ISO 9001 REGISTERED
DNV MGMT. SYS. RvA C024
DNV Certification B.V., The Netherlands

ISO 14001 REGISTERED
DNV MGMT. SYS. RvA C425
DNV Certification B.V., The Netherlands

CE

Total solutions for Movement

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High-Tech New Concept Elevator

Time & Space

Mokdong Hyperion,
Seoul, Korea

Incheon International Airport,
Incheon, Korea

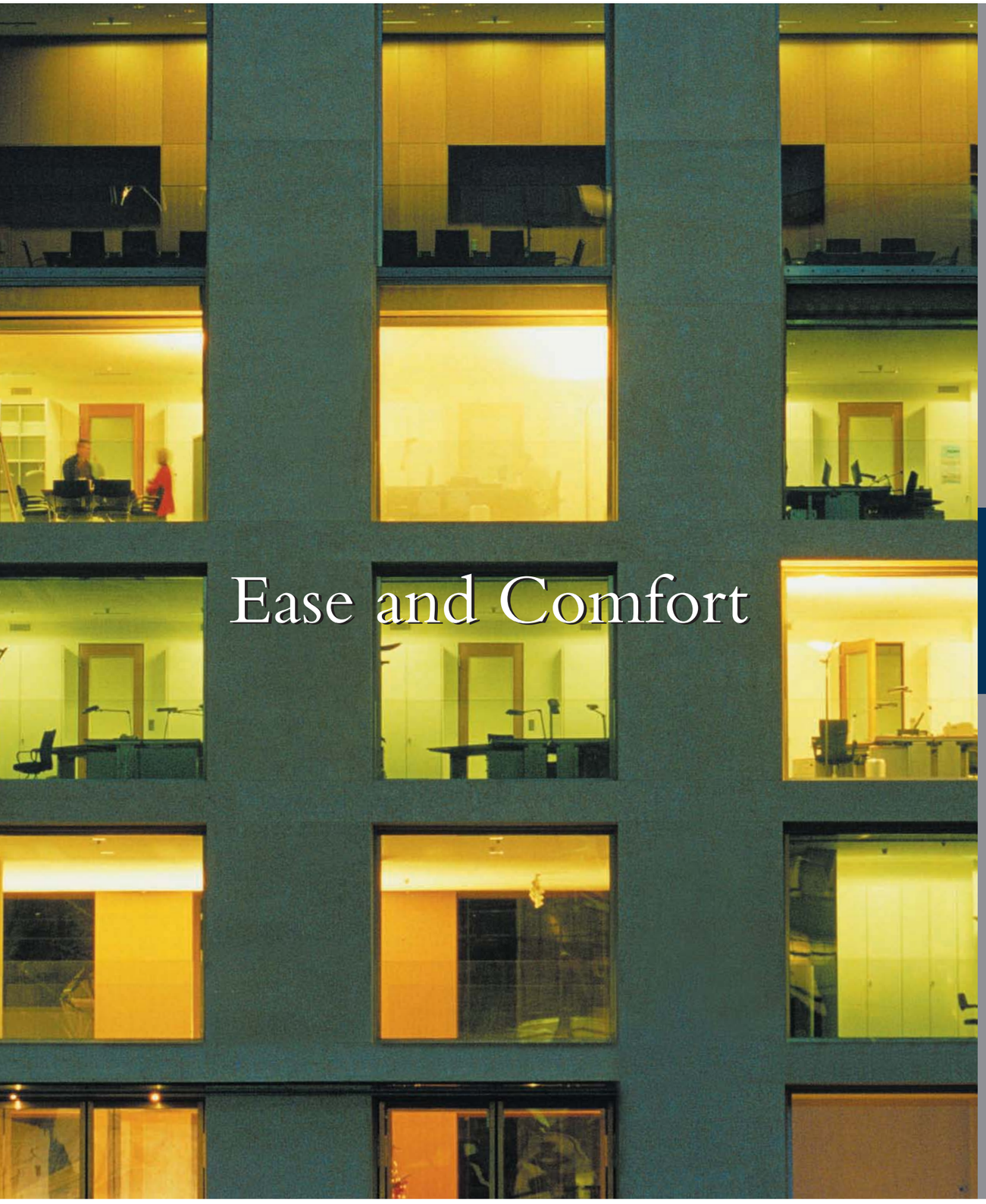
National Agricultural Cooporative Federation
Seoul, Korea

Daechidong Kosmo Tower,
Seoul, Korea

Time & Space, Hyundai's high-speed elevator for passengers, is a high-tech, new concept elevator that realizes a high level of riding comfort and reliability. Time & Space employs a high efficient Gearless Traction Machine with a Permanent Magnet Synchronous Motor, a high precision inverter drive system, advanced microprocessor, and data network systems.

Contents

The super high-speed elevator test tower at Icheon headquarters in Korea is the world's tallest elevator test tower.



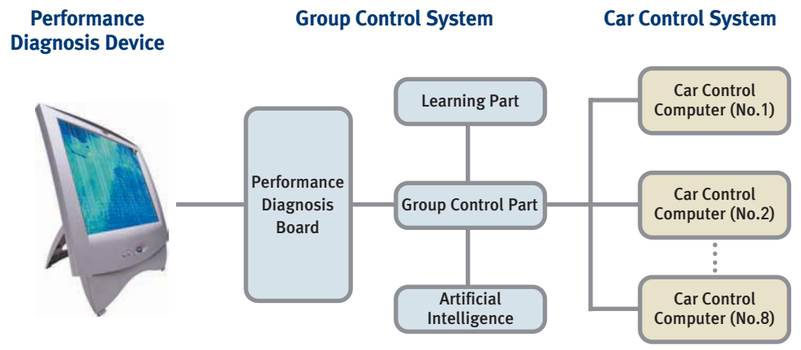
Ease and Comfort

Easy and comfortable space movement begins with Time & Space technology. You will ride in comfort and quietness surrounds you. You will experience a smooth, fast but undistributed ride through space and get to your destination swiftly and comfortably.

Comfort and Safety

We are pursuing reliability and safety

In Time & Space, microprocessors are distributed throughout the elevator system in the car operating panel, hall fixtures, and control system in the machine room, monitoring the elevator operation and maintaining the reliability of the system to ensure passenger safety. The Elevator Data Network collects system operation data from the moment the hall or car call is registered until the passenger arrive at their destination floor.



▪ Self-checking System

Time & Space technology enhances the reliability of the entire system with the use of microprocessors to control speed and movement and has a self-checking system that monitors the safety functions of the operation system.

