Hitachi Elevator

VFI-II



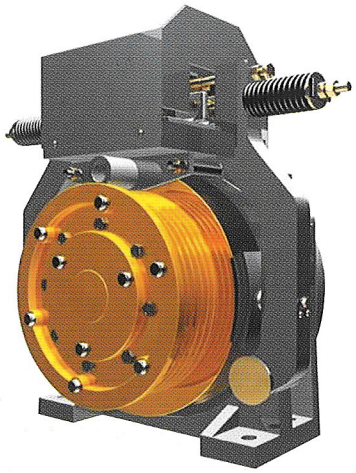
HITACHI
Inspire the Next

VFI-II

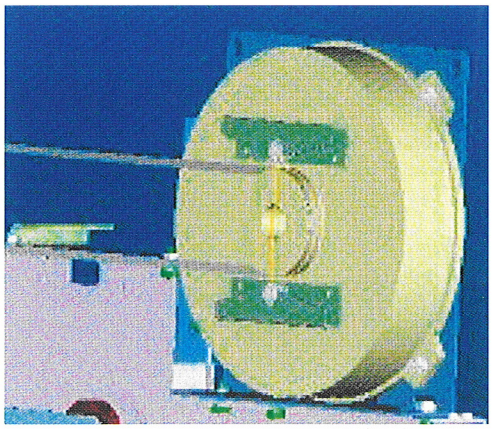
The VFI elevator has been reborn with the latest and most reliable Hitachi technology for a sustainable environment.
The new VFI-II elevator serves as an environmentally friendly transportation system to your building in addition to being reliable, safe, comfortable, of high quality and user-friendly.

Energy conservation

A gearless traction machine with Permanent Magnet-type synchronous motor (PM motor) conserves energy by improving power efficiency.
A PM motor is also used in the drive unit for car doors and a direct drive method is employed to realize improved energy efficiency and smoother door opening and closing motions.



Gearless traction machine with PM motor
(By 3D modeling)



PM motor with VVVF door control
(By 3D modeling)

Energy-saving features

Automatic dimming of indication light

The brightness of the elevator hall and car position indicator is dimmed automatically after a preset duration when elevator is idle.

Automatic turn-off of elevator light and fan

In the event that the elevator is idle, the light and ventilation fan in the elevator are automatically turned off to conserve energy.

Hall and car buttons using LED light

Hall and car buttons utilizes LED lights which consumes less energy.

Hall lanterns (optional) using LED light

Hall lanterns using LED light are available for your selection.

Regenerative system (optional)

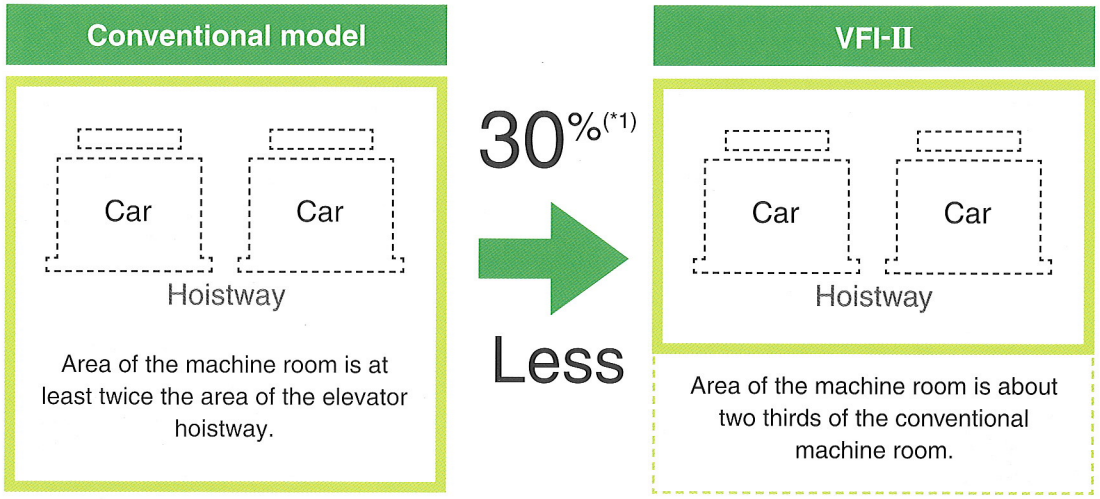
Making use of the energy generated by an elevator when traveling downwards with a heavy car load or upwards with a light car load, the traction machine acts as a power generator to transmit power back to the electrical network in the building.

Energy-saving preference control

(applicable to FI-600 group control only)
As one of the standard functions of the FI-600 group control system, the number of elevators in service is reduced when traffic demand is low. This reduces energy consumption.

Space-saving design

The VFI-II elevator requires a smaller machine room size through the use of slimmer traction machine, control panel and machine room equipment. This allows flexibility in building design through maximizing the usage of building space.



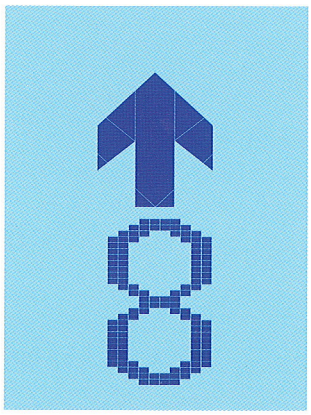
(*1) As an average and based on Hitachi model.

The human touch

The VFI-II elevator provides a comfortable ride and appeals to different aspects of the human sense, touch, sight and hearing - by the integration of tactile button, LCD display, voice synthesizer and multi-beam door sensor.



Touch: Button with Braille and tactile, and LED light (optional)



Sight: LCD (monochrome) car position indicator

Hearing: Voice synthesizer (optional)
Preset standard messages are announced to the passengers by a voice synthesizer.

The human touch: Multi-beam door sensor
In the event that the beam paths are obstructed, this sensor, installed on the edge of the doors, will keep the doors open.

Standard Car and ceiling design



CS-101S Ceiling design

Center : Milky white acrylic
Surrounding : Painted sheet steel
Lighting : Fluorescent
Height (from floor) : 2350mm

Side and rear walls (3 sides)
Stainless steel hairline

Front return panel/ car door/ transom panel
Stainless steel hairline

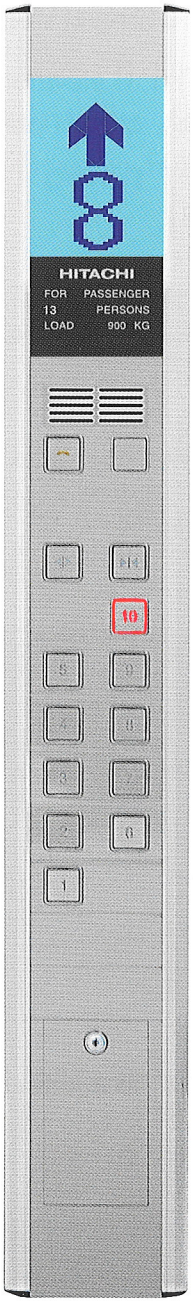
Kickplate
Stainless steel hairline

Flooring
Vinyl tile

Door sill
Extruded hard aluminum

Car position indicator (*1)
LCD (monochrome), incorporated into car operating panel

