



# Schindler Modernization

## Staying Ahead of the Game



Jardine Schindler



**Schindler**

# Keeping pace

Capacity shortages, long waiting times, high energy consumption and new regulations may affect existing elevators. As an elevator system ages, its maintenance and operating costs increase over time and it may no longer be performing well enough to deliver service on par with new buildings in the vicinity.

Nowadays, tenants expect more than just safe mobility, they also aspire for modernity and best-in-class performance.



# A tailor-made approach to modernization

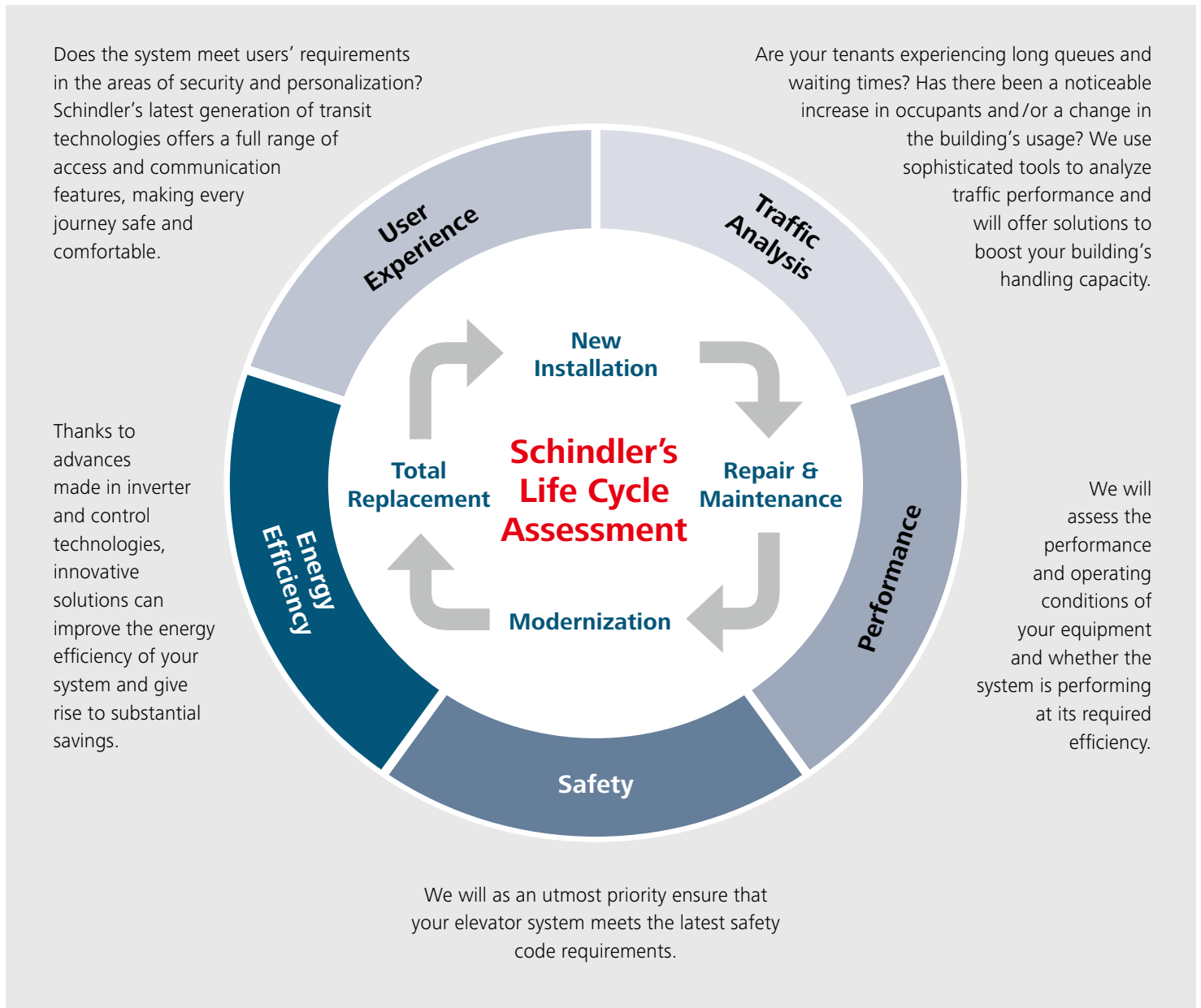
## Schindler's life-cycle assessment

We are here to help you go through this process step by step.

Schindler will perform for you a thorough life-cycle assessment (LCA) to better understand how your mobility system performs over time. Scrutinized areas include safety, performance, energy-efficiency, aesthetics, traffic performance and user experience.

Based on the LCA, we will identify areas with potential for improvement and propose modernisation or replacement packages that suit your objectives, requirements, priorities, budget and timing, so that you can enjoy the utmost benefit from the process.

In effect, the LCA will help you decide on what, when and how to modernize.



# The path to modernization

## A suite of solutions to match your priorities

Thanks to our systems' modular design, a modernization exercise can range from a single component upgrade to a full replacement. We will propose you a modernization approach that best suits your equipment condition and your requirements.

### Phased Modernization (PM)

#### A step-by-step solution

A phased modernization approach enables you to plan according to your project schedule and financial planning. The phases may involve replacing an existing control system with a new Transit Management System, or an obsolete inverter system with the latest green technology. This tailor-made program reduces initial investment and allows for each step to improve performance while reducing service disruption. Versatility is the key.