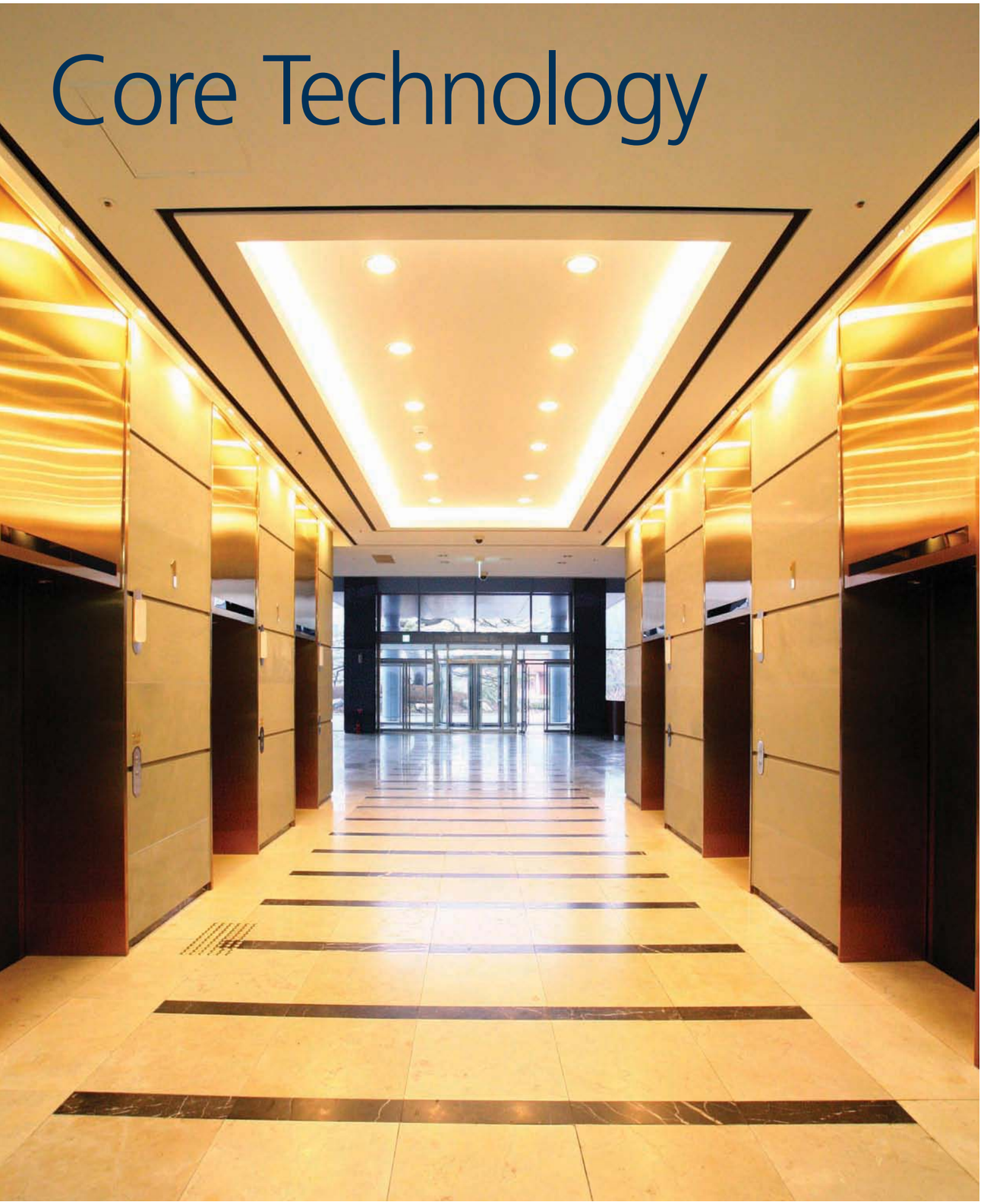
▪ Data Network and Fiber Optic Transmission Device

Fiber Optic is used for the communication between the microcomputers that controls dispatching, car speed and door operations. This provides a fast, accurate signal delivering network. In addition, there are enough optional specifications to meet various passenger needs.

The essence of core technology, the Permanent Magnet Synchronous Motor, is hidden

Gearless Traction Machine with a Permanent Magnet Synchronous Motor, developed for the first time in Korea, is the core technology of Hyundai Elevator, a company striving for passenger's safety and elevator technology for three decades. Discover Korea's high technology in Korea's first core technology, Time & Space.

Core Technology



We guarantee a pleasant and comfortable ride

You will experience new riding pleasure in Time & Space with its adoption of a high efficient Gearless Traction Machine with a Permanent Magnet Synchronous Motor and energy saving inverter (VVVF).

▪ Quiet Ride

Quiet and smooth riding was realized since the optimal control of harmony noise successfully reduced the noise and vibration due to the application of high responding synchronous motor.

▪ Leaner and Lighter

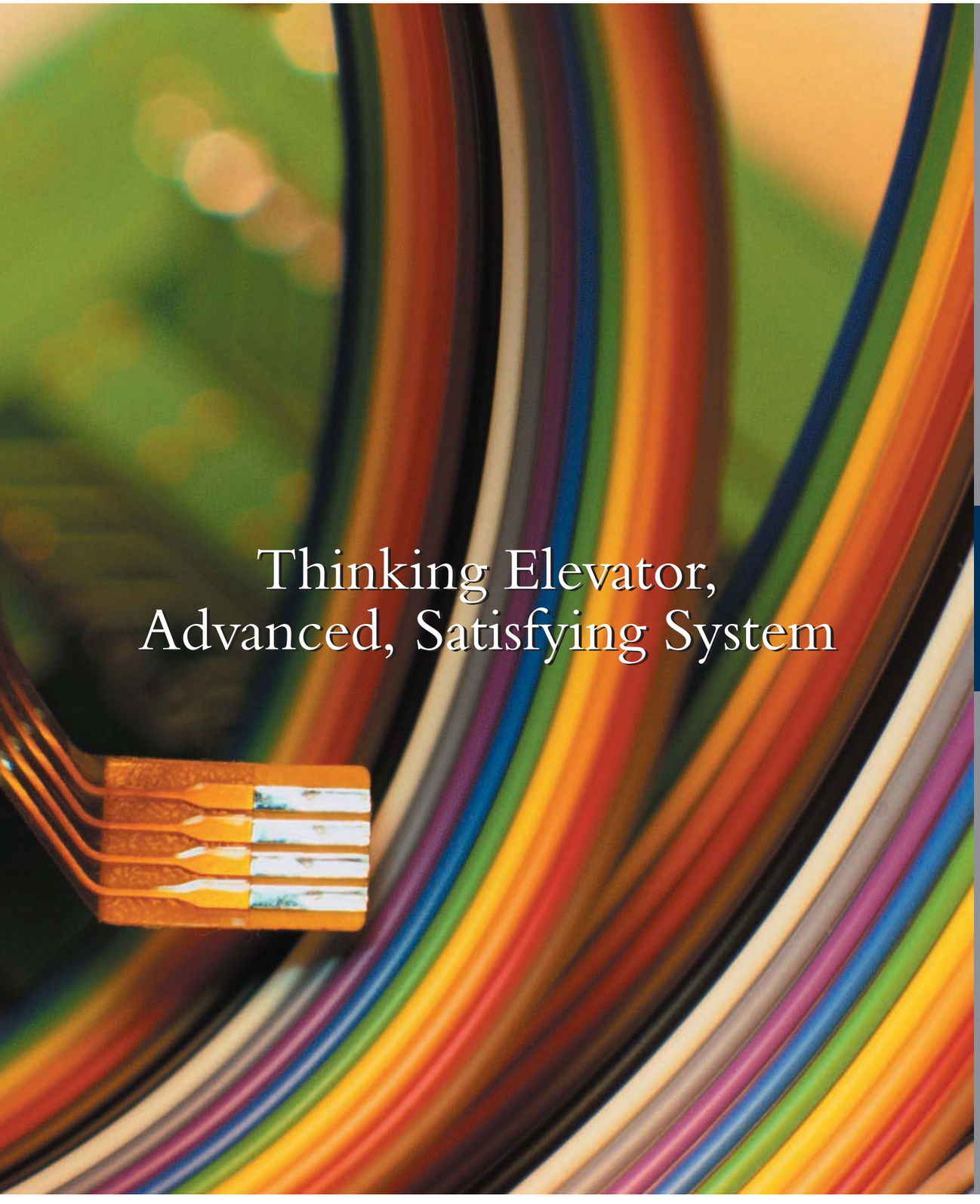
Since Multiple Arrangement is available, the size of the traction machine has become 50% smaller and lighter compared with existing Induction Motor type.