Ventilation
Air-blown through ceiling duct



OPE-10A-TNS3 (*1) Operating panel

Face plate
Stainless steel hairline
with aluminum side edge

Button type
TNS-3

Indicator type
LCD (monochrome)

Standard Entrance design

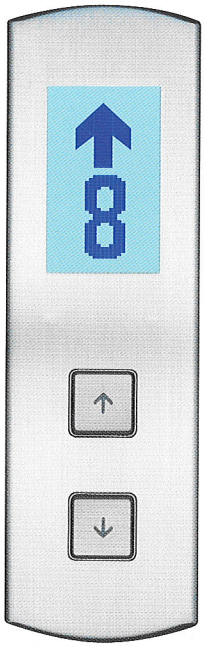


AS-1X Type Jamb

Jamb frame
Painted sheet steel, 50mm wide

Door panel
Painted sheet steel

Door sill
Extruded hard aluminum



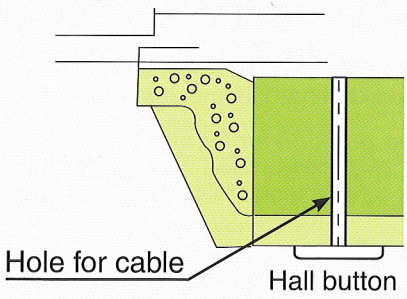
VIB-10A-TNS3
Surface-mount type hall button and indicator

Face plate
Stainless steel hairline

Button type
TNS-3

Indicator type
LCD (monochrome)

Surface-mount type minimizes building interfacing



(*1) In case the number of floor buttons is more than 20, OPE-10**B**-TNS3 shall be applied.

Note: Colors reproduced here may vary slightly from the actual.

Optional Car and ceiling designs

Cars and ceilings

For Passenger lifts (LMR)



Side and rear walls (3 sides)
Stainless steel hairline

Front return panel/ car door/ transom panel
Stainless steel hairline

Operating panel type
OPE-10A-TNS3 (*1)

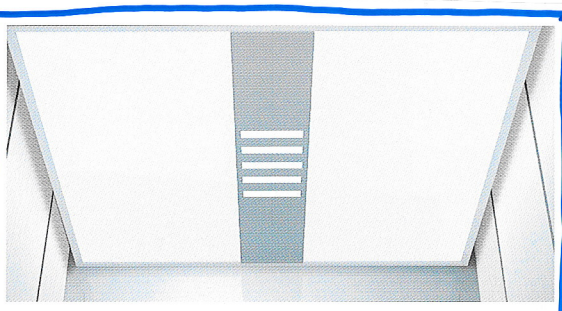
Kickplate
Stainless steel hairline

Flooring
Vinyl tile

Door sill
Extruded hard aluminum

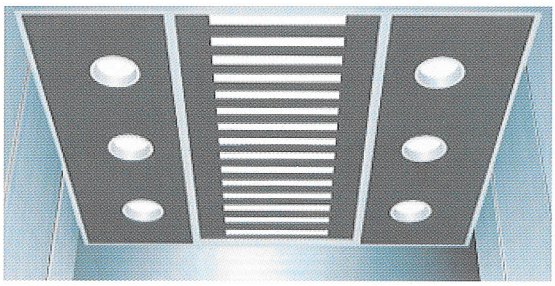
Car position indicator (*1)
LCD (monochrome), incorporated into car operating panel

Ventilation
Air-blown through ceiling duct



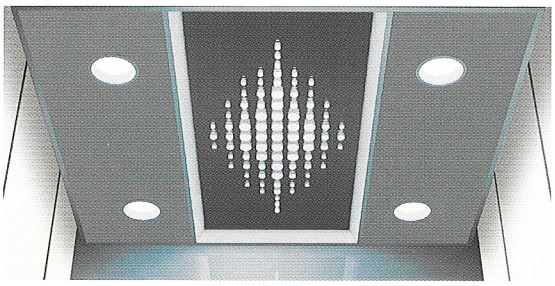
DX-201S Ceiling design

Center	: Painted sheet steel
Both sides	: Milky white acrylic
Ceiling trim	: Anodized aluminum
Lighting	: Fluorescent
Height (from floor)	: 2300mm



DX-12S Ceiling design

Center	: Painted sheet steel
Both sides	: Painted aluminum with recess
Ceiling trim	: Anodized aluminum
Lighting	: Fluorescent
Height (from floor)	: 2300mm



DX-23S Ceiling design

Center	: Half mirror
Both sides	: Painted aluminum with recess
Ceiling trim	: Anodized aluminum
Lighting	: Fluorescent
Height (from floor)	: 2300mm



Side and rear walls (3 sides)
Stainless steel hairline

Front return panel/ car door/ transom panel
Stainless steel hairline

Operating panel type
OPE-10A-TNS3 (*1)

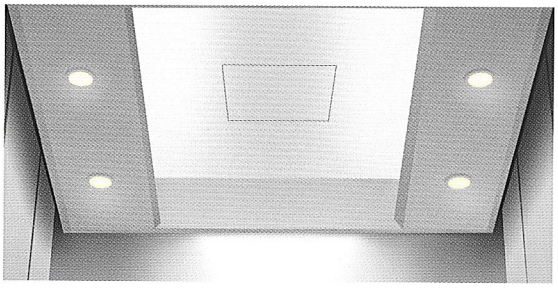
Kickplate
Stainless steel hairline

Flooring
Vinyl tile

Door sill
Extruded hard aluminum

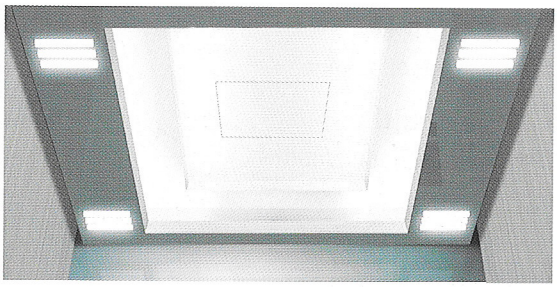
Car position indicator (*1)
LCD type, incorporated into car operating panel (monochrome)

Ventilation
Air-blown through ceiling duct



SL-102S Ceiling design

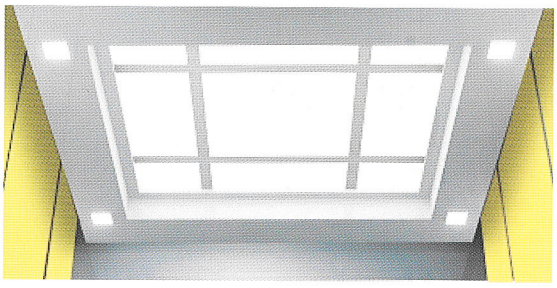
Upper portion	: Painted sheet steel (with emergency hatch)
Both sides	: Painted sheet steel
Lighting	: Fluorescent & Down light
Height (from floor)	: Upper 2470mm, Lower 2300mm



EX-32S Ceiling design

(Applicable for car loading of 600kg and above)

