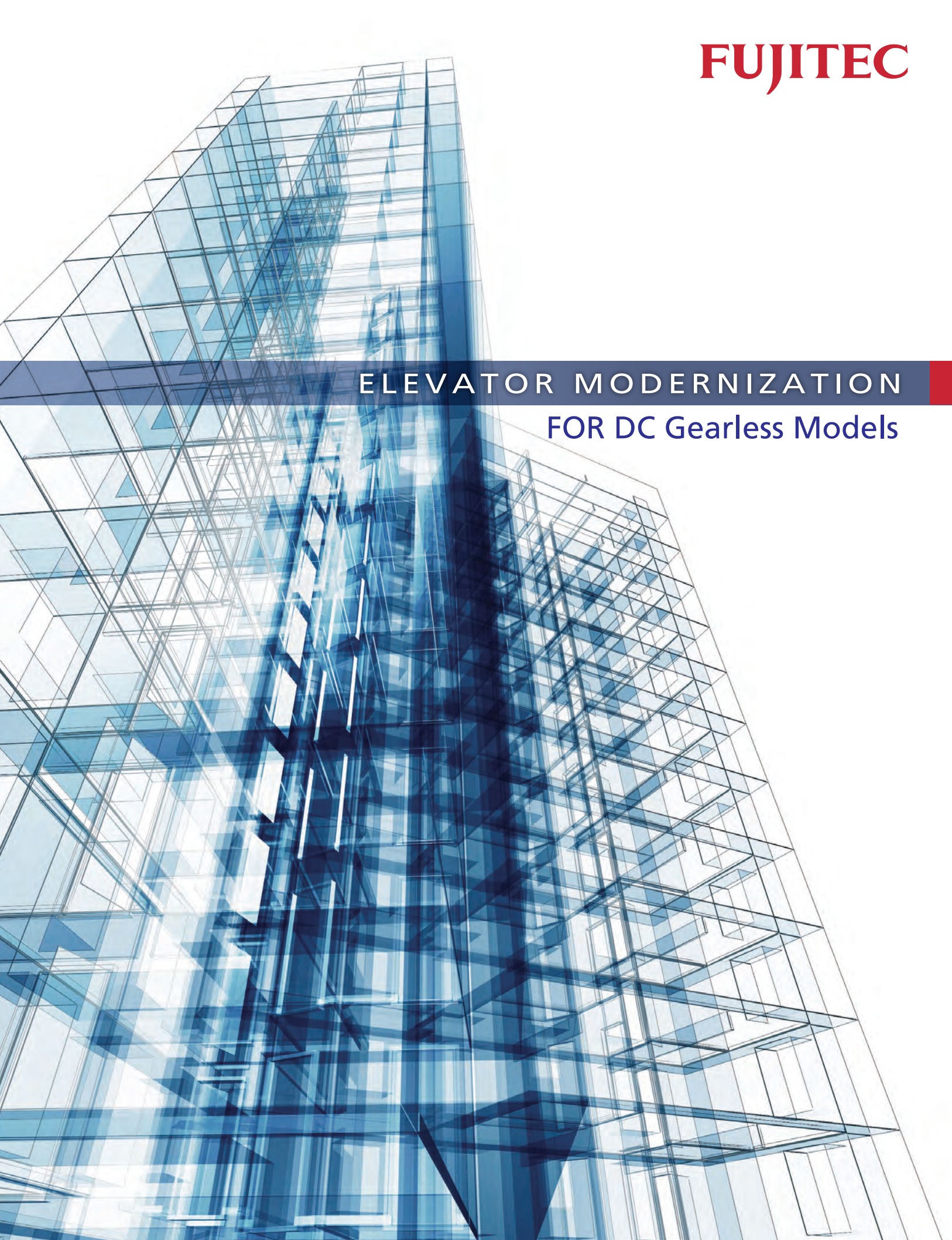
FUJITEC

ELEVATOR MODERNIZATION

FOR DC Gearless Models



Necessity of

Modernization

Even with periodic maintenance, it is generally difficult
to maintain optimal elevator performance beyond the original service life.
As user requirements and social needs change over time,
the original elevator performance itself no longer meets the needs of the times.