▪ Safe Braking

Double brakes in which one brake takes over if the other does not work were adopted to enhance the level of safety. This product satisfies EN81 of the European elevator standards.

▪ VVVF Inverter Control

The VVVF inverter controls the motor speed at the optimal level by changing the voltage and frequency continuously to provide a super and quiet ride. In addition, a converter for restoring electric power (PWM Converter) is adopted to improve control efficiency.



Thinking Elevator, Advanced, Satisfying System

High technology in elevator is here now. Meet the future-oriented service that Hyundai provides with optional features like EDS(Electronic Display System)- a full- color screen that provides internet-based news, weather, local traffic, and financial market information to elevator passengers. New elevator life style, Time & Space, will be with you in the future.

Smart System

A broad range of information is provided by the elevator

You receive the latest information and various conveniences in Time & Space with the advanced information system of our high-speed elevator.

▪ EDS (Electronic Display System)

Inside or outside of the elevator or at the lobby of the building, an TFT-LCD (Thin Film Transistor-Liquid Crystal Display) or PDP (Plasma Display Panel) provides internet-based information such as car operation, weather, stock price, index trends, and real-time headline news .

▪ Hall Information Display System (IDS-02)

This is an information system to provide simple information such as elevator operation status, weather, stock price, index trends, floor guides, and headline news using LEDs of various colors.

▪ Computer Monitoring

A Monitor in the machine room is provided with each Time & Space to show operational status, and history, error history, and other data that will help trouble shooting and preventive maintenance.

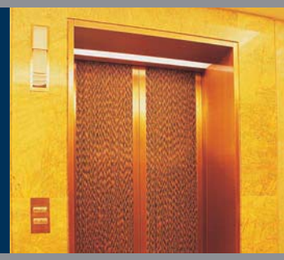
▪ RMS (Remote Monitoring System)

The Time & Space system comes with a RMS(Remote Monitoring System). This system responds ever so quickly to emergency situation, for example, when the elevator will not function due to various reasons including blackout. The emergency is reported to the RMS center through phone line and the maintenance staff receives the trouble call and is on their way for fast recovery.

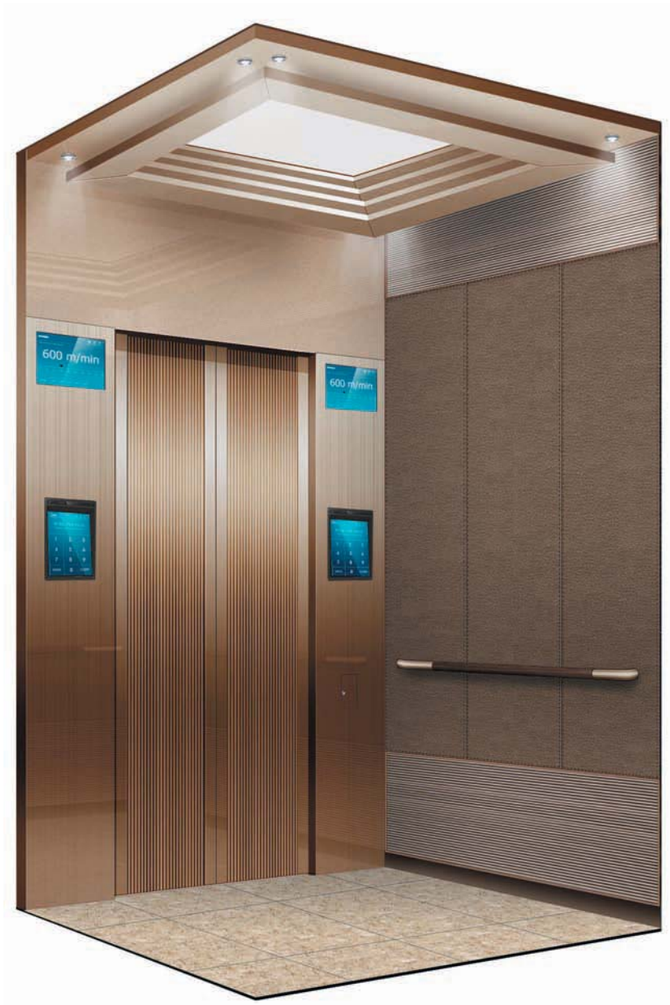
Refined elegance is added for special value

Time & Space

Dignified style delivers placidity. Refined delicacy attracts our attention. A beautiful and special elevator added with high performance increases the value of the building. Increase the value of your building with Time & Space, a deep and special taste.



Car Design SD40



CAGE DESIGN

Ceiling	Titanium Bronze 3S Vibration, Indirect Lighting
Car Wall	System Interior, Bronze (Bonded Metal Delta/Bronze) Titanium Bronze 3S Vibration, Leather
Car Doors	Bonded Metal (Delta/Bronze), Hairline-Finished Titanium Bronze
Operating Panel	Swing Panel, Touch Screen Type Operating Panel (Hairline-Finished Titanium Bronze)
Handrail	Titanium Bronze + Wood
Flooring	Marble (Vlatza/Beige)
Information Display System	LCD Display (Boxless/IDS-01)

ENTRANCE

Landing Doors	Bonded Metal (Delta/Bronze), Hairline-Finished Titanium Bronze
Jamb	Hairline-Finished Titanium Bronze
Position Indicator	PI-D400 (Dot Type)
Hall Button	Micro Push Button (Hairline Etched Titanium Bronze)
Hall Lantern	Acrylic Lens

Note: The colors in this catalogue may vary slightly from actual colors.