Upper portion	: Painted sheet steel (with emergency hatch)
Other portions	: Painted sheet steel
Lighting	: Fluorescent
Height (from floor)	: Upper 2600mm, Lower 2300mm



EX-403S Ceiling design

(Applicable for car loading of 600kg and above)

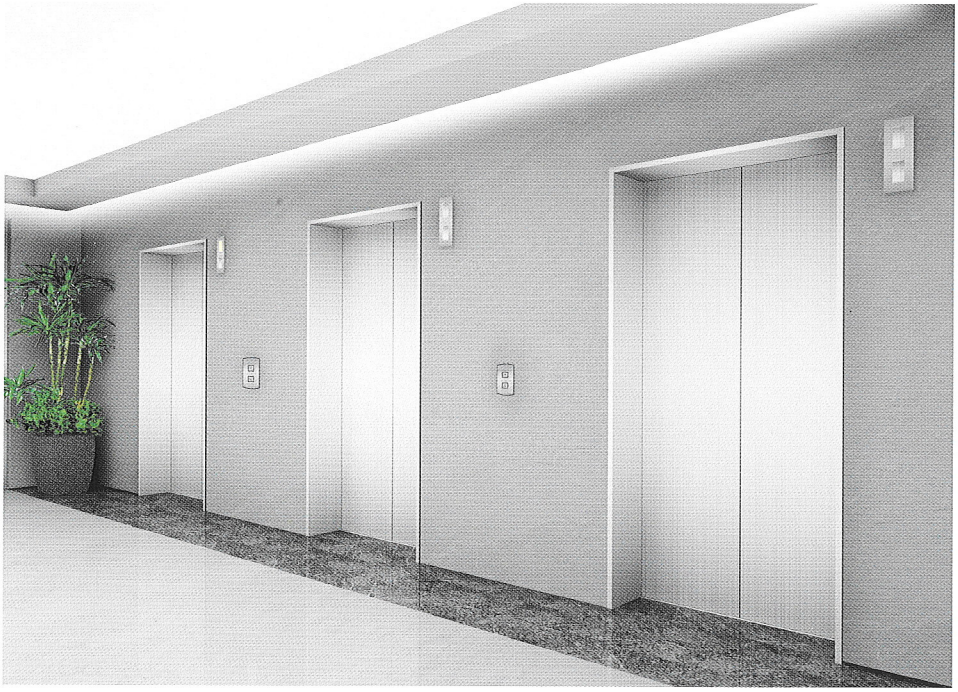
Center	: Milky white acrylic
Center decoration	: Painted sheet steel
Surrounding	: Painted sheet steel (with acrylic lens)
Lighting	: Fluorescent
Height (from floor)	: Upper 2425mm, Lower 2300mm

(*1) In case the number of floor buttons is more than 20, OPE-10**B**-TNS3 shall be applied.

Note: Colors reproduced here may vary slightly from the actual.

Optional Entrance designs

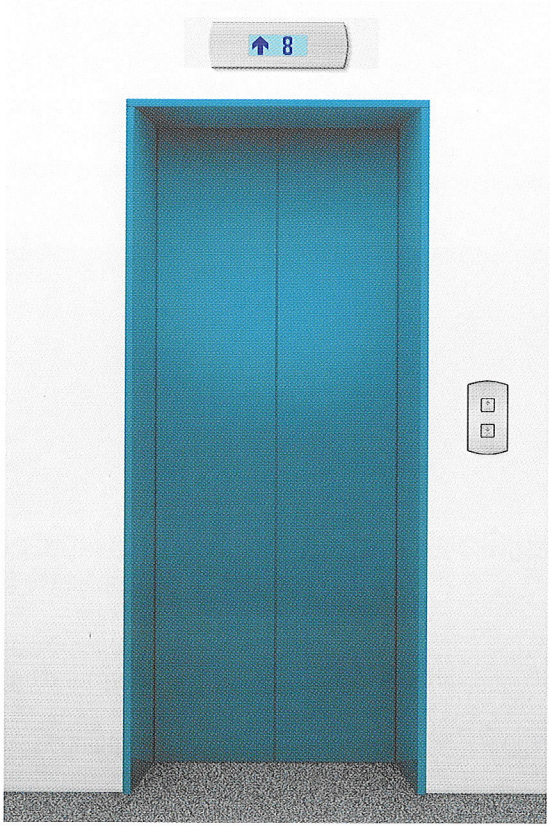
Entrances



Jamb frame
TS-1X (wide) type,
stainless steel hairline

Door panels
Stainless steel hairline

Landing sill
Extruded hard aluminum



Jamb frame
TS-1X (wide) type,
painted sheet steel

Door panels
Painted sheet steel

Landing sill
Extruded hard aluminum



Jamb frame
TL-2X (wide) type with transom panel, painted sheet steel

Door panels
Painted sheet steel

Landing sill
Extruded hard aluminum



Jamb frame
SL-2X (wide) type, stainless steel hairline

Door panels
Stainless steel hairline

Landing sill
Extruded hard aluminum

Note: Colors reproduced here may vary slightly from the actual.

Optional Car fixtures

Operating panels

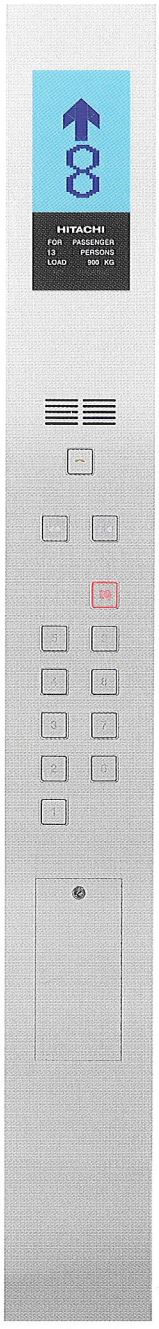


OPE-10A-TNS7 (*1)

Face plate
Stainless steel hairline with aluminum side edge

Button type
TNS7

Indicator type
LCD (monochrome)



OPE-10B-TNS3

Face plate
Stainless steel hairline

Button type
TNS3

Indicator type
LCD (monochrome)



OPS-B95

Face plate
Stainless steel hairline

Button type
B95

Indicator type
Dot matrix

For Passenger lifts (LMR)

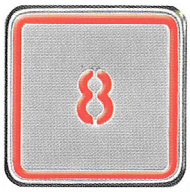


OPS-A98-1
Face plate
Stainless steel hairline

Button type
A98-1

Indicator type
Dot matrix

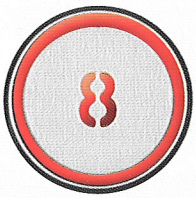
Buttons (Applicable to both car and hall sides)



TNS3 (*2) **(Standard)**
Stainless steel hairline



TNS7 (*2)
Stainless steel hairline with Braille and tactile



DMD3
Stainless steel hairline



DMD7
Stainless steel hairline with Braille and tactile

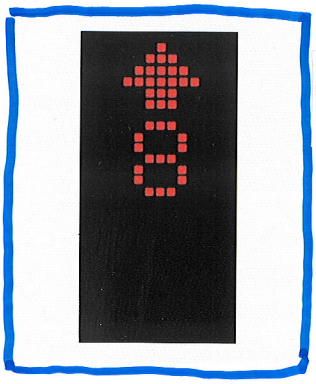


A98-1
Plastic resin



B95
Plastic resin

Position indicator



For Passenger lifts (LMR)

Dot matrix type

(*1) In case the number of floor buttons is more than 20, OPE-10**B**-TNS3 shall be applied.
(*2) Only applicable to OPE-10A type operating panel and surface-mount type hall button.