Under such circumstances, owners and managers
are now requested to maintain and even improve elevator
safety and security from the standpoint of elevator users.

Safety

Based on manufacturer's product information (*) including design concept at the time of manufacturing, we study the effect on the entire system and how remaining portions interact with upgraded portions; thus minimizing failure risk after modernization. In addition, various safety devices, systems and functions that are standard features in the latest elevator models will be added.

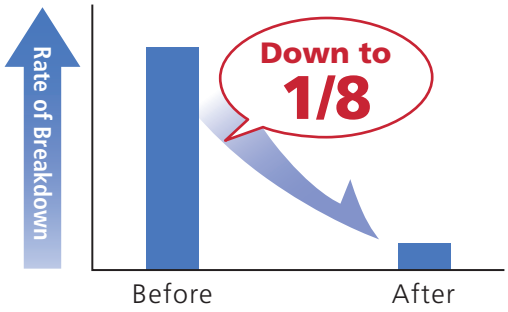
(*) If any elevator maintenance or modernization work had been consigned or outsourced to a third-party other than Fujitec or any of its affiliated companies, the original design may have been modified. In this case, consult a Fujitec sales representative.

Security

With old elevators, there is a growing risk for failure or accidents, which may trigger more unexpected trouble. By modernizing, electrical systems that have higher risks for failure due to age, while usable parts remain unchanged, will be replaced and upgraded. For durable goods such as elevators, we do not recommend makeshift repairs.

Improvement in Operation Performance

Breakdown Rate varies greatly from pre- and post modernization.
(Survey by Fujitec)



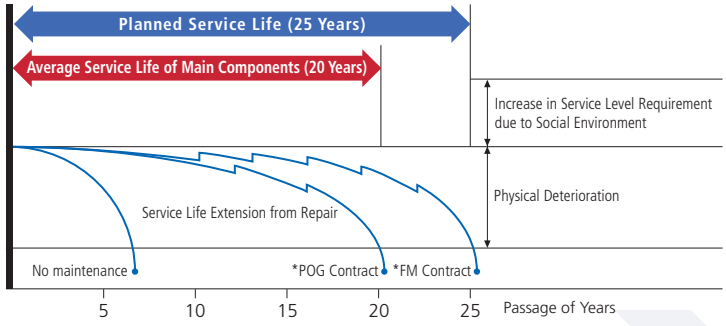
Recommended Elevator Modernization Schedule

An old elevator is inferior to the latest one in terms of safety, comfort, reliability and energy savings, as well as in design. In order to make in-building travel safer and more comfortable and to enhance the value of a building or property, elevator modernization is indispensable.

The average elevator replacement cycle is 20 to 25 years.

Elevators which have passed 20 years of service since installation are recommended to be modernized to meet the standards or specifications of latest models.

Service Life and Modernization



* POG Contract = Parts, Oil, Grease Contract
* FM Contract = Full Maintenance Contract

Equipment
ation
Energy saving
Renewal

■ Standard Packages of Modernization for DC Gearless Models

Line of Modernization Packages

Fujitec provides three packages for elevator modernization depending on traction machine type and drive control system model. For all three packages, the control system of the control panel (incorporating logic control circuits) will be upgraded to the latest type. For elevators operating under a group supervisory control, their group supervisory system will also be upgraded to the latest type Flex-NX Series. This system renewal will increase both elevator operating efficiency and passenger transportation capability.

Plan A Thyristor (Re-use) Drive Control

Elevator drive system will be updated. Existing traction machine and existing thyristor panel operating in the elevator drive sytem will be reused. This plan promotes a low-cost elevator renewal. Existing DC gearless machines and thyristor panels can continue to be used in Plan A. (For motor-generator-equipped DC gearless machine types, Plan A cannot be applied.)

Plan B DC Chopper Drive Control

Elevator drive system will be upgraded; existing drive system will be changed to an exclusively developed type, the DC Chopper; and existing machine will be reused. The DC Chopper Drive Control can be applied to the system of gearless machines that employs motor generators and thyristors. In Plan B, existing DC gearless machines will continue to be used with the addition of a DC Chopper Drive Panel.