Car Design SD41

CAGE DESIGN

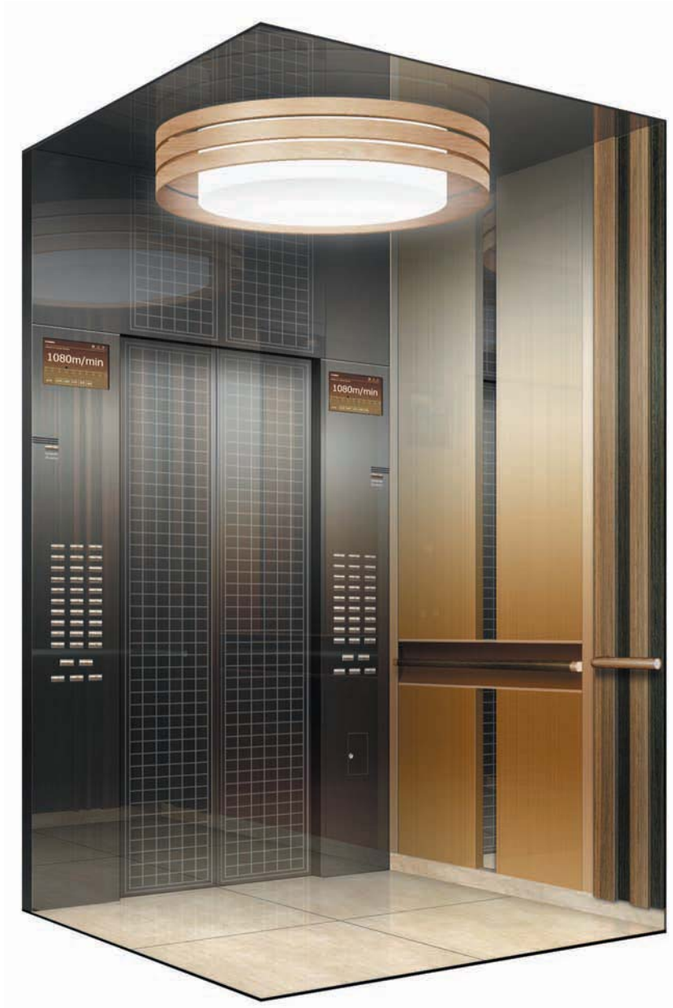
Ceiling	Back Paint Glass, Stainless BA Pattern Blast, Painted Steel, Indirect Lighting
Car Wall	Stainless (Dull Finished Stainless Steel) + Pattern Blast, Stainless Mirror Razer Cutting, Stainless Hairline Trim, Back Paint Glass
Car Doors	Stainless (Dull Finished Stainless Steel) + Pattern Blast
Operating Panel	Return Panel, Stainless (Dull Finished Stainless Steel) + Pattern Blast
Handrail	Stainless Hairline
Flooring	Granite, Stainless Hairline Trim
Information Display System	LCD Display (Boxless/IDS-01)

ENTRANCE

Landing Doors	Stainless (Dull Finished Stainless Steel) + Pattern Blast
Jamb	Stainless (Dull Finished Stainless Steel) + Pattern Blast
Position Indicator	Delux Type (Dot Type)
Hall Button	Micro Push Button

Note: The colors in this catalogue may vary slightly from actual colors.

Car Design SD42



CAGE DESIGN

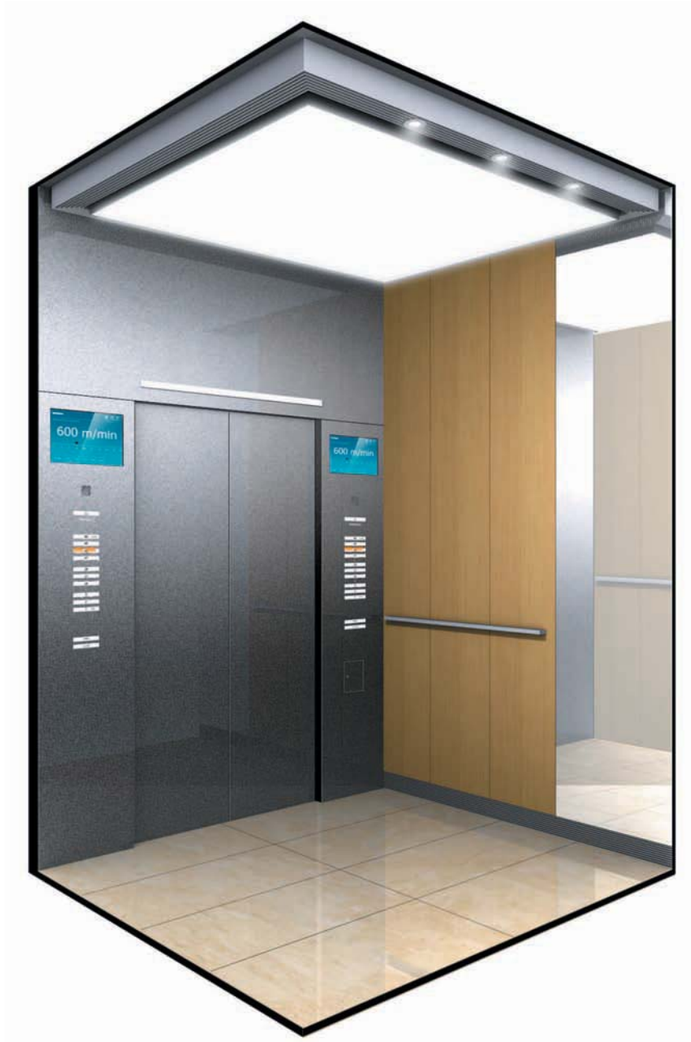
Ceiling	Titanium Black Mirror, Wood Bending, Barisol
Car Wall	Titanium Black Mirror, Brass, Brass Bead Trim (Ebony, Walnut)
Car Doors	Titanium Black Mirror Etching
Operating Panel	Swing Panel (Titanium Black Mirror)
Handrail	Titanium Bronze Hairline, Wood + Titanium Bronze Bracket
Flooring	Marble (Votticino)
Information Display System	LCD Display (Boxless/IDS-01)

ENTRANCE

Landing Doors	Titanium Black Mirror Etching
Jamb	Titanium Black Hairline, LED Arrival Signal Lamp
Hall Button	50 Type, Titanium Black Hairline

Note: The colors in this catalogue may vary slightly from actual colors.

Car Design SD43



CAGE DESIGN

Ceiling	Barisol, Indirect Lighting, Stainless Hairline
Car Wall	Marble (Votticino), Wood (Aniegre), Stainless Mirror, Stainless Mirror Trim
Car Doors	Stainless 3S Vibration
Transom	Stainless 3S Vibration, Arrival Signal Lamp (LED Orange Color)
Operating Panel	Swing Panel, Touch Button (Stainless 3S Vibration)
Handrail	Stainless Bar, Stainless Hairline
Flooring	Marble (Votticino)
Information Display System	LCD Display (Boxless/IDS-01)

ENTRANCE

Landing Doors	Stainless 3S Vibration
Jamb	Stainless 3S Vibration
Hall Button	Touch Button, Acryl
Information Display System	LCD Display (Boxless/IDS-01)

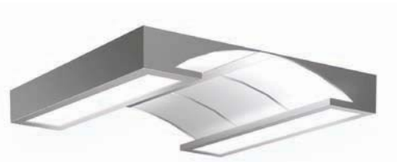
Note: The colors in this catalogue may vary slightly from actual colors.

Ceilings & Signal Fixtures

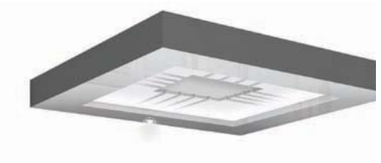
Ceiling

CD291C
- Lumasite
- Stainless Mirror 3S Vibration

CD519D
- Aluminium Silver
- Indirect Lighting
- Convective Air Sterilization System



CD517A
- Stainless Mirror 3S Vibration
- Lumasite
- Painted Steel (White)



CD523A
- Stainless Mirror
- Indirect Lighting
- Painted Steel (White)

Car Operating Panel

OPP-N250 (Swing Panel)
OPP-D250B (Swing Panel)
OPP-N250B (Swing Panel)
OPP-D240B
OPP-N240B
OPP-N240

Note : The colors in this catalogue may vary slightly from actual colors.

