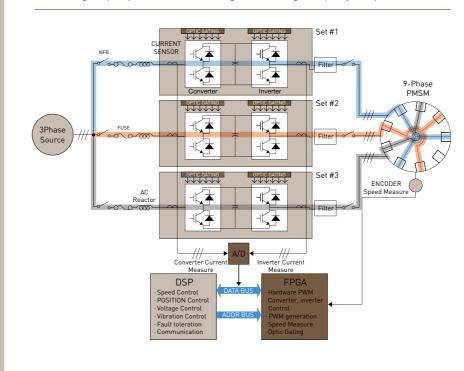




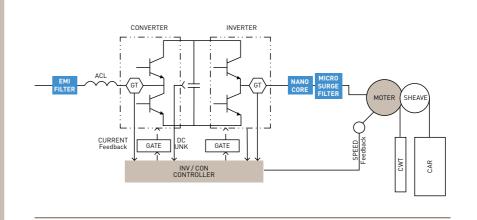
Structural analysis simulation in consideration of heavy load

	GT 350	GT 500	GT900(D/D)	GT 1000	GT 1500 (D/D)
Max. Rise (m)	200	300	400	600	600
Max. Capacity (kg)	2000	2000	3200	2000	4000
Max. Speed (mpm)	420	600	600	1080	600

**Three-phase parallel control device** The three-phase parallel control device maintains the independence of three synchronous motors and mutually connects them, and it has a highly efficient, high-capacity control board, resulting in outstanding shift quality and quietness.



- \* EMI Filter: Satisfies EMC standards (EN12015, EN12016, EN61000-4 etc)
- \* Nano Core: Minimizes Common Mode Noise
- \* Micro Surge Filter: Protects the motor, minimizes leakage current, reduces noise



THE  $\mathsf{EL}$  . I

# 7

### N.V.H SYSTEM

(NOISE, VIBRATION, HARSHNESS)





**Airtight car door system** After the door closes, it slides towards the cage. This completely seals the entrance, which is the main source of noise, resulting in excellent noise insulation and atmospheric pressure control.

**High performance roller guide shoe** The high elasticity roller and lever structure minimizes the transmission of external force from the rail to the inside of the car, ensuring optimal comfort during high speed operation.

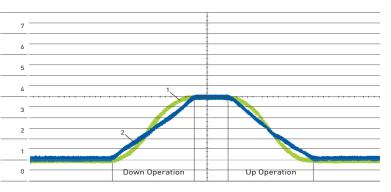
Aerodynamic capsule cage The aerodynamic, streamlined capsule cage that was designed through flow analysis and simulation minimizes air resistance, resulting in a smooth riding experience with little noise and vibration.

**Vibration control system** The active guide roller control system reduces the lateral vibration within the car to less than 5gal. The longitudinal vibration control system uses a motor control device and reduces vibration by 40%.

# ATMOSPHERIC PRESSURE CONTROLLER

**Minimization of ringing in the ears** By controlling the induction and exhaust system within the cage, the atmospheric pressure control system reduces air pressure fluctuation to within 5% inside the car. It maintains atmospheric pressure at a certain level, preventing the pressure change that would otherwise occur during ultra high speed operation. This allows the body to more easily adapt to the change, resulting in a comfortable riding experience.

#### [Change in the atmospheric pressure within the cage ]

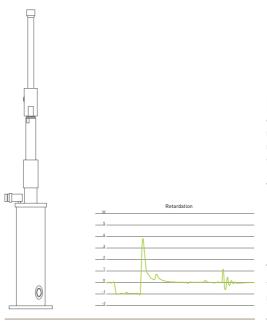


1. No-controlled atmospheric pressure 2. Controlled atmospheric pressure

## MECHANICAL SAFETY COMPONENTS

Emergency stop device Attached to the bottom of the cage, this device grasps the guide rail like a wedge in the event of excessive speed, resulting in outstanding braking force. The special ceramic friction material can maintain frictional force even at high temperatures of more than 1000°C. It offers excellent braking performance and safety by its outstanding thermal resistance and durability.





Fly ball governor A fly ball governor detects abnormal speed and activates an emergency stop when necessary. Speed can be precisely measured even during ultra high speed operation, resulting in a level of safety that befits the elevator's class.



**Three-stage telescopic buffer** The three-stage telescopic buffer reduces shock to the car if the elevator were to descend below the lowest floor to the pit. The buffer can reduce the height in three stages, which improves the use of space with pit depth.

