### Functions and options of the H.Solution

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
<th>HRGC-100 (general type)</th>
<th>HRGC-1000 (standard type)</th>
<th>HRGC-3000 (premium type)</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic operation</td>
<td>Automatic operation of one elevator by separating it from group control operation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>VIP operation</td>
<td>Exclusive operation by VIP call signal</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>NEAR MISS restriction</td>
<td>When high-speed elevator is operated in same direction within the same hoistway, occurrence of noise/vibration due to air current is suppressed.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>DOOR TIME auto adjustment</td>
<td>Automatically controls opening/closing time depending on floor, car type, and traffic situation.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Function for changing departure base floor</td>
<td>Function that can change departure base floor</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Function for changing service floor</td>
<td>Changes service floor by controlling switch or using E/L monitoring panel</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>System BACKUP function</td>
<td>Uses double-calculation micom configuration to operate group control as assistant group controller in case of failure of main group controller</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Device to display platform information</td>
<td>Device for displaying E/L information, building information, and general information on the screen for passengers waiting for elevator</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Device for displaying information in the elevator</td>
<td>Device for displaying elevator information such as floor and location and general information in text or video for the passengers in the elevator</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Elevator monitoring system</td>
<td>System that monitors elevator operating status, change operation item on group control, and controls monitoring function using personal computer</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Remote monitoring control system</td>
<td>System that uses central computer and communications network installed in the maintenance center to inspect operating status of elevators on a 24-hour basis.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Collective function for group control performance</td>
<td>Can display operating status of elevator group control into statistics so that collective function for group control operation can be achieved using computer</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

### Items that are added and changed in system upgrade

<table>
<thead>
<tr>
<th>Category</th>
<th>Parts</th>
<th>Independent</th>
<th>Group control system</th>
<th>Group control system</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>△ HRGC-100</td>
<td>△ HRGC-1000 HRGC-3000</td>
<td>△ HRGC-1000 HRGC-3000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>△ HRGC-100</td>
<td>△ HRGC-1000 HRGC-3000</td>
<td>△ HRGC-1000 HRGC-3000</td>
<td></td>
</tr>
<tr>
<td>Main group controller</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Double-calculation back up system</td>
</tr>
<tr>
<td>Auxiliary group controller</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Double-calculation back up system</td>
</tr>
<tr>
<td>E/L monitor for destination selecting system</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Double-calculation back up system</td>
</tr>
<tr>
<td>Group control communication board for each elevator</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Double-calculation back up system</td>
</tr>
<tr>
<td>Power supply device for group control board</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>Uninterruptible Power Supply (UPS)</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>For ten-key destination selecting system Power supply device</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>Group control communication cable for each elevator</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>Billet removal swing panel within the elevator</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>LCD to display registered floors</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>Destination selecting system communication cable</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>Elevator lantern</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
<tr>
<td>Emergency sign for elevator</td>
<td>△</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>DC24V 1.5A</td>
</tr>
</tbody>
</table>

Available types: STVF, FIVF3, FIVF4, T&S, HSVF, WBVF, WBHS, SUVF

www.hyundaielevator.com

H Solution Group control system Destination Selecting System C-GCS-E0117 / 2017. 12 / 1st edition

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Hyundai Elevator
H.Solution
Offers the fastest and most effective movement

H.Solution is an elevator operation system that offers the most effective elevator operation that is suitable for the purpose and characteristics of each building.

- Group control system
- Destination selecting system
It controls movement by integrally managing and controlling several elevators in a group. This is a system that encourages passengers going in the same orientation to board the first arriving elevator.

Characteristics of group control system
- Designates one elevator that arrives the earliest.
- Use a conventional operating method.
- Able to change destination floor after boarding the elevator.
- Suitable for places where residents amount to 1,000 or less such as apartment complexes, small and medium-sized offices, and shopping malls.

As an advanced group control system, it is a system that features improved operation efficiency of elevators by encouraging passengers going in the same orientation to board the first arriving elevator and reducing waiting time and boarding time.

Characteristics of destination selecting system
- Minimizes number of stops to reduce boarding time.
- Designates elevator depending on the destination and improves operation efficiency of elevators by up to 20-30% by reducing waiting time and congestion in lobby.
- Easy to expand additional functions and to be linked to security system in the building.
- Suitable for places where residents amount to 1,000 or more such as skyscrapers, small and medium-sized offices, and shopping malls.