LCD Touch Screen

OPT-L260

Selected as 2002
Good Design Product

Hall Lanturn

HLS-640 **HLS-720** **HLS-750** **HLS-760** **HLS-770**
HLS-780 Boxless Type

Type of Buttons

50 TYPE
(Swing Panel Only)

40 TYPE

41 TYPE

Hall Button

HPB-344 (41 Type Button)
HPB-342
HPB-252
HPB-242 Arrival Announcement Lamp
HPB-254 Arrival Announcement Lamp
HPB-640 Boxless Type
HIP-D640 Boxless Type
HIP-D240

Note : HPB-640, HIP-D640,HBI-64A : 30 type button cannot be applied.

Indicator

PI-D600
PI-D110

Note : The colors in this catalogue may vary slightly from actual colors.

Remote Elevator Calling Button

To minimize waiting time at a special floor, a special car calling button can be installed in an office (e.g. Secretary for a CEO office) or in a penthouse (e.g. Penthouse for Executives or Government Officials or Speical Guests) or in a high-rise apartment.

HBI-24A **HBI-24B** **HBI-11A** **HBI-64A** Boxless Type

Information Display System

IDS-01
(LCD TYPE)

IDS-02
(LED TYPE)

Group Control Operating System

The group control operating system is designed to optimize elevator operational efficiency by operating, distributing, and controlling such operation information as location, speed, number of passengers, and registered call numbers for each of the elevators when a hall call occurs. This serves to enhance the overall efficiency of elevator operation.

Basic Functions of Group Control

	Description	Applicable Item by Building Type		
		Office	Hotel	Multiplex Skyscraper
Artificial Intelligence	Artificial intelligence applying fuzzy logic automatically controls ambiguous changes in complex traffic and always provides the best service.	○	○	○
Learning Function	This function learns elevator usage by day and time and sets various operational parameters automatically to enhance group control operational performance.	○	○	○
Forecast Allocation Method	Optimal car usage is determined by forecasting traffic and evaluating elevator suitability for the calls.	○	○	○
Minimize Average Waiting Time	Calls are allocated to minimize the average waiting time of passengers.	○	○	○
Minimize Long Waiting Passengers	When traffic demand is at a high level, the number of passengers waiting for more than 60 seconds is minimized with this controlling function.	○	○	○
Overall Evaluation	The performance of the overall system is improved by evaluating all of the previously registered hall calls as well as the newly registered calls in terms of call allocation.	○	○	○
Multi-purpose Control	Optimal group control is available all the time since items such as waiting time of the basic control target, ratio of waiting passengers, and importance of energy consumption are determined automatically depending on traffic status providing a flexible response to the traffic stream.	○	○	○

Operation Functions

	Description	Applicable Item by Building Type		
		Office	Hotel	Multiplex Skyscraper
Rush Hour Service (Up)	During rush hour, elevators under group control will return to the base floor during intensive service.	○	★	★
Rush Hour Service (Down)	To minimize the waiting time of passengers going downward during rush hour, the down calls are allocated to the nearest elevators.	○	★	★
Peak Traffic Control	Considering other floor services, elevators are allocated to the floors with peak traffic as a priority.	★	★	★
Distributed Waiting Function	Idle elevators are distributed to other floors with higher demand.	○	○	○
Allocation in Priority	Elevators with calls for a certain floor are allocated to that floor as a priority.	○	○	○
Automatic by pass	A full-loaded car will bypass hall calls in order to maintain maximum operating efficiency.	○	○	○
Automatic Separation of an out-of-order Elevator	An out-of-order elevator is separated from group control automatically to isolate its effect.	○	○	○
No Service for Certain Floors	Certain service floors are separated and elevators do not stop at such floors.	○	○	○
Group Control including Elevators for the Handicapped	Elevators for the handicapped are not operated separately but are included in group control.	○	○	○
Cut Service	Certain elevators are cut out from group control and converted to independent operation by the cut service hall button.	★	★	★
Service Reservation Indication	When you press the hall button, the hall lantern Reserved for Service turns on to display that the service is reserved.	★	★	★
Car Arrival Lantern	Lantern begins flashing 4 or 5 seconds prior to car arrival to alert passengers to the arriving elevator.	○	○	○

Standard feature ○ Optional Feature ★

Services

	Description	Applicable Item by Building Type		
		Office	Hotel	Multiplex Skyscraper
Independent Operation	Cars can be separated from group control and converted into independent operation by car calls.	○	○	○
Programmable Door Timer	Timing can be set to automatic control of opening/closing of doors according to the call registered.	○	○	○
Repetitive Door Operation	If the door cannot fully close, it will repeatedly open and close for a specified number of times.	○	○	○
Door Reopen by Hall Button	If the hall button in the same moving direction of the car is pressed when the door is closing, the door will reopen.	○	○	○
Parking	The car can be parked at a specified floor at night or on holidays.	○	○	○
Each Floor Stop	The car can stop at each floor up to its arrival on the specified floor for the purpose of crime prevention during the night or on holidays.	○	○	○
Safety Shoe	If the door cannot fully close because of an object in the door track, it will repeatedly open and close until the object has been removed.	○	○	○
Cancel Reverse Direction Call	Car call registration in the reverse direction can be cancelled.	○	○	○
Anti-Nuisance	Evaluates the number of people in the car and compares that value to the number of car calls registered. If the number of calls exceeds the number of people in the car, the car call exceeding the number of passengers is not registered.	○	○	○
Car Call Cancel	When the registered car call button is pressed, it is cancelled.	○	○	○
Light, Fan Shut-Off	Light and fan in the car are automatically shut off if there is no call registered for a predetermined period of time.	○	○	○
Auxiliary Car Operating Panel	Even when the car is crowded, calls can be registered easily.	★	★	★
Multi-Beam Door Protection	Multi-beam sensor installed in the door senses any obstruction caught in the door, causing the door to reopen, or stay open before the door touches such obstruction.	★	★	★
Photo Eye Door Protection	If the safety ray from the beam sensor in the door is interrupted, the door reopens or stays open.	★	★	★
Voice Guidance System	A synthesized voice instructs passengers on current status, including floor numbers, etc.	★	★	★
Touch Button	Calls can be registered only by touching.	★	★	★
Information Display System	Information display installed on each floor and/or inside the car shows traffic information and other necessary information.	★	★	★
EDS (Electronic Display System)	Inside or outside of the elevator or in the building lobby, an TFT-LCD (Thin Film Transistor-Liquid Crystal Display) or PDP (Plasma Display Panel) provides various information such as news, weather, transportation, financial news, music video, commercials, etc.	★	★	★
Reserving System for Target Floor	The purpose of registration is to automatically select the best service of the elevator car within the system and the passenger does not need to click the car operating button in car. It manages elevator more effectively.	★	★	★