Plan C the Latest Drive Control with PM Machine

Existing traction machine models will be changed from DC gearless to the latest PM gearless. This machine-model change can be applied to all existing DC gearless elevators. Along with this model change, elevator drive control system will be upgraded to be used with PM gearless machines and main drive panels (including inverters and converters) will be modernized.

● Comparison of Product Packages

	Plan A	Plan B	Plan C
Low Cost	◎	○	△
Short Work Time	◎	○	△
Securement of Safety due to Overhaul of Brake	◎	◎	Replace Machine
Increased Door Performance and Safety Enhancement	◎	◎	◎
Increased Leveling Accuracy	◎	◎	◎
Flight Time Reduction	◎	◎	◎
Power Consumption Reduction	○	○	◎
Reliability of Products	△	○	◎

◎: Excellent ○: Good △: Fair

■Other Upgrade to consider

Destination Floor Guidance System DFGS

Installing a Destination Floor Guidance System (DFGS) as well as updating the elevator group supervisory control system can also lead to a further increase in passenger handling capacity.

DFGS

Elevator Remote Monitoring and Control System ELVIC

One of the main features is the capability to manage and control elevators remotely. This is accomplished by monitoring the status of elevators and giving necessary commands to them from the central control station in a building.

IONFUL

This technology can provide cleaner air more efficiently than conventional ventilation system.

Modernization Menu/Package

■What is an Elevator Control Panel?

The Control Panel (COP) is a device located in an elevator machine room on the rooftop of a building and controls elevator operation and speed. So-called elevator's brain, the COP is an important device. But with the passage of service years, deterioration appears earliest in the COP.