Phased Modernization	Controller & Inverter	Machine	Car door	Car interior & fixtures, landing door	Elevator Car	PORT Technology
<b>Phase 1</b> Performance Upgrade	✓	✓	✓			
<b>Phase 2</b> Aesthetics Enhancement				✓	✓	
<b>Phase 3</b> Transit Management						✓

### Full Modernization (FM)

#### A one-stop solution using state-of-the-art technologies

Core equipment including the controller, inverter, machine, doors and interior can be replaced in one step to achieve the best combination of energy efficiency and performance.

Full Modernization	Controller & Inverter	Machine	Car door	Car interior & fixtures, landing door	Elevator Car	PORT Technology
<b>Full Modernization</b>	✓	✓	✓	✓		

### Replacement (RP)

#### The best solution for aged equipment

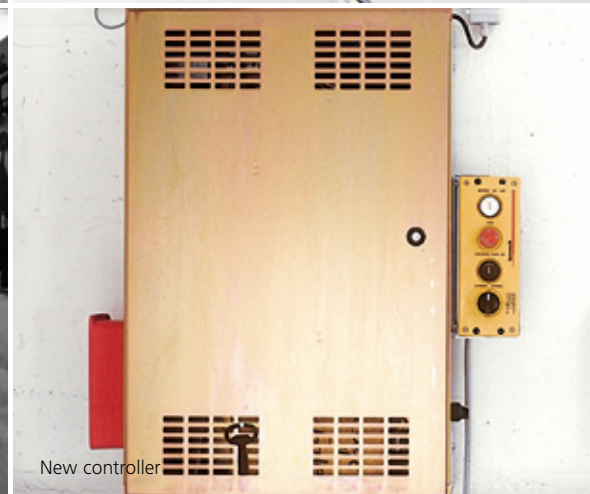
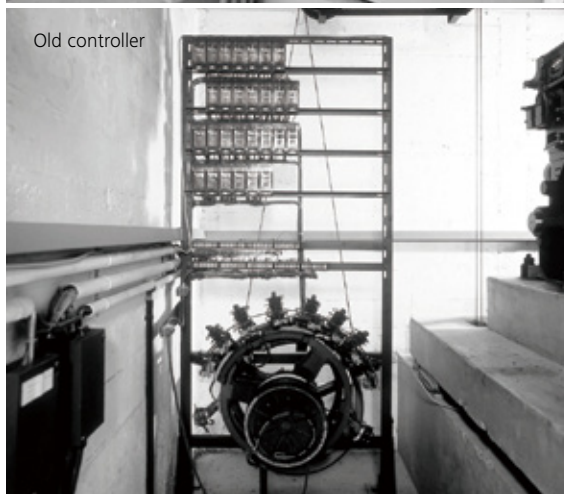
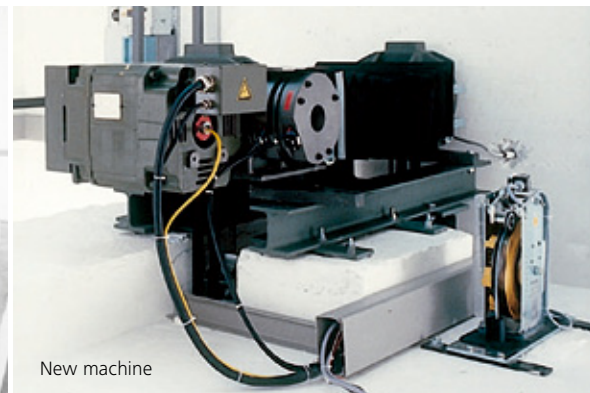
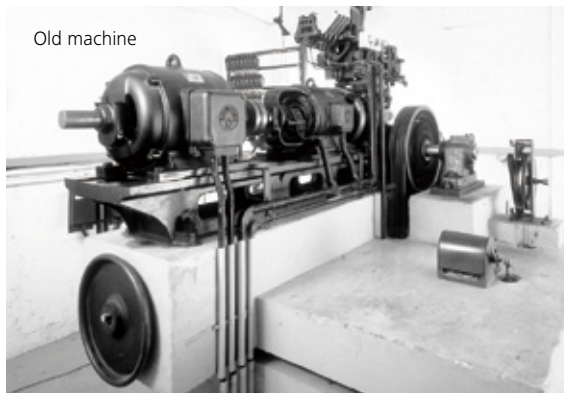
All equipment can be replaced with a brand new elevator with the choice of retaining the landing door / architrave, guide rail and/or counterweight to reduce the builder's work.



# A strong boost to performance

The performance of ageing equipment rarely compares well with that of newly installed systems. This may lead to a whole range of issues, including inefficiencies, lack of reliability, higher running costs, safety concerns and /or a generally unpleasant experience for the building occupants.

Schindler's modernization solutions are designed to help a building boost its elevator performance while delivering significant energy savings. All components in our smart, fully engineered products – from inverters to controllers, doors and cars – interact perfectly, thus maximizing efficiency.



## A state-of-the-art controller that enhances the performance of your elevator group

Schindler's control system modernization brings the latest microprocessor technology to your existing elevators, and a much higher capacity to perform real time traffic calculations. Simply replacing key components of your elevators with state-of-the-art systems can actually make your elevators perform even better than when they were brand new, and improve user experience.

### Other benefits of a controller modernization include:

- Superior ride comfort, thanks to better controlling of the inverter to provide a smooth start up;
- More efficient dispatching due to more advanced computing technology;
- More consistent car leveling and improved safety;
- Increased reliability;
- Adjustable full-load bypass;
- Diversified operating modes to suit traffic conditions.