Effect of introducing destination selecting system

H company building (20 floors)
Waiting time is reduced by 24.8 seconds (▼29%)

K company building (33 floors)
Waiting time is reduced by 14.6 seconds (▼34%)

It dramatically reduces time needed for waiting for elevators at the platform and congestion in lobby to improve operation efficiency of elevators. Successful cases prove the excellence of the destination selecting system.

Before adaptation
After adaptation

Select your destination.

```
1 2 3
4 5 6
7 8 9
P 0
```

Destination Selecting System

Effect of introducing destination selecting system

H company building (20 floors)
Waiting time is reduced by 24.8 seconds (▼29%)

K company building (33 floors)
Waiting time is reduced by 14.6 seconds (▼34%)

It dramatically reduces time needed for waiting for elevators at the platform and congestion in lobby to improve operation efficiency of elevators. Successful cases prove the excellence of the destination selecting system.
Hyundai Elevator H.Solution achieves optimal operation efficiency by using the latest artificial intelligence technology. It provides customers with a complete movement system based on its advanced smart service.

**Customizing Service**
*Customized system that considers characteristics of each building*

It establishes a system that is suitable for a building’s characteristics and uses a simulator to provide an optimal operation plan that is suitable for each building. Also, it provides a solution for improving traffic in rush hours. It can be optimally used on different types of buildings ranging from low-rise buildings to skyscrapers that have 60 floors or more.

**Artificial Intelligence**
*Adaptation of deep learning artificial intelligence algorithm*

Based on artificial intelligence analysis on elevator traffic, it learns weekly estimated traffic and patterns for optimal group control, which enables effective control and operation of several elevators.
Hyundai Elevator pledges to provide the highest satisfaction based on priority customized service. We always strive for customer’s safety and convenience and watch for customer’s preferences in order to achieve customer’s satisfaction.

**Stylish Design**

Customized design considering building’s characteristics

Not only is destination input device provided by Hyundai Elevator excellent in functionality such as audio guidance and linkage to card key, but also has refined design, which enhances building’s quality.

**Touch screen destination input device (audio guidance and card key linkage are provided)**

E/L floor, E/L status, destination can be marked

---

**Ten key destination input device**

Capacitive ten key (audio guidance)

- Push button

---

**HT5-A02**

- LCD, card key

**HT5-B01**

- Audio, satisfies EN 81 code

**HT5-K01**

- Applied LED light at the bottom

**HT5-C01**

- For the disabled, audio

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**Performance of Hyundai Elevator H.Solution**

- **LG U+**
  - New building in Yongsan
  - Adaption of destination selecting system
  - Speed: 6-10 m/s
  - Serves 62 floors service

- **BIFC, Busan International Finance Center**
  - Adaption of destination selecting system
  - Speed: 6-10 m/s
  - Serves 62 floors service

- **DAISHIN Securities, New building in Myeong-dong**
  - Adaption of destination selecting system
  - Speed: 6 m/s
  - Serves 28 floors service

- **Turkey Metropol Istanbul**
  - Adaption of destination selecting system
  - Speed: 10 m/s
  - Serves 67 floors service

- **Malaysia KL Gateway Office & Residential Towers**
  - Adaption of destination selecting system
  - Speed: 4 m/s
  - Serves 48 floors service

- **Panama Hilton Hotel**
  - Adaption of destination selecting system
  - Speed: 4 m/s
  - Serves 62 floors service