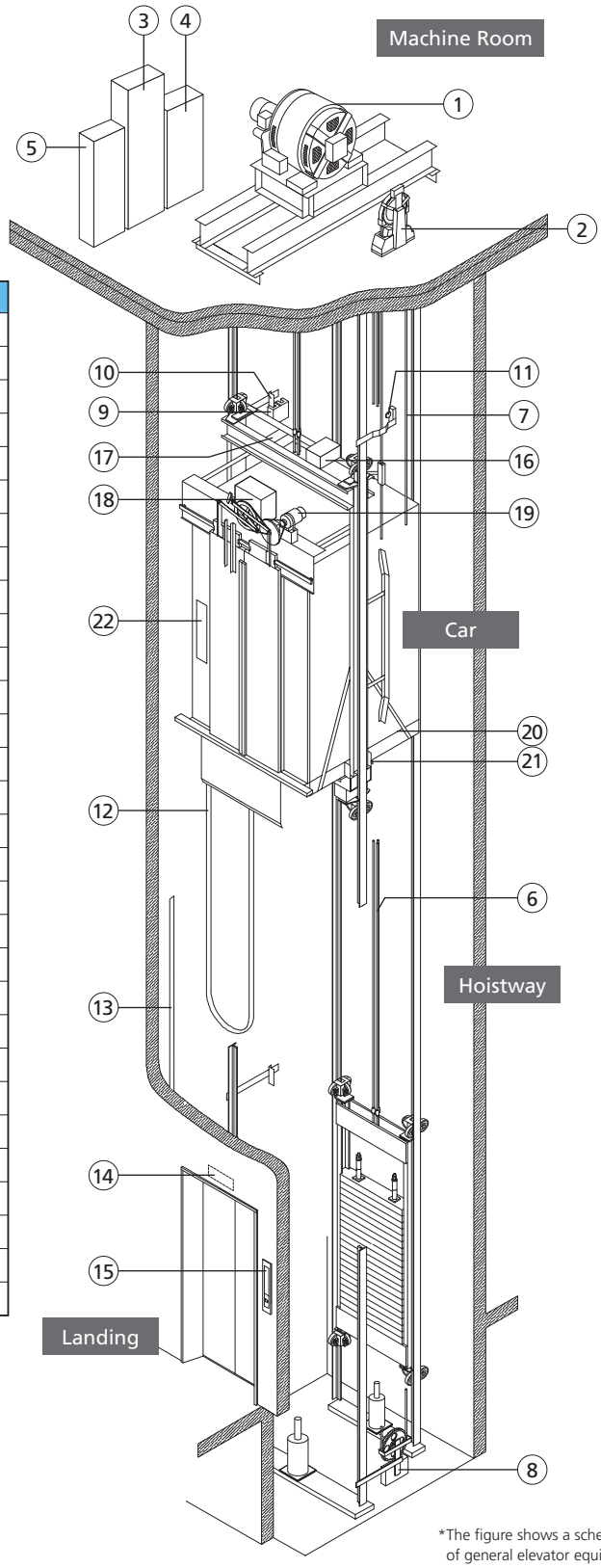
Modernization Equipment List

Location	No.	Equipment	Plan A	Plan B	Plan C
Machine Room	1	Machine / Motor			●
		Brake	*1	*1	●
		Encorder	●	●	●
		Main Sheave			●
		Sec. Sheave			●
	2	Governor			
	3	COP	●	●	●
	4	Drive Panel	*2	●	●
	5	GSP	●	●	●
Hoistway	6	Main Rope			●
	7	GV Rope			
	8	Tension Pully			
	9	IR	●	●	●
	10	IR Plate			
	11	Limit SW			●
	12	Travelling Cable	●	●	●
	13	HWY Cable			●
Landing	14	Interlock SW			
	15	HPI, HLL, Hall Botton			
Car	16	Car Top JB	●	●	●
	17	Car Top Service SW	●	●	●
	18	Door Drive Unit	●	●	●
	19	Door Motor	●	●	●
	20	Load Weighing			●
	21	Load Cell			●
	22	COB	*2	*2	●
Others	-	Console Panel			
	-	ELVIC	★	★	★
	-	DFGS	★	★	★
	-	IONFUL	★	★	★

(NOTE) ●: Replace ★: Add Blank: Re-Use
*1: Overhaul is required.
*2: Modificaton is required.

Listed parts are essential for elevator modernization. Upgraded parts may be added as needed.

[Layout of Main Elevator Equipment]

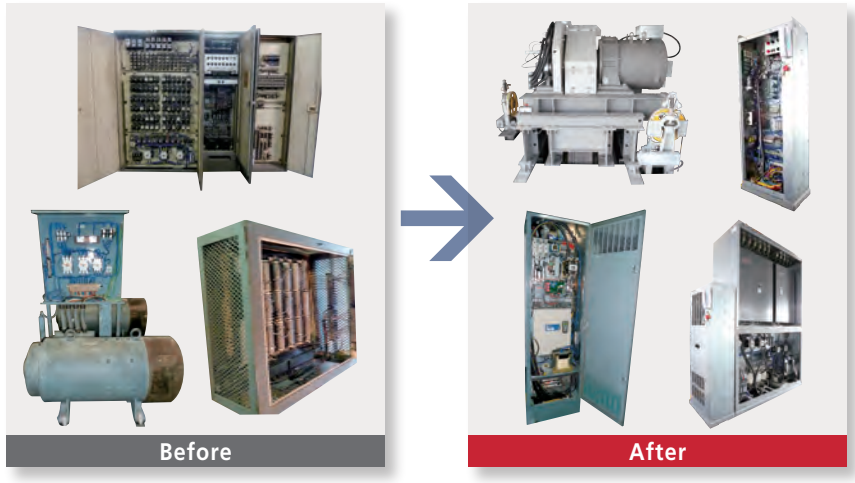


*The figure shows a schematic diagram of general elevator equipment.

Safety and Security

Being Trouble-free is the Best Solution

Just replacing deteriorated parts is not enough to eliminate the risk for failure or accidents. The replacement or repair of deteriorated parts do nothing more than to partially or temporarily stop deterioration from age and usage.
On the other hand, through modernization, older or antiquated microcomputer-controlled systems are replaced with the latest high-performance microcomputer-controlled systems.
Therefore, basic elevator performance will be brought to the latest standards, and safety. In addition, comfort and cost effectiveness will be dramatically enhanced.