## High-efficiency inverters

### Direct Current (DC) inverter

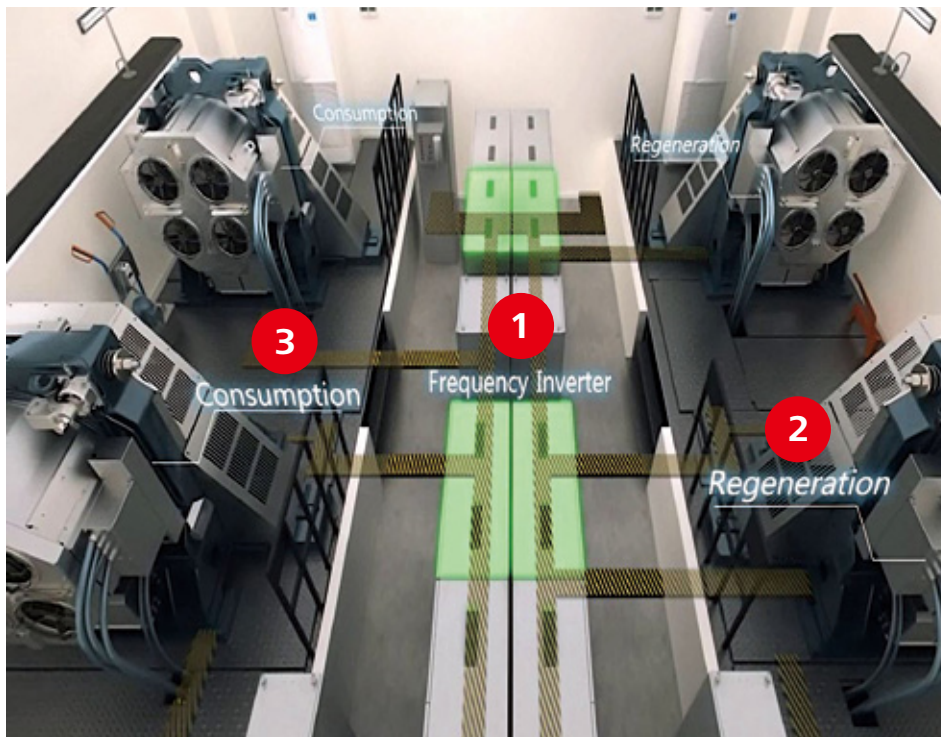
Quite often, a one-off replacement of all old and large DC machines in a building can be too costly and impractical for building operators. An alternative approach is to convert an existing DC machine (provided that it is in a good working condition) and controller to a variable frequency (VF) system simply by installing a new VFDC inverter.

You can always decide in a later phase to replace less efficient DC machines with highly

efficient Alternating Current (AC) machines with permanent magnet motors.

### Power Factor One (PF1) Regenerative Drive

Schindler Power Factor One (PF1) inverters feed power generated by the elevator back into the building's power grid. The regenerated energy is fully compatible with the building mains with a total harmonic distortion (THD) of less than 5%.



- 1 The PF1 module enables bi-directional energy flow and feeds the regenerated energy to the main power supply
- 2 Energy is generated during heavy load down or light load up
- 3 Energy is consumed during heavy load up or light load down

**PF1 Regenerative Drive. The regenerated power can be consumed by other electrical systems in the building, such as other elevators, lighting or air-conditioning.**

## Machines that maximizes power utilization

In the case of older machines requiring full replacement, Schindler offers a full range of machines with asynchronous or permanent magnet (PM) motors to suit various applications. A modular asynchronous machine is designed for higher efficiency and performance, while a PM machine with a PF1 drive would yield the best combination of efficiency and energy regeneration.

Upgrading to the latest inverter and machine technologies brings significant improvement in elevator performance, leveling precision, reliability and ride comfort, as well as substantial energy savings.

# Achieve tangible energy savings

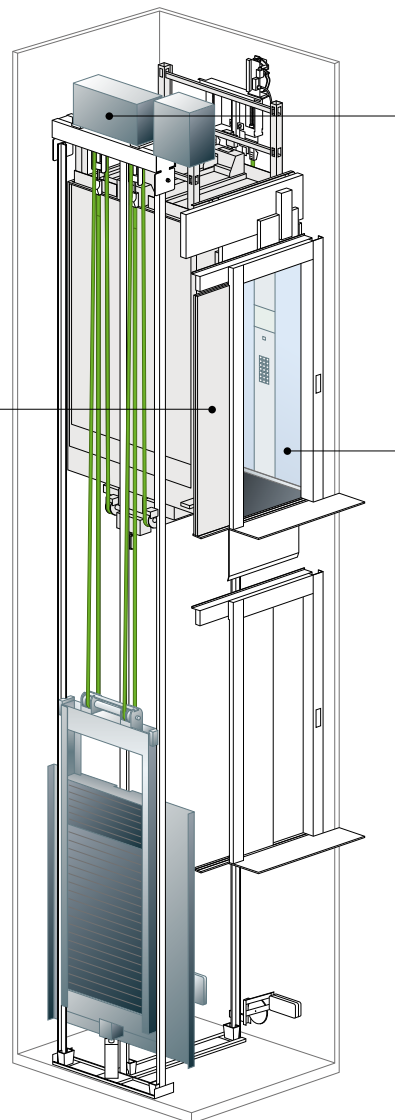
Sustainability, energy efficiency and environmental impact are now amongst the key considerations for developers. These concerns and larger focus on greener operation have been met with an extensive set of technical solutions that may not have been available at the time your equipment was first installed.

Schindler offers many innovative solutions that improve your transportation systems' energy efficiency and cut your building's carbon footprint and electricity costs.