- **DAISHIN Securities**
  - New building in Myeong-dong

---
H.Solution Application Map

**H.Solution product**

<table>
<thead>
<tr>
<th>Category for group controller</th>
<th>Number of group control</th>
<th>Number of floors/adapted</th>
<th>Characteristics</th>
<th>Buildings adapted</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRGC-100 (general type)</td>
<td>2 - 6</td>
<td>64 floors or below</td>
<td>• Fuzzy + ETA assignment</td>
<td>Adaptation to small and medium size building</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Neural network learning function</td>
<td>When adapted to elevator without a machine room (MRL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>When adapted with default specifications</td>
</tr>
<tr>
<td>HRGC-1000 (premium type)</td>
<td>2 - 8</td>
<td>96 floors or less</td>
<td>• Game tree + ETA assignment</td>
<td>Adaptation to medium and large size buildings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Deep-learning function based on ANFIS*</td>
<td>When adapted to elevator without a machine room (MRL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Adapted expert system</td>
<td>Linked to security of building having 6 or more elevators</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>When there are too many residents compared to the number of elevators</td>
</tr>
<tr>
<td>HRGC-3000 (premium type)</td>
<td>2 - 10</td>
<td>128 floors or below</td>
<td>• Game tree + ETA assignment</td>
<td>Adaptation to high-rise and skyscrapers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Deep-learning function based on ANFIS*</td>
<td>When adapted to variable double deck</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Adapted expert system</td>
<td>When there are too many residents compared to the number of elevators</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Installation of control panel separately designed for group controller</td>
<td></td>
</tr>
</tbody>
</table>

*Game Tree: An optimization technique that compares every assignment method

**H.Solution selection guide**

**9 - 10 Destination selecting system**

- Destination selecting system
- Group Control System

**7 - 8 Destination selecting system**

- Destination selecting system
- Group Control System

**3 - 6 Destination Selecting system**

- Destination Selecting System
- Hotel - Apartment - Office
- Shopping mall - Hospital

**2 Destination Selecting system**

- Destination Selecting System
- Group Control System

**Number of elevators**

- Single deck
- Double deck or double + single deck

**Functions and options of the H.Solution**

- **Adapting function**
  - Optimal control of building/traffic volume through application of the latest AI technology
- **Learning function**
  - Improves group control performance by conducting learning by day/time zone
- **Adaptation of variable speed elevator**
  - Optimal control of elevator where speed varies depending on elevator load
- **Adaptation of double deck and double + single deck**
  - Optimal control for group control on double deck or double + single deck
- **Predictive assignment type**
  - Optimal control after conducting comprehensive evaluation on present/future traffic situations
- **Evaluation on weighted waiting time depending on estimated number of passengers**
  - Reduces congestion in platform by providing service to the floor where it is expected to have many passengers waiting for the elevator
- **Linkage control of security system in the building**
  - Can control personnel having access to each floor by linking with security systems within the building (cardkey, speed gate, destination selecting system)
- **Hybrid destination selecting system**
  - Installs destination selecting system at the floor where it is frequently congested and general hold button at other floors (used call button in the elevator)
- **System control by experts**
  - Provides solutions for improving traffic during peak congestion
- **Casual waiting status of the elevator**
  - Controls operation so that at least one elevator can stand by at the floor
- **Commuting hour service**
  - Controls operation so that several numbers of elevators can stand by at the floor during peak hours
- **Lunch time service**
  - Controls operation so that several numbers of elevators can stand by at the floor during peak hours
- **Closing hour service**
  - Minimizes waiting time by distributing elevators during peak hours
- **After lunch time service**
  - Minimizes waiting time by distributing elevators during peak hours
- **DT peak hour service**
  - Reduces power consumption by minimizing unnecessary operations during night time
- **Distribution service during commuting hours**
  - Distributes elevators into low-floor and high-floor elevators during commuting hours to maximize transportation ability
- **Centralized service on certain floors**
  - Executes multi-batch in order to solve temporary congestion within a short period of time
- **Multiple objective control evaluation type**
  - Can select certain objectives such as focusing on waiting time, changing operating floors, and designating certain floors
- **Controls stop status on the floor**
  - Every elevator that passes by departure floor stops at the base floor
- **Power saving service**
  - Executes power saving operation by minimizing number of operating elevators when the number of passengers is reduced
- **Controller priority assignment**
  - Assigns the elevator that has been called upon from adjacent floor
- **Estimated control for capacity**
  - Estimates the number of passengers to control capacity in advance and improve operation efficiency
- **Exclusive operation**
  - Operated exclusively by car call separately from operation of group control
- **Displays arrival alarm**
  - Generates signal that can be recognized visually / audibly at the time when car speed is reduced
- **Prompt notification function**
  - Generates a signal that can be generated visually / audibly by selecting the car to be serviced immediately after the call is registered
- **Displays the selected elevator**
  - Turns on lantern on the elevator that leaves from base floor to provide customers with convenience
- **Cancel registration**
  - Press the button once more to cancel the registration (only available in group control system)

- **HRGC-1000**: Planned to be launched in March, 2018.

- **HRGC-1000**: Planned to be launched in March, 2018.