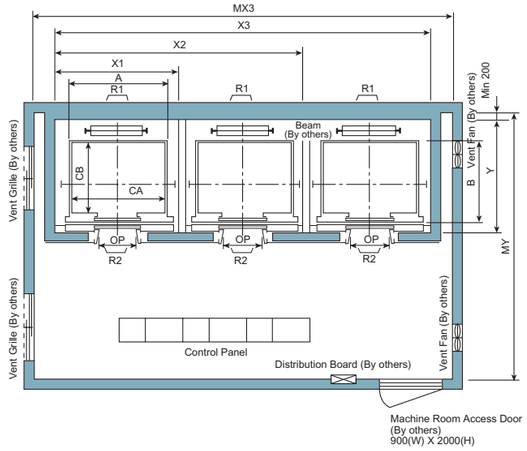
Supervisory Operation

	Description	Applicable Item by Building Type		
		Office	Hotel	Multiplex Skyscraper
Performance Monitoring Function	The operation and performance of the elevator can be monitored in the machine room.	★	★	★
Earthquake Service - S wave	When the seismic sensor detects an earthquake, all cars proceed to stop at the nearest floor to prevent damage.	★	★	★
Earthquake Service - P wave	When the seismic sensor detects a delicate tremor (P wave) before an earthquake (S wave) arrives, all cars in operation are forced to stop at the nearest floor to prevent damage.	★	★	★
Fire Emergency Service	When a fire breaks out, all cars are immediately called to the specified rescue floor for service.	★	★	★
Firefighting Operation	Elevators can be used for firefighting activities with key switches. (Emergency Elevator)	★	★	★
Emergency Power	Service continues by automatically or manually selecting the number of cars covered by the building's emergency power source.	★	★	★
Computer Monitoring System (HELMON)	Monitors operation of all elevators in the building and within the apartment complex. (Floors where the cars do not stop can be set.)	★	★	★
Remote Monitoring System (RMS)	Monitors operation of elevators with RMS remotely by telephone line and computer.	★	★	★

Standard feature ○ Optional Feature ★

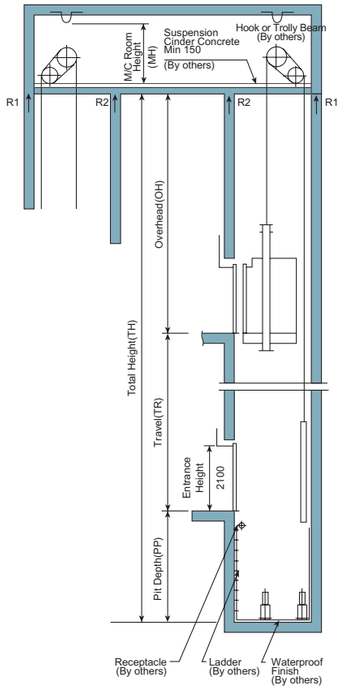
Installation Layout Plan & Standard Dimensions

Plan of Hoistway & Machine Room (In-Line Arrangement of 3 Units)

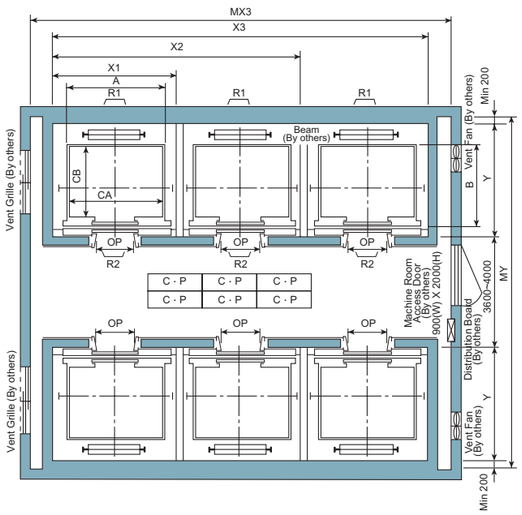


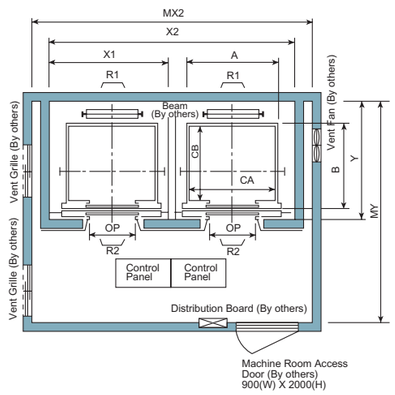
Note : Temperature should be maintained below 40℃ and humidity below 90%, with installation of a ventilating fan, ventilating grille, and air conditioner (if necessary). Toxic gas or dust should not be generated.

Section of Hoistway



Face-to-Face Arrangement





Standard Dimensions & Reactions

(Unit: mm)

Speed(M/Min)	Capacity		Clear Opening	Car		Hoistway				M/C Room				M/C Room Reaction(Kg)	
				Internal	External	1Car	2Cars	3Cars	Depth	1Car	2Cars	3Cars	Depth		
	Persons	(Kg)	OP	CA X CB	A X B	X 1	X 2	X 3	Y	MX 1	MX 2	MX 3	MY	R1	R2
180	13	900	900	1600×1350	1700×1570	2300	4550	6900	2200	2800	5500	7900	4500	12030	6630
				1600×1400	1700×1620	2300	4550	6900	2250	2800	5500	7900	4500		
	15	1000	900	1600×1500	1700×1720	2300	4550	6900	2350	2800	5500	7900	4700	12810	6950
				1600×1550	1700×1770	2300	4550	6900	2400	2800	5500	7900	4700		
	17	1150	1000	1800×1500	1900×1720	2500	4950	7500	2400	3000	6100	8800	4700	13080	7130
			1100	2000×1350	2100×1570	2700	5350	8100	2250	3200	6250	9100	4500		
	20	1350	1000	1800×1700	1900×1920	2500	4950	7500	2600	3000	6100	8900	5000	14360	7650
				1800×1730	1900×1950	2500	4950	7500	2630	3000	6100	8900	5000		
			1100	2000×1500	2100×1720	2700	5350	8100	2400	3200	6250	9100	4700		
				2000×1550	2100×1770	2700	5350	8100	2450	3200	6250	9100	4700		
	24	1600	1100	2000×1750	2100×1970	2700	5350	8100	2650	3200	6250	9100	5000	15090	8080
				2000×1800	2100×2020	2700	5350	8100	2700	3200	6250	9100	5000		
				2150×1600	2250×1820	2850	5650	8550	2500	3400	6500	9400	4900		
				2150×1670	2250×1890	2850	5650	8550	2570	3400	6500	9500	4900		
210 240	15	1000	900	1600×1500	1700×1720		4600	6950	2400		5600	8200	4900	12810	7800
				1600×1550	1700×1770		4600	6950	2450		5600	8200	4900		
			1000	1800×1300	1900×1520		5000	7550	2200		5800	8400	4900		
				1800×1370	1900×1590		5000	7550	2300		5800	8400	4900		
	17	1150	1000	1800×1500	1900×1720		5000	7550	2400		6100	8900	4900	14100	8000
			1100	2000×1350	2100×1570		5400	8150	2250		6200	9000	4900		
	20	1350	1000	1800×1700	1900×1920		5000	7550	2600		6100	8800	5000	15100	8050
				1800×1730	1900×1950		5000	7550	2650		6100	8800	5000		
			1100	2000×1500	2100×1720		5400	8150	2400		6200	9000	5000		
				2000×1550	2100×1770		5400	8150	2450		6200	9000	5000		
	24	1600	1100	2000×1750	2100×1970		5400	8150	2650		6400	9000	5000	15700	8100
				2000×1800	2100×2020		5400	8150	2700		6400	9000	5000		
				2150×1600	2250×1820		5700	8650	2500		6500	9400	5000		
				2150×1670	2250×1890		5700	8650	2600		6500	9400	5000		
300 360	20	1350	1000	1800×1700	1900×1920		5100	7700	2650		6200	9100	6000	17800	13200
				1800×1730	1900×1950		5100	7700	2700		6200	9100	6300		
			1100	2000×1500	2100×1720		5500	8300	2450		6200	9100	5900		
				2000×1550	2100×1770		5500	8300	2500		6200	9100	6300		
	24	1600	1100	2000×1750	2100×1970		5500	8300	2650		6500	9100	6300	18100	13500
				2000×1800	2100×2020		5500	8300	2700		6500	9100	6300		
				2150×1600	2250×1820		5800	8750	2500		6500	9400	6200		
				2150×1670	2250×1890		5800	8750	2600		6500	9400	6300		
420 480 540 600	17	1150	1000	1800×1500				7800	2500			8900	6000		
	20	1350	1100	2000×1500				8750	2500			9500	6300		
	24	1600	1100	2000×1750				8750	2750			9500	6300		