## Selected green features for elevator systems

### Controls

- Automatic sleep mode for components during non-peak hours
- ECO Mode switches non-essential elevators to standby mode during non-peak hours
- Latest control system with intuitive real-time traffic management, minimizes empty car operation
- Advanced transit management system promotes direct travel with fewer stops



### Machines

- State-of-the-art gearless machines with maximum mechanical and electrical efficiency
- Outstanding inverter architecture with low harmonic content
- Regenerated energy is fed back into the building's power grid

### Elevator cars

- Reduced weight
- Car lighting is automatically switched off when elevator is not in use
- LED car lighting
- Use of highly efficient roller guide shoe ensures a smooth ride with less friction

### Solution

### Typical Energy Savings (non-cumulative)\*

Power Factor One (PF1) Regenerative Drive	30% to 55%
DCVF Inverter	25% to 50%
VVVF Control	20% to 60%
Change old machine to ACVF machine	10% to 25%
Planetary Gear vs Worm Gear	10% to 25%

#### \* Remarks:

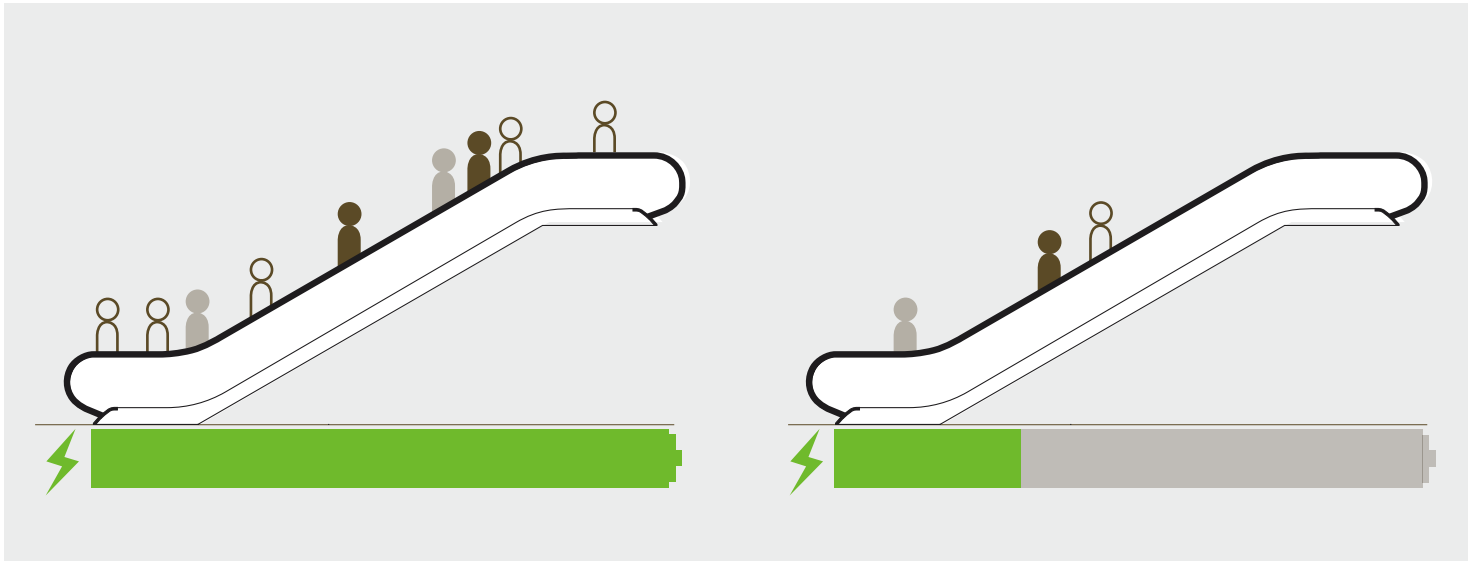
- 1) The specifications, options, solutions and estimates of energy savings expressed within this brochure are indicative only.
- 2) Actual energy-savings results depend upon the condition of the existing equipment, the model and package offered and the passenger flow pattern.



## Selected green features for escalator systems

Older escalators and moving walks that are not equipped with frequency converters are not energy-efficient. These equipment often run for relatively long periods of time during off-peak hours without being used at all.

Schindler's ECOLINE energy saving packages can help you cut energy consumption. Our goal will be to boost efficiency without affecting passenger flows. Depending on the package, power consumption can be reduced by up to 36% compared to continuous operation.



Remarkable power-saving due to Schindler's smart power management

### SCHINDLER ECOLINE Energy Saving Packages\*

Ecoline Package	ECO	ECO Plus	ECO Premium	ECO Premium Plus
<b>Energy Savings ^ Up to</b>	<b>25%</b>	<b>36%</b>	<b>32%</b>	<b>35%</b>
<b>Operation Mode</b>	Continuous operation with ECO power feature: Motor power adjusts to passenger load.	<b>Stop &amp; Go</b> operation with ECO power feature: Escalator stops when unused.	<b>Slow-speed</b> operation with ECO power feature: Escalator slows down when unused.	<b>Stop &amp; Go</b> and <b>Slow-speed</b> operation with ECO power feature: When unused, escalator slows down then stops after an preset period of time.
<b>Application</b>	For continuous medium to heavy passenger traffic.	Non-commercial application; Intermittent flows including periods without traffic.	Commercial application; Intermittent flow including periods without traffic.	Commercial and non-commercial application; Intermittent flow including without traffic.
<b>Benefits</b>	<ul style="list-style-type: none"> <li>- Maintain passenger flow as escalator is in motion when passengers approach it</li> <li>- Short amortization period</li> </ul>	<ul style="list-style-type: none"> <li>- Increased escalator lifespan</li> </ul>	<ul style="list-style-type: none"> <li>- Maintain passenger flow</li> <li>- Components' reduced wear &amp; tear</li> </ul>	<ul style="list-style-type: none"> <li>- Maintain passenger flow</li> <li>- Components' reduced wear &amp; tear</li> <li>- Increased escalator lifespan</li> </ul>

(\*) Values based on theoretical calculations for one Schindler 9300AE-10 escalator. Average value for up and down operated escalator pair: 4.5 m. Step width: 1,000 mm. Speed: 0.5 m/s.