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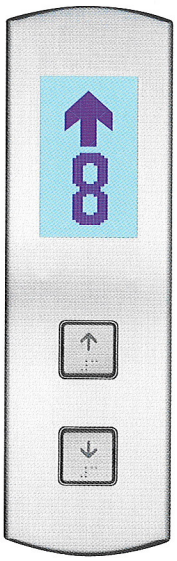
Optional Entrance fixtures

Hall buttons with indicators



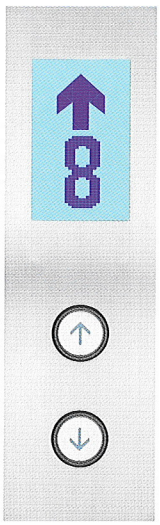
VIB-10A-TNS7



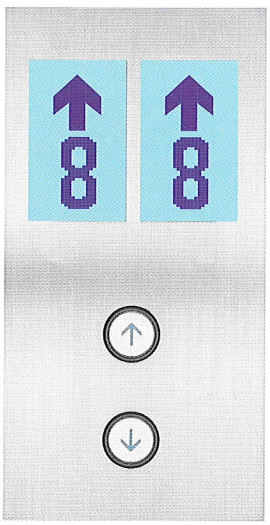
VIB-10AD-TNS7

Surface-mount type hall button with indicator
Face plate: Stainless steel hairline

Indicator type:
LCD (monochrome)



VIB-10B-DMD3

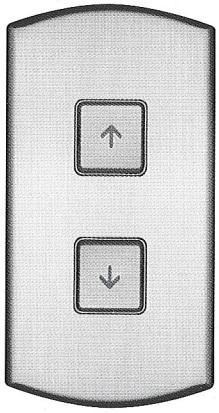


VIB-10BD-DMD3

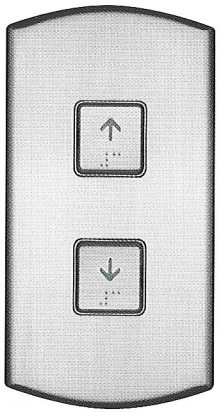
Hall button with indicator
Face plate: Stainless steel hairline

Indicator type:
LCD (monochrome)

Hall buttons

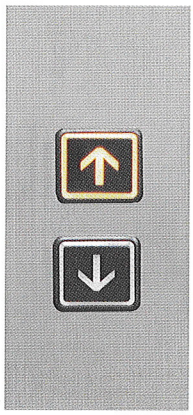


BN-TNS3

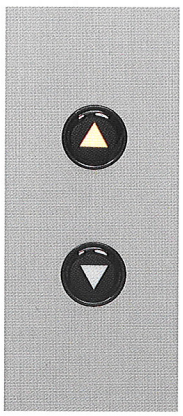


BN-TNS7

Surface-mount type hall button
Face plate: Stainless steel hairline



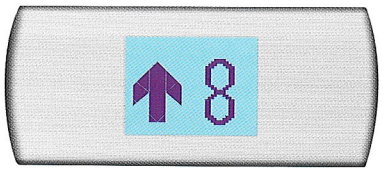
BL-B95



BL-A98-1

Hall button
Face plate: Stainless steel hairline

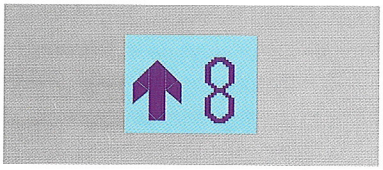
Hall indicators



HNLX

Surface-mount type hall indicator
Face plate:
Stainless steel hairline

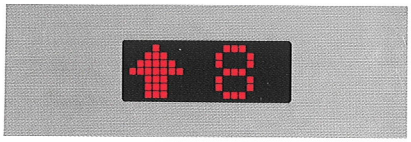
Indicator type:
LCD (monochrome)



HFLX

Hall indicator
Face plate:
Stainless steel hairline

Indicator type:
LCD (monochrome)

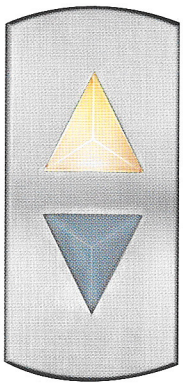


HSDX

Hall indicator
Face plate:
Stainless steel hairline

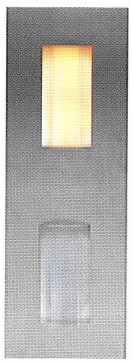
Indicator type:
Dot matrix

Hall lanterns (When group control system is employed, HYD-94 type hall lanterns are provided as a standard.)