Notes : 1. White colored dimensions shall be applied for Malaysia & Singapore market.
2. The minimum hoistway dimensions are shown on the above table. Therefore, some allowances should be made considering the sloping of the hoistways.
3. Above dimensions are based on center opening doors. For applicable dimensions with side opening doors, consult Hyundai.
4. For elevators with more than 28 persons capacity, consult Hyundai.
5. When non-standard capacities and dimensions are required to meet the local code, consult Hyundai.
6. The capacity in persons is calculated at 68kg/person. (EN81 75kg/person)
7. Above dimensions are applied in case the door is standard. In case fire protection door is applied, hoistway size for 1 car should be applied above X1 dimension plus 100 mm.

(Unit: mm)

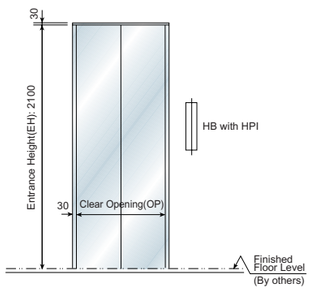
Speed (m/min)	Overhead (OH)	Top Clearance (TC)	Pit (PP)	M/C Room Height (MH)
180	6000	2300	2700	2500
210	6400	2700	3200	2800
240	7100	3350	3850	2800
300	7700	4000	4050	3000
360	7700	4000	4050	3000

Speed (m/min)	Overhead (OH)	Top Clearance (TC)	Pit (PP)	M/C Room Height (MH)
420	9500/8400	6000/4900	5600/4500	3200
480	9500	6000	6000	3500
540	9750	6250	8000	3500
600	9750	6250	8000	3500

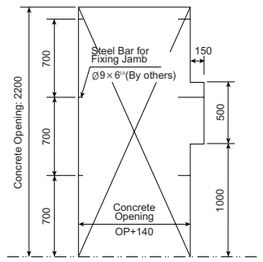
Notes : 1.The above table shows minimum figures. Therefore, some allowances should be made considering errors that may occur during construction.
2. Above dimensions are applied in case car height is 2500 mm. In case car height is over 2500 mm, overhead should be applied above dimension plus additional height.

Typical Entrance Layouts

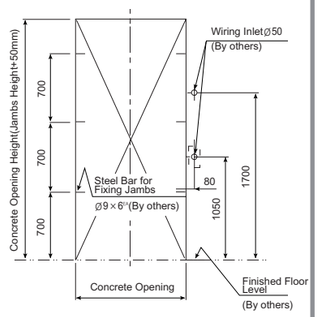
JP050 Type (Basic)



Entrance

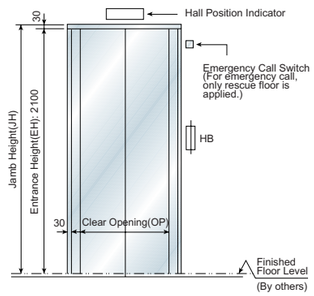


Structural Opening of Entrance

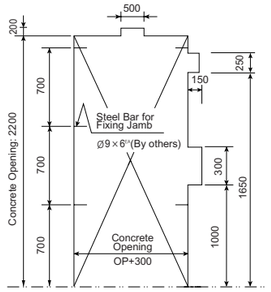


In case of Boxless type Buttons and Fire man's Switch

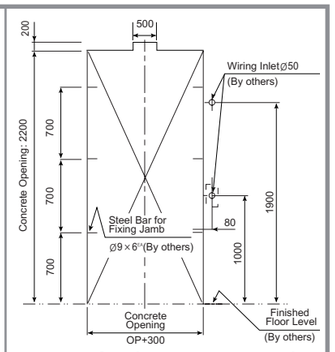
JP100 Type (Optional)



Entrance

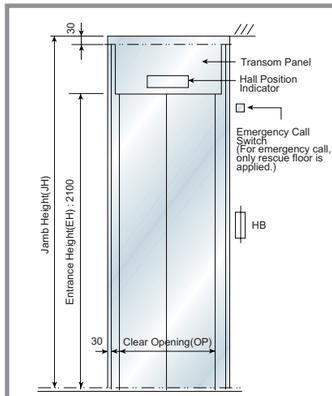


Structural Opening of Entrance

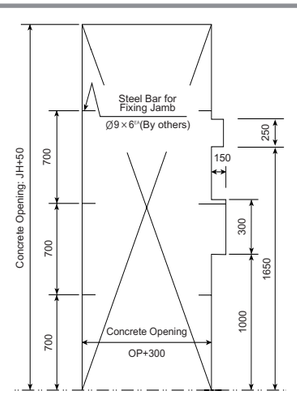


In case of Boxless type Buttons and Fire man's Switch

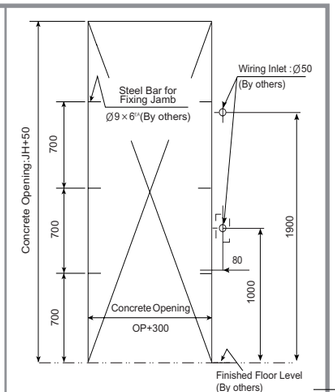
JP200 Type (Optional)



Entrance



Structural Opening of Entrance



In case of Boxless type Buttons and Fire man's Switch

Work to be Done by Other Contractors (Conditions for Estimate)

The following works are not included in the elevator contract, and shall be done by other contractors in accordance with the Hyundai Elevator's drawings and the applicable codes and regulations. The reference rules shown are from ANSI A17.1 Code.