Load profile: 11 hours per day, 365 days per year. 2.5 hrs – 0%. 7 hrs – 25%. 1 hr – 50%. 0.5 hrs – 75%. 0 hrs – 100%.

(^) Standard operation mode: 11,967kWh, 100% continuous running

# PORT Technology: Schindler's best-in-class

It is now the norm for recently completed buildings to be equipped with a modern transit management system. The PORT Technology, Schindler's third and latest generation of such system, not only helps your elevator system reach unprecedented levels of traffic performance, it also brings in many security and personalization features that have become increasingly relevant to both building owners and tenants, as well as a first-class, contemporary experience.

## Unprecedented levels of traffic performance

Schindler's PORT Technology continuously identifies the most efficient way to transport passengers. At its core, sophisticated algorithms run round the clock to ensure the optimal utilization of an elevator group. PORT eliminates elevator runs and random stops at numerous floors, and transports passengers swiftly and efficiently.

## Enhanced Access Control

Access Control is a powerful feature of the PORT Technology, which helps your elevator system play a significant role in controlling access within your building. PORT terminals can be easily integrated with turnstiles, where user credentials can be verified.

## Personalized services

PORT's proprietary software opens up a limitless universe of possibilities when it comes to personalized user experience. PORT has the capability to adapt to the requirements of any particular passenger or situation, including passengers with disabilities or in need of express or exclusive transit.

## Stylish touch-screen terminals

There is a cutting-edge and sophisticated appeal to the PORT Technology. The stylish ergonomics and contemporary look of its touch screen user interface, the PORT Terminal, never fail to impress.



# Transit Management System



**As easy as 1,2,3  
User Friendly Operation**



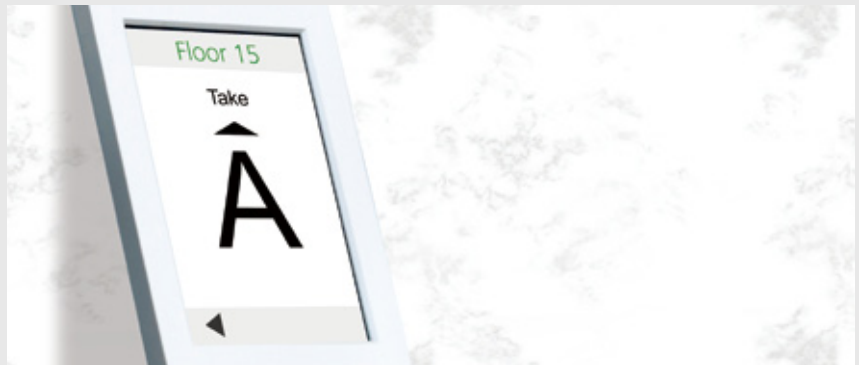
**Step 1**

Choose your destination via the touch screen or swipe your personal RFID card



**Step 2**

Read your elevator car assignment



**Step 3**

Enter your assigned elevator and enjoy the ride



# Safer door operators

Proper door operation is critical to maintaining passenger satisfaction and ensuring safety at all times. It is essential for a door operator to be in good working condition. Replacing an ageing door operator will help boost the overall reliability of your elevator system.

Schindler offers various solutions to help your elevator doors perform smoothly, reliably and safely.

## Door operators upgrade

Schindler's door operators modernization was designed to address the critical door operation function. If major mechanical components are still in good working condition, the upgrade can consist of transforming an older, limited-performance door control technology into a modern, reliable, digital closed-loop operator system.

### Benefits

Upgraded door operators will:

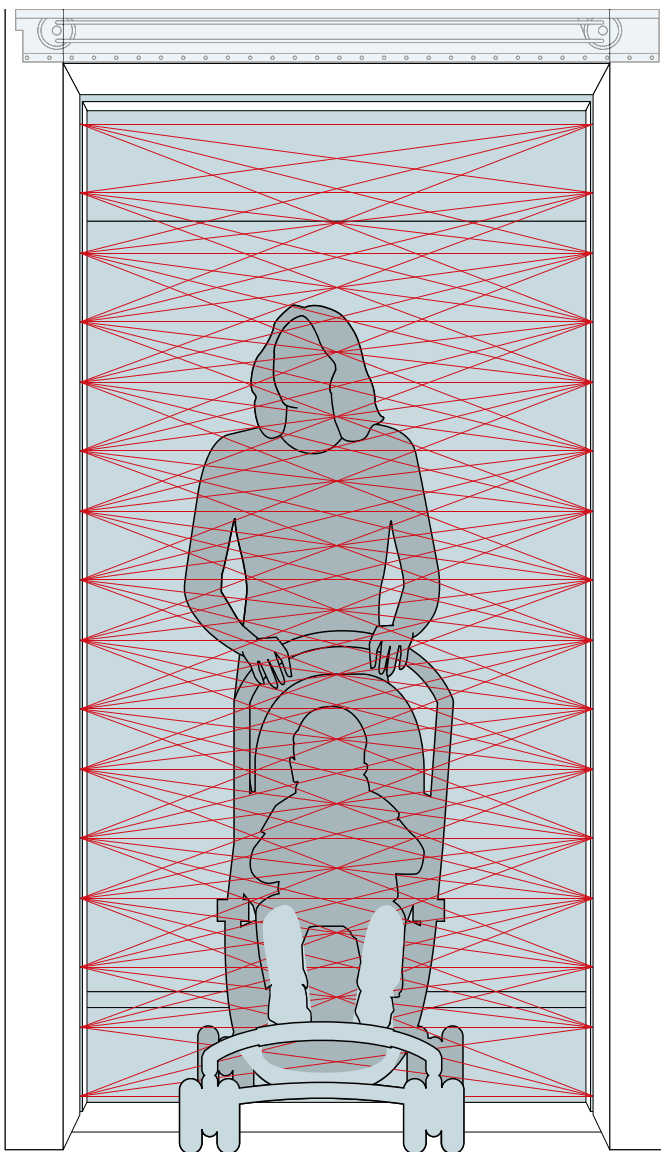
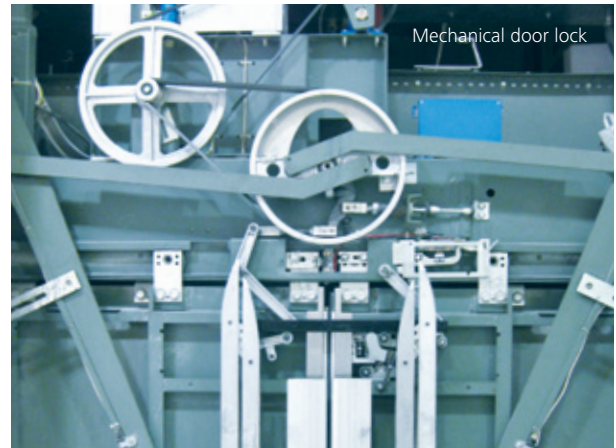
- Operate at a precise and consistent speed profile;
- Provide shorter door opening /closing time (if required);
- Ensure low-noise operation;
- Overcome strong air current from the elevator shaft;
- Ensure high reliability and longer product life.



## Safe door openings

Replacing a worn-out mechanical car door lock prevents vandalism and protects passengers against any unsafe self-rescue attempt during an elevator entrapment.

Trying to force open an elevator car door may seriously endanger passengers, particularly if the elevator is moving or has stopped between landing floors.



## Light curtain

While replacing the door operator, we will also propose to install a light curtain system, which has a definite advantage over a traditional mechanical safety device.

A light curtain system using multiple streams of infrared rays protect passengers from closing doors, without requiring any physical contact. Such a system will immediately open a closing door if a small object moves into its path.

**Schindler's door operators and light curtains react quickly while maintaining speed and force within applicable safety standards.**

# Improved safety and code compliance

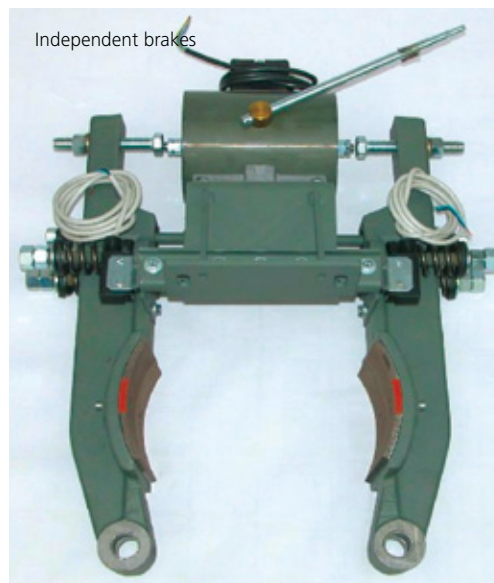
Technologies and regulations keep evolving. Elevators may need to be upgraded to comply with the latest safety requirements. Often such evolutions are compounded with changes in passenger behavior and building usage.

Schindler offers a whole range of solutions to bring your equipment in compliance with today's best practices on passenger safety. With a thorough know-how and familiarity with your elevator system, we will assess and recommend appropriate safety upgrades.

The following two examples of safety component upgrades illustrate how we can ensure that your system is compliant with the latest safety standards.

## Independent brakes

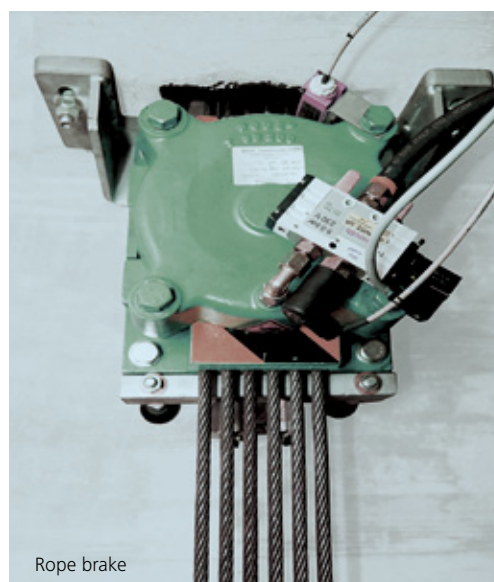
Independent brakes offer better protection to passengers as compared to the old single actuation design, where both sides of the brake drum work independently to ensure there is sufficient braking pressure to slow down the elevator in case either side of the brake malfunctions.



## Protection against uncontrolled car movement

In the event of brake failure, a lightly-loaded car will accelerate upward due to the imbalance caused by the counterweight, with potentially catastrophic consequences.

By installing a rope brake system as one of the protections against uncontrolled car movement, your elevator will be equipped with the necessary protection against such risk.