# OPERATION SYSTEM

High efficiency and security are both offered by the double deck system maximizing transport efficiency, the destination floor reservation system, the mobile call system that features the latest technologies, and the remote monitoring system.

# INTELLIGENT BUILDING SYSTEM





operation, handwrite enabled OPB(Operating Panel Board), and crime prevention system.

# DESTINATION SELECTING SYSTEM (DESTINATION FLOOR RESERVATION SYSTEM)

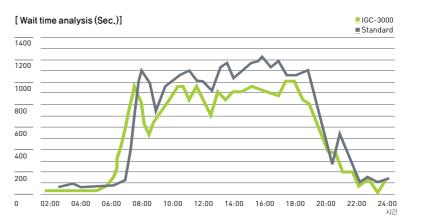


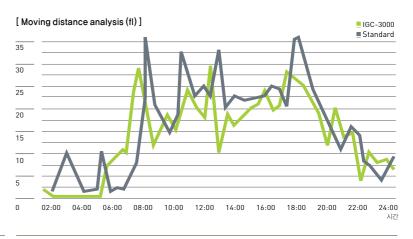
This is a system where you register a destination floor at a landing. The most appropriate elevator is automatically selected. In addition to reducing passenger wait time and unnecessary operation, it enables maximum energy saving.

# ARTIFICIAL INTELLIGENCE-BASED GROUP CONTROL SYSTEM

(IGC-3000)

Artificial intelligence-based analysis of elevator traffic volume allows the system to learn weekly traffic volume and patterns. This enables optimal group management and efficient operation of several elevators.





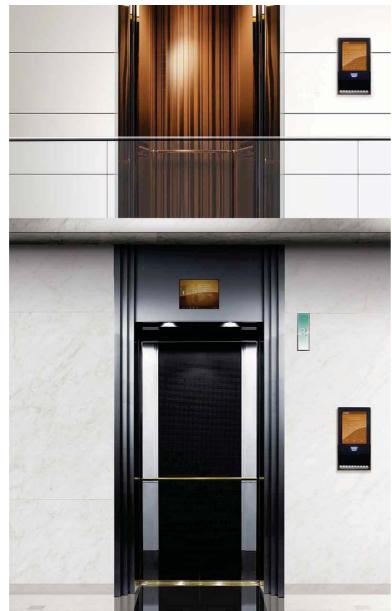
# REMOTE MONITORING AND VIDEO TELEPHONY SYSTEM



Terminals on control panels that are used for collecting and analyzing operation data allow remote real-time monitoring of the operation of elevators across the nation. This prevents breakdowns and accidents. The video telephony system is used to determine the status inside cars through the customer center. This system prevents crime and accidents caused by emergency situations.



# ADVANCED DOUBLE DECK SYSTEM

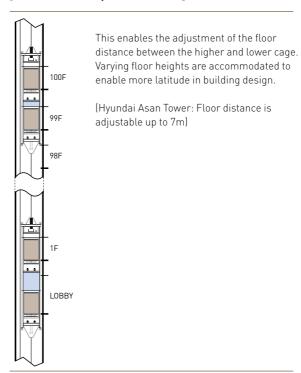




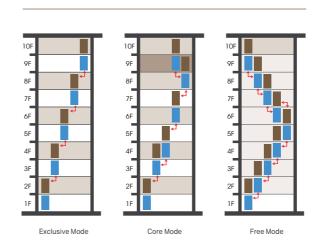
**Higher transport efficiency** Two elevators connected vertically are simultaneously run to offer 1.8 times greater transport capability. Fewer hoistways mean lower construction costs and more available floor space.

**Streamlined capsule design** An aerodynamic capsule design that is applied to airplanes was adopted to minimize air resistance for a smooth riding experience with low noise and vibration.

#### [ Floor distance adjustable device ]



#### [ Three modes of operation of the double deck system ]



The system can be flexibly operated in one of three modes – Exclusive, Core, Free – depending on building characteristics or traffic volume.

Exclusive Mode A typical approach based on odd number floor/even number floor operation

Core Mode Free Mode Top and bottom deck service is enabled for specific floors. The bottom deck services all floors except for the very top floor, while the top deck services all floors except for the very bottom floor.



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# PERFORMANCE

Hyundai Elevator is there for a new ultra high rise building that becomes the latest and greatest landmark in the city.

THE EL is the only elevator that can provide top speed and performance for your ultra high rise building.