Building Work

■ Hoistway

1. Clear, plumb hoistway with fire resistant hatch walls as required by the governing code. (Rule 100.1a)
2. 75° bevel guards on all projections, recesses or setbacks over 50mm except on side used for loading or unloading. (Rule 100.6)
3. Venting of the hoistway as required by the governing code or authority.(Rule 100.4)
4. Supports for rail brackets at each floor, roof, and machine room.(Rule 200.9)
   Maximum allowable vertical spacing of rail supports without backing. (Rule 200.4 and 301.1)
   Divider beams 100mm between hoistway at each floor and roof, for guide rail bracket supports.(Rule 200.4, 200.9 and 301.1)
5. Recesses supports and patching as required to accommodate hall button boxes, signal fixtures, etc.
6. All barricades either outside elevator hoistways or between inside hoistways as required.
7. Dry pit reinforced to sustain normal vertical forces from rails and buffers.(Rule 106.1b and 109)
   Consult Hyundai Elevator Company for rail forces and buffer impacts. Where there is space below the pit floor which can be occupied, consult Hyundai Elevator Company for special requirements.(Rule 300.4) Cylinder hole, casings under the pit as required and backfilling around the cylinder casings when direct plunger type is to be installed.
8. Where access to the pit is by means of the lowest hoistway entrance, vertical iron ladder extending 1060mm minimum above sill of access door. (Rule 106.1d)
9. Entrance walls and finished floor are not to be constructed until after door frames and sills are in place.
   Door frames are to be anchored to walls and properly grouted in place to maintain legal fire rating.
10. Sill supports 64mm minimum floor recesses full hoistway width for entrance sills, with grouting after sills are set in place.
11. For application as indoor or outdoor observation elevator, a minimum 3.6m high glass enclosure above bottom landing is recommended for safety.
    For application as outdoor observation elevator, full height glass enclosure is required.

■ Machine Room

12. Enclosed and protected machine room. (Rule 101.1)
13. Access to the machine room and machinery space as required by the governing code or authority. (Rule 101.3)
14. Reinforced concrete machine room floor slab or grating, as specified, which must not be placed over the hoistway until elevator machinery is set in position. (Rule 100.3 for Traction Elevator)
    Clear access above ceiling or trench in floor, for oil line and wiring duct from machine room, if machine room is remote from elevator hoistway. (For Hydraulic Elevator)
    Cutout through machine room wall, for oil line and wiring duct as required by the Hyundai Elevator's shop drawings.(For Hydraulic Elevator)
15. Hoisting beams, trap doors and other means of access to machine room for maintenance and equipment removal purposes. (Rule 101.3d)
16. Cable guards in the machine room or secondary level. (Rule 104.1)
17. Supports for machine and sheave beams and reactions including wall pockets and patching after beams are set in place. (Rule 105.1 to 105.5)

Electrical Work

Hoistway

1. Light outlet for each elevator, in center of hoistway(or in machine room)as indicated by Hyundai Elevator Company.
2. Convenience outlet and light fixture in pit with switch located adjacent to the access door. (Rule 106.1e)
3. Wiring and piping work of emergency bell, interphone, etc.
   Outside the hoistway and the machine room.

■ Machine Room

4. Lighting, convenience outlets, ventilation, heating of machine room, and machinery space. (Rule 101.5)
5. Temperature should be maintained below 40°C with ventilating fan and/or air conditioner, if necessary, and humidity below 90%.
6. A fused disconnect switch or circuit breaker for each elevator and light switch located per the governing code and where practicable located adjacent to the door of the machine room. (Rule 210.5 and 306.7)
7. Feeder and branch wiring to the controller, including main-line switch and convenience outlets.
8. Suitable power feeder and branch wiring circuits as required for elevators with power operated doors, including disconnect switch or circuit breaker.

■ Emergency Provisions

9. Elevator fireman's and other emergency services wiring and interconnections to automatic sprinkler systems or heat and smoke sensing devices furnished by others and installed to terminal points on the elevator controllers.
10. When emergency power operation of elevators is required, the electrical contractor should coordinate with Hyundai Elevator Company or local distributor for operation requirements.
11. Elevator fireman's and other emergency service requirements may differ from each country. Consult Hyundai Elevator Company or local distributor for other local requirements.
12. When provisions for earthquake protection are required, consult Hyundai Elevator Company for special requirements.

HEAT EMISSION OF MACHINE ROOM

Q(kcal/H)=W × V × F × N

W: Capacity(kg)
V : Speed
F : Factor
N : Number of cars
F : 1/40-VVVF

Electric Power Requirements (By others)

(50/60Hz, 380V)

Persons (kg)	Speed (m/min)	Motor (kW)	C.B. Rated Current (A)		Transformer Capacity (kVA)		Power Feeder (mm²)		Earth Wire (mm²)		Persons (kg)	Speed (m/min)	Motor (kW)	C.B. Rated Current (A)		Transformer Capacity (kVA)		Power Feeder (mm²)		Earth Wire (mm²)	
			1Car	2Cars	1Car	2Cars	1Car	2Cars	1Car	2Cars				1Car	2Cars	1Car	2Cars	1Car	2Cars	1Car	2Cars
13 (900)	180	16.6	50	100	18	33	10	25	6	16	20 (1350)	240	35	125	200	39	70	35	70	25	50
												300	42	125	225	47	84	35	70	25	50
15 (1000)	180	18.4	60	100	20	37	10	25	6	16		360	50	150	300	56	100	50	120	35	95
	210	23	75	125	26	46	16	35	10	25		420	58	150	300	64	116	50	120	35	95
	240	26	100	150	29	52	25	50	16	35		480	67	175	300	74	134	50	120	35	95
17 (1150)	180	21.2	75	125	24	42	16	35	10	25		540	75	200	350	83	150	70	150	50	120
	210	25	75	150	28	50	16	50	10	35		600	83	225	400	92	166	70	185	70	150
	240	30	100	175	33	60	25	50	16	35	24 (1600)	180	30	100	175	33	60	25	50	16	35
	300	36	125	200	40	72	35	70	25	50		210	35	125	200	39	70	35	70	25	50
	360	43	125	200	48	86	35	70	25	50		240	40	125	225	44	80	35	70	25	50
	420	50	125	225	56	100	35	70	25	50		300	50	150	300	56	100	50	120	35	95
	480	57	150	300	63	114	50	120	35	95		360	60	175	350	67	120	50	150	35	120
	540	64	175	300	71	128	50	120	35	95		420	69	175	350	77	138	50	150	35	120
	600	71	175	350	79	142	50	150	35	120		480	79	200	350	88	158	70	150	50	120
20 (1350)	180	25	75	150	28	50	16	50	10	35		540	89	225	400	99	178	70	185	70	150
	210	30	100	175	33	60	25	50	16	35		600	98	250	500	109	196	95	240	95	185

Notes : 1. The above power sizes are for lengths of electric wire up to 50 meters from the elevator machine room to the transformer.
For lengths of 50 meters or more, the following formula should be applied :

$$\text{Power feeder size (mm}^2\text{)} = \frac{\text{Power feeder length (m)}}{50} \times \text{size in the above (mm}^2\text{)}$$

Number of elevator(N)	1	2	3	4	5
Diversity factor	1.00	0.91	0.85	0.80	0.76

2. Above power feeder sizes are for copper wires inside electro-metallic tubing.
3. It is recommended a larger diameter earth wire be used.
4. For installing several elevators, apply the following formula.
   Transformer Capacity (kVA) = Number of elevator X Diversity factor
5. For AC-Geared elevators, consult Hyundai Elevator.
6. Consult Hyundai if you need eletric power requirements for 220v.