## Offer maximum protection and peace-of-mind to your passengers

Passenger safety is the utmost priority at Schindler. We design and build our elevators and escalators with a range of safety mechanisms and work diligently to ensure our systems are properly maintained and used safely.

At your request, Schindler specialists can perform an in-depth safety assessment of your elevators and escalators. Once the survey is completed, we will propose an upgrade program to reach safety standards in a progressive manner, either by replacing individual accessories or components, by implementing a packaged solutions, or by installing a completely new system.

# Aesthetics that match performance

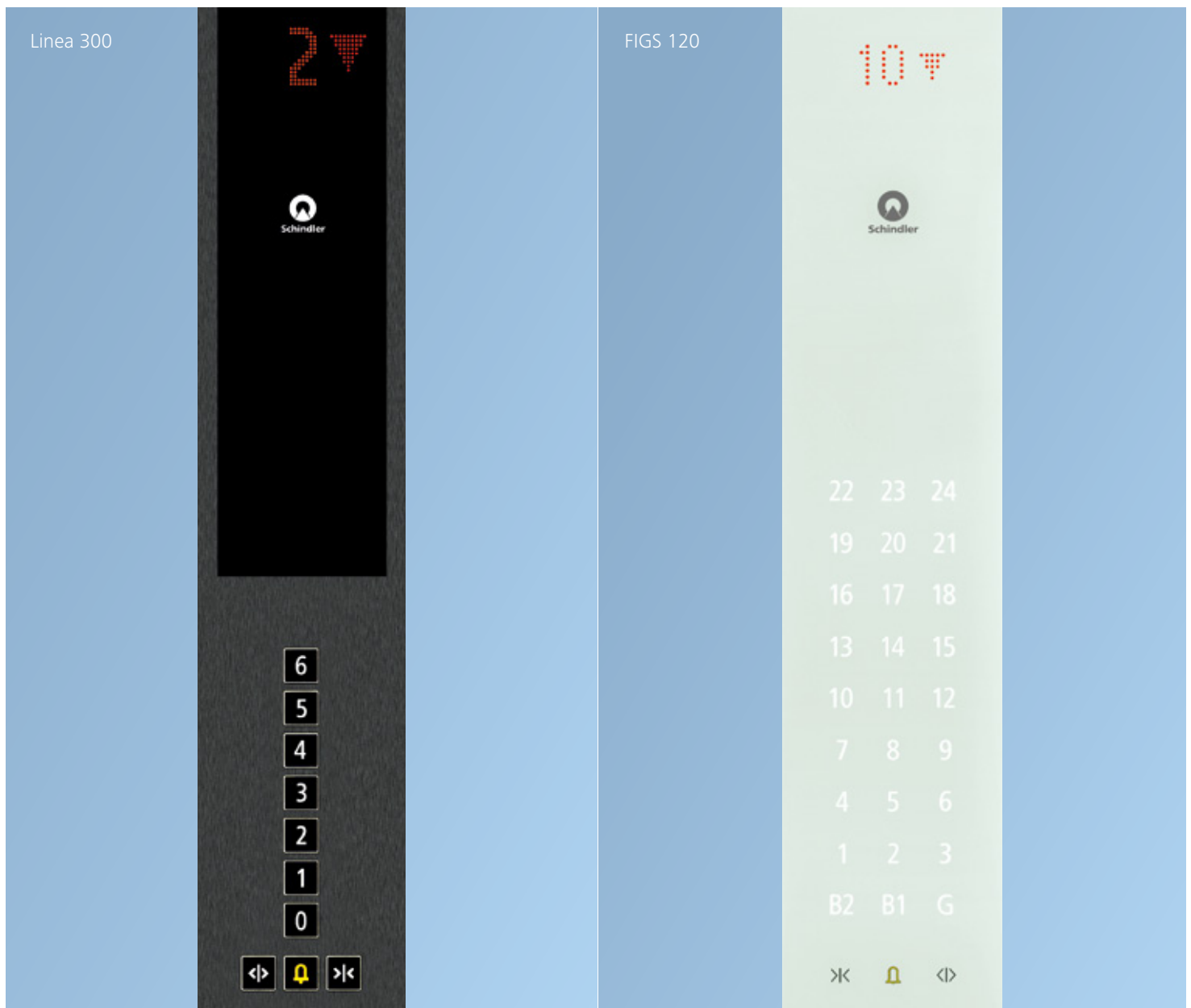
As much as safety, efficiency, reliability and performance matter, so does the overall ride experience to your tenants. Hence the aesthetics of your elevators or escalators should not leave too much to be desired. Today's developers place great emphasis on interior decoration, with a focus on sleek and contemporary features, such as modern touch screens and laminated panels.

Upgrading an elevator interior is a great way to add value to a building. Schindler offers a series of pre-designed interior options to fit your style and budget.

Schindler's standard fixtures are economical, as well as durable and attractive. Our operating panels and options, such as handrails, mirrors and lighting, give a perfect finish to revitalize your elevator.

Our panels and touch screens use the latest design and technologies. A choice of coating technologies allows individual parts to match the architectural style of the building and its elevators.

Custom fixture designs are also available for customers seeking a truly unique look.







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# Modernizing without disruption

Our modernization philosophy is a total service concept. Not only do we devote significant resources to designing and developing intelligent modernization solutions for all equipment types, we also place an equal amount of focus on professional project management.

## Detailed project planning

Before the modernization starts, detailed planning encompassing modernization methods and timing, material delivery, transportation, communication to tenants, process, etc. will be discussed with you to ensure the whole modernization will be carried out as smoothly as it is planned.

Thanks to Schindler's pioneering work planning tools and processes, we can also perform the most detailed and effective building traffic analysis, including full simulations and custom traffic consultancy, wherever required.