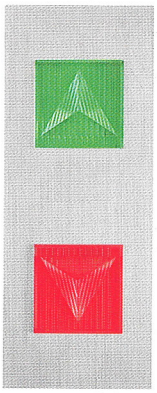


HYD-94

Surface-mount type hall lantern
Face plate: Stainless steel hairline

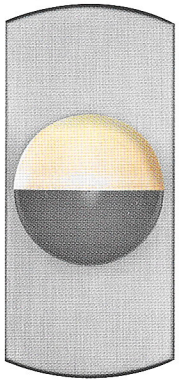


VLS-115



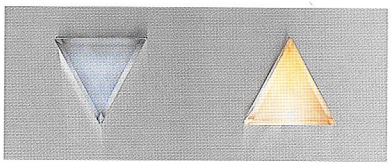
VLS-90S

Vertical hall lantern
Face plate: Stainless steel hairline



HYD-93

Surface-mount type hall lantern
Face plate: Stainless steel hairline



HLS-025S

Horizontal hall lantern
Face plate: Stainless steel hairline

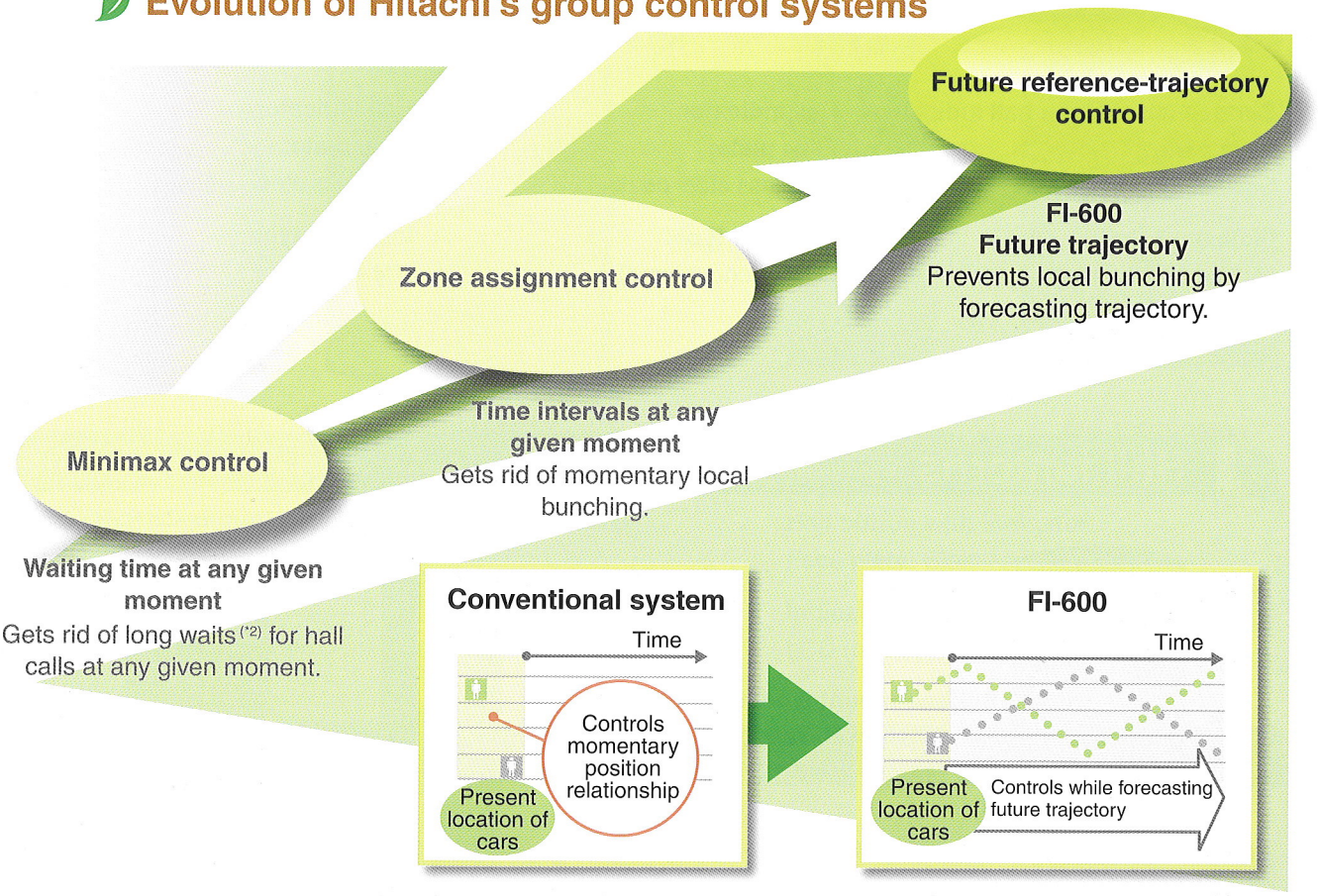
For Passenger lifts (LMR)

Intelligent group control system

VFI-II comes with Hitachi's new group control system, FI-600

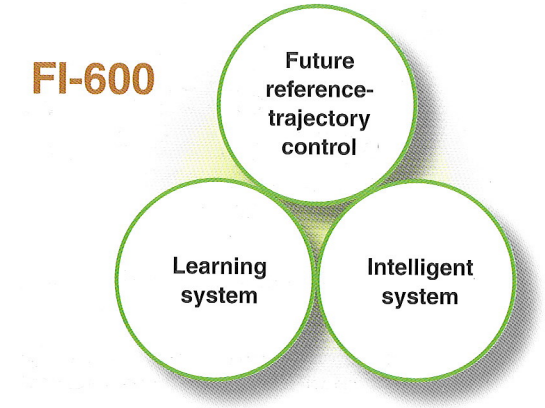
Shortening waiting times and reducing the probability of a long wait (*2) are always the most critical concerns of group control systems.
Hitachi has been striving for the development of control algorithms to address these concerns. A new algorithm, "Future reference-trajectory control" is used for the FI-600.
The probability of a long wait (*2) is minimized by operating elevator cars at equal time intervals while forecasting future trajectories.

Evolution of Hitachi's group control systems



With our proprietary algorithm, "Future reference-trajectory control", changes in traffic demand are taken into account.

A future reference-trajectory control algorithm that forecasts the future trajectory of elevator cars is implemented in FI-600. FI-600 is a next-generation elevator group supervisory control system using advanced forecasting trajectory technique, by means of a high performance RISC* micro-controller and intelligent processing application technology.



Using this algorithm, you can determine and configure the optimum trajectory by taking into account not only the past and present usage data, but also the trend of future traffic demand. This allows the system to cope with the change in status flexibly and quickly, optimizing the allocation and operation of elevator cars for every user.

*RISC: Stands for Reduced Instruction Set Computer. It is a microprocessor that implements high-speed operation with a small number of simple instructions.

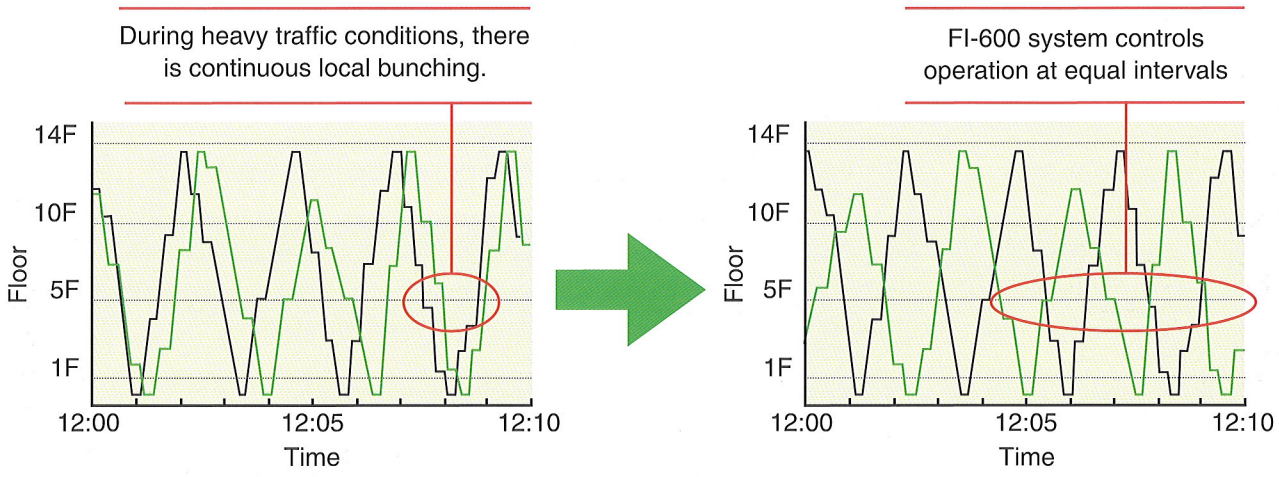
What is future reference-trajectory-control?