BIFC (63 FL.)

Busan, Korea Speed: 540m/min (5units), 480m/min (8units) Total: 30units



Park-Hyatt Hotel (34 FL.)

Busan, Korea Speed: 360m/min (2units) Total: 11units



D-CUBE City
[41 Ft.]

Seoul, Korea Speed: 240m/min (4units) Total: 38units



Venezuela Centro Simon Bolivar

(56 Fl.) (Government Complex)

Songdo I-Tower

Speed: 360m/min(2units)

Incheon, Korea

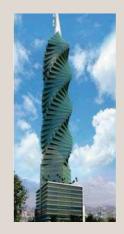
Total: 18units

Caracas, Venezuela Speed: 480m/min (2units), 420m/min (4units), 360m/min (2units) Total: 15units



Lerthai Center [29 Fl.]

Shijiazhuang, China Speed: 360m/min (4units), 210m/min (4units), 180m/min (2units) Total: 10units



Panama Revolution Tower (55 FL.)

Panama City, Panama Speed: 240m/min (5units) Total: 5units



Hilton Panama City Hotel

(53 Fl.)

Panama City, Panama Speed: 240m/min (8units) Total: 31units



Rivage Tower

(68 Fl.)

Panama City, Panama Speed: 240m/min (4units), 180m/min (1units) Total: 5units



Hanoi Landmark Tower

(72 Fl.)

Hanoi, Vietnam Speed: 240m/min (2units), 210m/min (10units) Total: 29units



JW Marriot Tripoli Hotel [39 FL.]

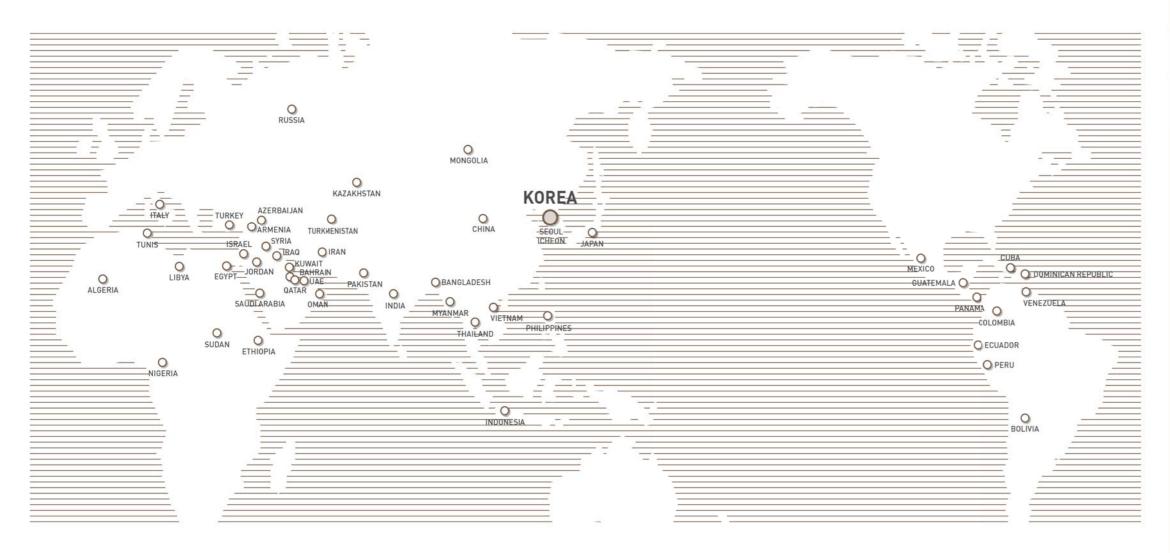
(39 Ft.

Tripoli, Libya Speed: 240m/min (5units) Total: 5units



Varyap Meridian Hotel

Istanbul, Turkey Speed: 240m/min (7units), 210m/min (5units) Total: 53units



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#### Prize & Certification



VDI4707 A class of the TÜV, German



ISO 9001 Quality System Certification



IS014001 Env ronmental System Certification



OHSAS 18001:2007 Safety System Certification



**Excellent Service Quality** Certification



**GD Mark** 

Good Design Certification

**Korea Certification** 



New Excellent Technology Certification



Green Management System Certification



Korea Brand Power Index

## Brand Line up



Speed 1080mpm









Speed 150mpm Rise 100m



High Rise

Mid Rise

Hyundai Elevator offers a lineup that is best for customers' various designs.