## Impeccable project management

During modernization, our project managers will take care of your needs and ensure that you are fully informed of every single step. That includes minimizing dirt and disruption, working unsocial hours for minimum inconvenience to users, specialist project management and active communication programs for tenants.

Most of all, what we bring to your building is experience: a track record of over 140 years and a network made of the industry's finest experts.





## **Schindler MOD Overlay** **Modernization without disruption**

With the vision that a modernization exercise should be carried out largely unnoticed by the building occupants, Schindler developed the MOD Overlay method, a proven technology that has been used in many installations worldwide.

With MOD Overlay, the whole modernization process is subdivided into individual steps, to minimize interruptions for the end users. This method effectively integrates the modernized elevators and the existing ones to maintain the overall elevator group performance.

And when the PORT Technology powers your elevator system, PORT Overlay will help provide an immediate improvement in traffic performance. This boost allows for individual elevators to be taken out for modernization without reducing the efficiency of the overall group. Once an elevator is modernized, it is seamlessly reintegrated into the group.

All of this happens without causing any inconvenience to end users.

# Modernization Case Studies



## Great Eagle, Hong Kong

### Customer's expectations

- To bring the 32-year old elevator systems up to the latest standard in terms of safety, ride comfort, performance, passenger experience and energy efficiency.

### Scope of Work

- 28 units: controller and machine replacement with regenerative inverter for the commercial building.
- PORT technology modernization.

### Benefits to customer

- Significant energy saving from the previous motor-generator set.
- Computerized elevator management system to facilitate single point supervision.
- Compact modernization schedule.



## Jardine House, Hong Kong

### Customer's expectations

- Performance increase of the whole elevator system.
- Minimum inconvenience to tenants during the whole modernization.

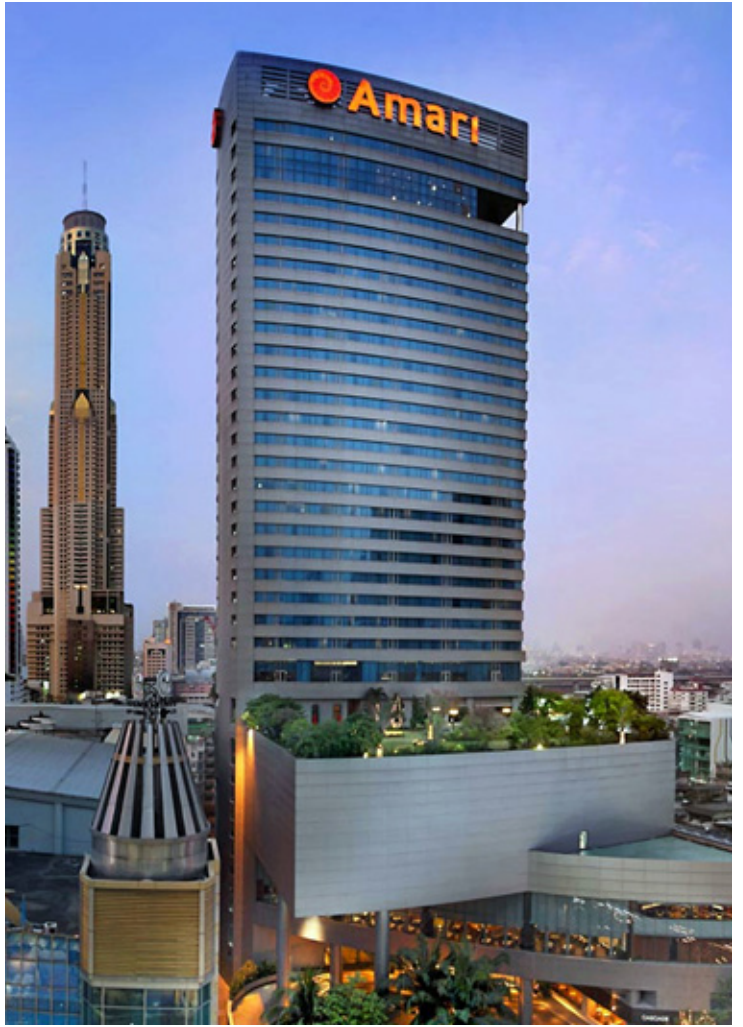
### Scope of Work

- Upgrade the entire elevator system from conventional control to destination control.
- Replacing former MG-set inverter systems with new eco-efficient and DC Power Factor One regenerative drive.
- Redecorating elevator cars and increasing car height.
- Upgrading door drives.

### Benefits to customer

- **Minimize disturbance to building tenants:**  
The Phased modernization of elevator cars made the entire process largely unnoticed by the occupants.

# Modernization Case Studies



## Doubletree by Hilton, Johor Bahru, Malaysia

### Customer's expectations

- Enhance users' experience and ride comfort.

### Scope of Work

- 5 units: controller, regenerative inverter, permanent magnet machine replacement and safety equipment for the hotel renovation project.
- 2 units with STM solution for the low zone.

### Benefits

- Full modernization to suit the new hotel usage.
- Lobby Vision system to support the hotel management and access control.

## Amari Watergate hotel, Bangkok, Thailand

### Customer's expectations

- Improve traffic performance and ride comfort.

### Scope of Work

- 5 units: full modernization of controller, regenerative inverter and permanent magnet machines.

### Benefits to customers

- Phased work program in off-season to align with hotel operation.
- Compact installation schedule to minimize disturbance to hotel occupants and the support in-progress traffic management.
- Improved traffic performance and ride comfort after modernization.

# Schindler Your First Choice

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