Generally speaking, a group of elevator cars must be operated at equal time intervals to minimize passenger waiting times, but in heavy traffic conditions, cars are frequently operated in a bunch, or all cars would end up clustering around the same level on their way and moving in the same direction in unison. In the conventional group control method, the most available cars at that moment are allocated to hall calls to eliminate local bunching, but when heavy traffic conditions are prolonged, this state cannot be completely eliminated, resulting in long waiting times.
In contrast, with future reference-trajectory control, elevator cars are controlled by taking into account their forecasted trajectories, allowing shorter passenger waiting times and reducing the probability of a long wait(*2).

Major advantages of FI-600

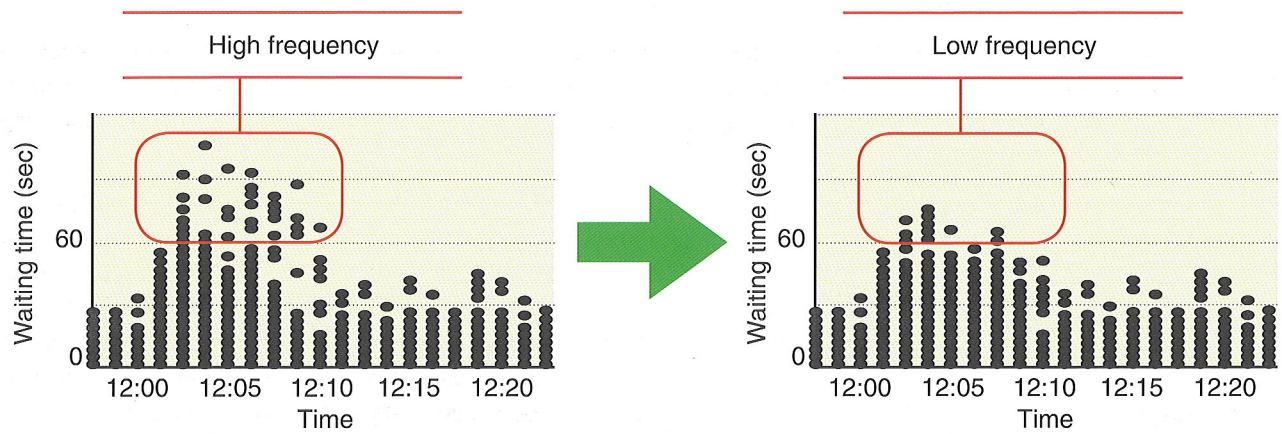
The FI-600 controls the fluctuation in waiting times, thereby shortening the average waiting times, reducing the probability of a long wait(*2) during heavy traffic, and improving the "quality of waiting times" of users.

Reduce average waiting time by as much as 10% (*1)



Conventional trajectories **FI-600 trajectories**

Reduce probability of a long wait(*2) by up to 12% (*1)



Conventional waiting time distribution **FI-600 waiting time distribution**

(*1) Comparison is based on Hitachi's conventional group control system.
(*2) "Long wait" is defined as waiting times of more than 60 seconds.

FI series group control system

● Standard specification
▲ Optional specification
— Not applicable

Basic functions

No.	Function		Description	FI series 600	FI series 100	FI series 10
1	Instantaneous reservation and service forecasting (FI-IRF)		Upon receipt of a hall call, this function activates an elevator to serve this call, and at the same time the call is acknowledged by the hall lantern and chime.	●	—	—
2	Arrival notice indication (FI-ANI)		Four to five seconds prior to the arrival of an elevator, this function will activate the hall lantern flickering and the chime sound.	●	●	▲
3	Basic call assignment control	Future reference-trajectory control (FI-FRTC)	Controls the allocation of elevator cars to hall calls according to the future reference trajectory resulting from learning-based daily traffic flows.	●	—	—
4		Reference-trajectory control (FI-RTC)	Controls the allocation of elevator cars to hall calls based on the theory used in the highest model in the FI series, FI-600, and the intelligent-based data containing our know-how accumulated over a long period of time.	—	●	—
5		Ring control (FI-RC)	Allocates an elevator car closest to the floor where a new hall call is made.	—	—	●
6	Bunching prevention (FI-BP)		This function prevents local bunching of elevator cars using the "future reference-trajectory control" or the "reference trajectory control" for operating cars at equal time intervals.	●	●	—
7	Learning function	Collection of usage data (FI-CUD)	Collects the traffic status information by floor and direction for a unit time based on the elevator information such as car positions and the number of passengers getting on and off, and hall call information.	●	●	—
8		Recognition of traffic flow mode (FI-RTM)	Extracts characteristics at any given moment, including congested floors, from the collected usage data, and identifies the traffic flow mode at that moment.	● 40 mode	● 2 mode	—
9		Search for optimum operation program (FI-SOP)	Searches the optimum operation program of the moment based on the identified traffic mode.	●	●	—
10	Congested floor recognition (FI-CFR)		Identifies congested floors according to the usage data learned in each traffic flow mode.	●	—	—
11	Service forecasting for hall call assignment (FI-SFH)		This function assigns elevator cars to hall calls more precisely by forecasting the arrival time and number of passengers in the car according to the learning-based traffic demand.	●	—	—
12	Intelligent function	Generation of new traffic flow modes (FI-GNT)	Extracts new characteristics according to the learning-based usage data, and registers them as a building-specific new traffic flow mode.	●	—	—
13		Generation of optimum operation programs (FI-GOP)	Generates an optimum operation program for a building by simulating the elevator operation according to the usage data learned in each traffic mode and preferential control target.	●	—	—
14	Energy-saving preference control (FI-ESC)		This system reduces the number of elevator cars in service when traffic demand is low.	●	—	—
15	Floor standby control	Forecasting dynamic allocation control (FI-FDA)	Dynamically allocates elevator cars in response to continuously changing situations in the building by determining the area assigned to each car according to the forecasted number of passengers and car usage.	●	—	—
16		Zone distribution control (FI-ZD)	Distributes the idle elevator cars to the pre-assigned zones.	—	●	—
17		Fixed floor distribution control (FI-FD)	Distributes the idle elevator cars to the pre-assigned floors.	—	—	●
18	Learning-based concentrated service (FI-LCS)		Centralizes the service to the learning-based congested floors during peak times including morning, lunch time and evening peaks while taking the service for other floors into account.	●	—	—
19	Automatic door open time control (FI-ADT)		This function automatically controls the duration of the door open time according to the floor and the kind of call (hall call or car call) as well as the elevator condition.	●	●	—

● Standard specification
▲ Optional specification
— Not applicable

Operating functions

No.	Function	Description	FI series 600	100	10
20	Centralized control for special floors (FI-CCF)	This function preferentially assigns an elevator to the special floor (e.g. the director's room).	▲	—	—
21	Service floor selection (FI-SFS)	Allows the operator to select the service and non-service floors using, for example, the switches on the control panel.	▲	▲	—
22	Independent automatic operation (FI-IAO)	This operation allows an elevator to be separated from the group supervisory control and operate independently by a separate hall button.	▲	▲	▲
23	VIP service (FI-VIP)	When welcoming or sending off important guests, this function permits an elevator to be summoned directly to the desired car call floor by pushing a specially provided hall button.	▲	▲	▲
24	Closest car priority service (FI-CPS)	When a hall call button is pressed, the elevator car in the shaft closest to the hall call floor is preferentially dispatched.	▲	▲	—
25	Destination floor reservation system (FI-DFRS)	Allows the passenger to preselect the destination floor on the destination floor panel installed at the landing hall. This reduces button operations to one, improving the operability.	▲	—	—
26	Scheduled reservation system (FI-SRS)	Allows the operator to schedule various elevator services in the building, including the reassignment of service floors, centralized service and priority service, at a specific date and time (setting through XEMS is also possible).	▲	—	—
27	Zoning express service (FI-EZS)	Starts a divided express service when the peak traffic demand takes place in the preset time zones.	▲	—	—