* This is just an example; actual model may differ.

Prevent Accidents Caused by Closing Doors

Multibeam Sensor Option

Infrared beams along the full opening height of the doors will create an invisible beam curtain. Interrupting any of the beams will cause the closing doors to stop and reopen. Through the use of multi-infrared beams, the sensor features high detectability of a moving person or object while the door is closing.

* Only two beams are available for some elevator models.

Prevent Tripping due to Leveling Error

The latest inverter control ensures excellent landing precision.

Updating Door Control Unit

Inverter control for door control units, door motors, etc. will be installed. This application stabilizes door closing and opening operations, and also enhances passenger safety by minimizing door closing force.

Daily Essential Inspection

Brake inspection operation will be automatically performed once every day, late at night or early in the morning; when there are few passengers in order to diagnose brake performance.

The elevator detects abnormalities, ensuring appropriate preventative maintenance.
* Please note that the above operation will not apply to Plan A. (See page 3.)

Function Improvements and Energy Savings

Elevator Leveling Accuracy

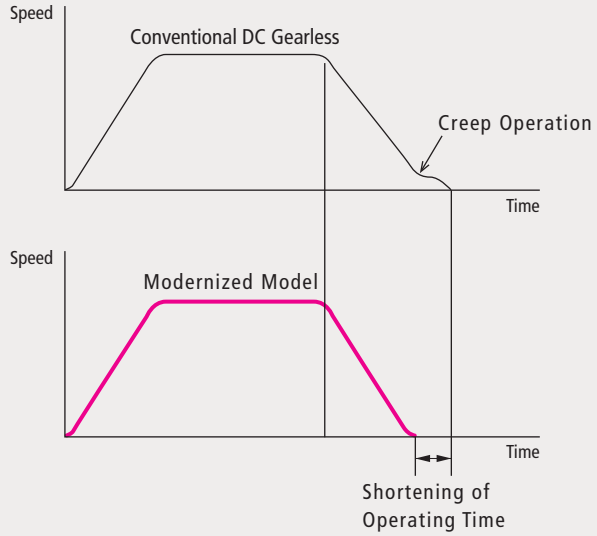
Existing analog-type elevator control systems are susceptible to changes in ambient temperature, which can adversely affect leveling accuracy. Current digital control systems are highly resistant to changes in the surrounding environment. Therefore modernizing an elevator's control system will increase car leveling accuracy much more than was possible before.

Elevator Operating Efficiency

In conventional elevator control systems, the Creep Operation is necessary in order to reduce car traveling speed for landing at a destination floor. The car-creeping time, which occurs before the car's arrival at a destination floor, is programmed in the car's total traveling time. With newer elevator control systems, the Creep Operation is no longer needed. By using Fujitec-modernized elevators, total car traveling time will be shortened and passenger transportation capability will be increased by 8 %* as compared to conventional models.

* The figure is based on data obtained from elevators with speeds traveling up to 210 mpm in a 20-story building.

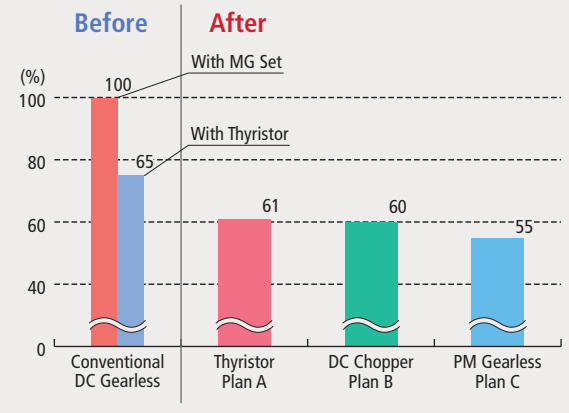
● Comparison of Operating Time :
Conventional DC Gearless vs. Modernized Model



Power Consumption

Modernized elevators consume less electricity than conventional elevators. This was found in comparative data representing power consumption in both types by testing under identical conditions; such as the same number of elevator starts, the same carload of passengers, etc.

● Comparison of Power Consumption



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