Man-machine functions

No.	Function	Description	600	100	10
28	Hall information (FI-HI)	General and elevator operation information is indicated on the LED or LCD hall indicator.	▲	▲	—
29	Car information (FI-CI)	Information useful for passengers is presented on the LED or LCD car indicator.	▲	▲	—
30	Traffic follow door control (FI-TFDC)	The door open time is adjusted by detecting passengers getting on and off with multiple infrared light beams that cover the full height and width of elevator doors.	●	▲	▲

System backup functions

No.	Function	Description	600	100	10
31	Group management A.I. microprocessor malfunction recovery system (FI-AMR)	If the A.I. micro-processor malfunctions, this system will allow hall call assignments to be carried out by choosing from standard modes of traffic flow.	●	—	—
32	Group management operation microprocessor malfunction recovery system (FI-OMR)	When the active micro-controller in the dual system fails, the standby micro-controller takes over the group control to continue operation.	●	—	—
33	Hall call circuit malfunction recovery system (FI-HMR)	In the event that the associated hall call button is not responsive, other hall call buttons located on the same floor can be used for registering hall calls.	●	●	●
34	Group management control system malfunction recovery system (FI-GMR)	When the group management control system malfunctions, this system activates the "skip/ stop" operation for all elevators, covering either the odd number or even number fioors with respect to the lowest floor.	●	●	—
35	Individual signal or control microprocessor malfunction recovery system (FI-SMR)	When individual control microprocessor malfunctions, or when miscommunication is detected, this system isolates the elevator from the group management control immediately.	●	●	●
36	Individual control malfunction recovery system (FI-CMR)	If the hall call is not responded to for a certain period of time due to, for example, a fault in the mechanical shoe of the door, the failed section is disconnected from the group control until normal operation is resumed.	●	●	●

Operating systems and functions

Depending on your requirements and the number of elevators in a group, customers can choose from a range of collective control systems, group control systems (including FI-series group control system) and operating systems. There are also basic and optional functions which you can choose from, depending on the building type and building requirements.

Operating systems

Legend STD: Standard
OPT: Optional

No.	Name		Description	STD	OPT
1	Simplex collective control (CCTL)		This is a fully automatic operation used for a single elevator system. Hall calls in the direction in which the elevator is travelling are responded to sequentially and when all calls in that direction are cleared, calls in the opposite direction will be responded to. When there are no more calls, the elevator will stay on the last floor served.	●	
2	Duplex collective control (DCTL)		This is a fully automatic operation used for a two-elevator system. Hall calls are responded to by whichever elevator that can serve the hall call faster. When there are no more calls, one of the elevators will standby on the start floor while the other elevator will stay on the last floor served.		●
3	Group control See "FI series group control functions" for more details.	FI-600	This is a group control system used to operate three to eight elevator cars in a large-sized building. This control system consists of 3 smart systems; "future reference- trajectory control" , "learning system" and "intelligent system".		●
4		FI-100	This is a group control system used to operate three to six elevator cars in a medium-sized building. This system uses "reference-trajectory control", which is based on the theory used in the highest model of the "future reference-trajectory control".		●
5		FI-10	This is a simplified group control system used to operate three or four elevator cars. The system provides a ring control to allocate the elevator car closed to the floor where a new hall call is registered.		●
6	Down collective control (DWCC)		For this system, all floors have "down" call buttons only, except for the start floor, where there is "up" call button only. The other operations are the same as in simplex selective-collective and duplex selective-collective operations.		●
7	Attendant operation (ATT)		For this system, the stop floor is manually set by an attendant, such as in a department store.		●
8	Independent operation (INOC)		This operation system is used when there is a need to serve special passengers. Under this operation, all hall calls are disabled and the elevator is reserved for exclusive use of the special passengers.		●

Safety functions

No.	Name	Description	STD	OPT
1	Multi-beam door sensor (MBDS)	In the event that the beam paths are obstructed, this sensor, installed on the edge of the doors, will keep the doors open.	●	
2	Door safety return system (ORS)	In the event of door overload, such as when passengers get their fingers, hands or personal belongings caught in the door, this system automatically senses this and either re-closes or re-opens the doors to prevent injury.	●	
3	Interphone system (INPS)	An interphone system is provided for emergency communication between the elevator car and the master unit (in the supervisory panel, etc.).	●	
4	Car emergency lighting (CEML)	In the event of power failure, an emergency light inside the elevator car will be automatically activated.	●	
5	Nearest landing operation (NLNO)	In the unlikely event of temporary trouble during operation, the elevator automatically goes to the nearest floor at a low speed and doors will open to prevent passengers from being trapped inside.	●	
6	Overload detection system (OLDS)	In the event of overloading, this system will activate an audio/ visual alarm and prevent the elevator from moving.	●	
7	Door safety edge (one side or both sides) (DSEB)	Mechanical safety units are installed on one side or both sides of the elevator doors. In the event of passengers coming into contact with the safety edges of closing doors, the doors will immediately re-open.		●
8	3D door safety device (3DDS)	This device detects passengers getting on or off the elevator, keeping the doors open as long as passengers are within the area of detection.		●
9	Abnormal speed protection function (ASPF)	In the event that the elevator is moving downwards at an abnormally high speed, the brakes will be automatically engaged and the elevator will cease operation.	●	
10	Out of door-open zone alarm (ASOZ)	In the event that the elevator stops out of the door-open zone of a selected floor, doors will not open, and an alarm will be sounded in the elevator car.	●	

Service functions

Legend STD: Standard
OPT: Optional

No.	Name	Description	STD	OPT
1	Mischievous call cancellation (MCCC)	In the event that a large number of calls is registered by a small number of passengers, the calls are determined to be mischievous and will be automatically cancelled upon responding to the next call. This thus eliminates unnecessary stops.	●	
2	Door time adjustment (DTAD)	The duration of the door open timing is tailored to usage conditions, substantially improving operational efficiency.	●	
3	Floor "deselect" function (FDSF)	This function allows you to cancel the selection of a floor you have pressed accidentally by pressing the button again. (This thus eliminates unnecessary stops.)	●	
4	Automatic return function (ARTF)	After all the calls have been served, the elevator will return to the start floor for standby.	●	
5	Door open prolong button (DOPB)	In the event that this button on the car operating board is pressed, the elevator doors will remain open for a pre-set period of time.		●
6	Automatic bypass operation (ABPO)	In the event that the elevator is fully loaded, the elevator will not respond to any hall calls but will only respond to the car calls.		●
7	Sub-operating panel (SOPB)	Additional floor selection and door open/ close buttons are located on the opposite side of the main operating panel in the elevator. This will be extremely convenient during rush hours.		●
8	Keypad sub-operating board (KSOP)	In order to comply with the barrier-free code, especially for high-rise buildings, individual car call buttons can be replaced with a keypad system.		●
9	Voice synthesizer (VSYS)	Preset standard messages are announced to the passengers by a voice synthesizer.		●
10	Arrival signal (ASGN)	An electronic chime (located at the top and bottom of the elevator) will be sounded just before the arrival of the elevator.		●
11	Interfacing with BGM speaker (BGMS)	A speaker for background music and public announcements for the building can be installed in the elevator car. Music and announcement systems, including wiring, is to be provided by others.)		●

Emergency operations

No.	Name	Description	STD	OPT
1	Earthquake emergency operation (EEMO)	In the event that an earthquake is detected, the elevator will stop at the nearest floor. (This function is not applicable to buildings with private lobby layouts.)		●
2	Fire emergency operation (FEMO)	In the event of fire, the elevator is automatically brought to the designated floor where it remains inoperative for passengers' safety.		●
3	Emergency operation for power failure (EPFO)	In the event of building power failure, the elevator can be operated by the building standby generator to move the elevator to the designated floor.		●
4	Automatic rescue device for power failure (ALP)	In the event of building power failure, the elevator automatically switches to battery power to bring the elevator to the nearest floor. (This function is not applicable to buildings with private lobby layouts.)		●
5	Fireman operation (FMNO)	In the event that the fireman switch is turned on, the elevator returns to the designated floor and will be ready for firemen's use.		●

Operating systems and functions

Management functions

Legend STD: Standard
OPT: Optional

No.	Name	Description	STD	OPT
1	Automatic turn-off of elevator light and fan (ATFL)	In the event that the elevator is idle, the light and ventilation fan in the elevator are automatically turned off to conserve energy.	●	
2	Maintenance operation (MTNO)	In the event that elevator maintenance is being carried out, the elevator operates at a lower speed.	●	
3	Parking operation (PKGO)	The elevator can be parked at a designated floor with a key switch.		●
4	Rush-hour schedule operation (RHSO)	By programming the rush-hour time, during this preset rush-hour timing, all the elevators automatically return to the start floor after serving the last call.		●
5	Floor lock-out operation (FLLO)	Specific service floors can be locked out by activating a switch.		●
6	Floor lock-out operation by Cipher code (ROCC)	By inputting a pre-programmed code using the car operating board floor buttons, only restricted passengers can gain access to certain floors.		●
7	Intelligent operation security system (IPSS)	This function allows controlled access to certain floors by means of a password or ID card. Note: Keypad or ID card-reader system is to be provided and installed by others, interfacing shall be by means of dry (voltage-free) contacts.		●
8	Interfacing with closed-circuitTV (CCTV)	This system enables the security personnel to monitor the movement inside the elevator. This will be effective in preventing criminal and mischievous acts inside the elevator. (CCTV system, including wiring, is to be supplied by others.)		●
9	Supervisory panel (SVP)	This panel provides various supervisory operations, including communication, and status monitoring.		●
10	eXtensible Elevator Monitoring System (XEMS)	This system shows the real time situation of the elevators such as the elevator position, movement direction and abnormal operation on the PC (Personal Computer) display. It is also possible to turn on/ off the elevators and change the service floors of the elevators using the PC.		●

List of designs and finishes

Car designs

No.	Item		Finishes / Design / Type	STD	OPT
1	Ceiling		Standard (CS-101S)	●	
2			DX-series (DX-12S)(DX-201S)(DX-23S)		●
3			SL/ EX-series (SL-102S)(EX-32S)(EX-403S)		●
4	Car wall (3 sides)		Painted sheet steel	●	
5			Stainless steel hairline		●
6			Stainless steel hairline etched (Hitachi standard pattern)		●
7	Front return panel & Transom panel		Stainless steel hairline	●	
8			Stainless steel hairline etched (Hitachi standard pattern)		●
9			Stainless steel hairline mirror		●
10	Door		Stainless steel hairline	●	
11			Stainless steel hairline etched (Hitachi standard pattern)		●
12			Stainless steel hairline mirror		●
13	Kickplate (3 sides)		Stainless steel hairline	●	
14	Sill		Extruded hard aluminum	●	
15	Operating panel	Position indicator	Stainless steel hairline with LCD indicator (*1) (OPE-10A) (*1)	●	
16			Stainless steel hairline with LCD indicator (OPE-10B)		●
17			Stainless steel hairline with dot-matrix indicator (OPS)		●
18		Button	Stainless steel face plate without Braille (TNS3)	●	
19			Stainless steel face plate without Braille (DMD3)		●
20			Stainless steel face plate with Braille (TNS7)(DMD7)		●
21			Plastic resin face plate without Braille (B95)(B98-1)		●

List of designs and finishes

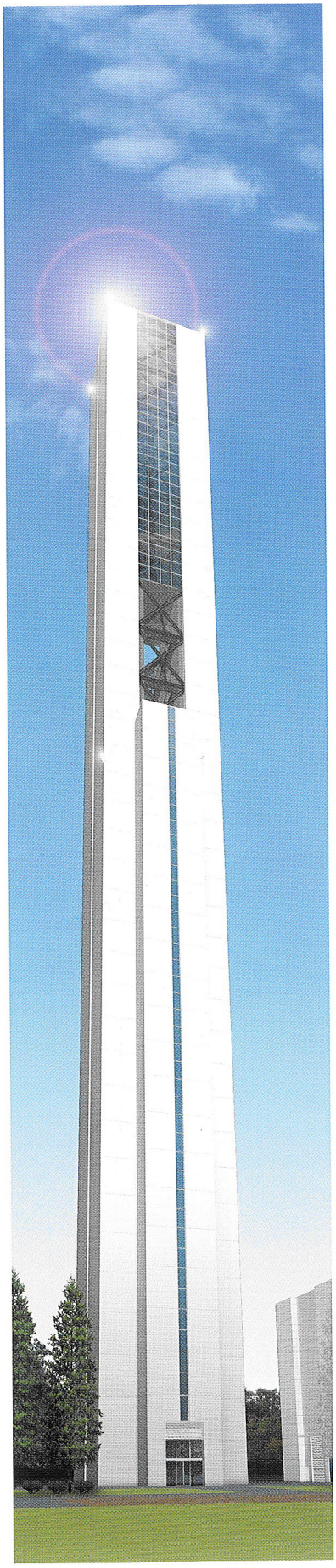
Entrance designs

Legend STD: Standard
OPT: Optional

No.	Item	Finishes / Design / Type			STD	OPT
1	Jamb frame	Narrow type (AS-1X)		Painted sheet steel	●	
2				Stainless steel hairline		●
3				Stainless steel mirror		●
4		T-wide type	Without transom panel (TS-1X) With transom panel (TL-2X)	Painted sheet steel		●
5				Stainless steel hairline		●
6				Stainless steel mirror		●
7		S-wide type	Without transom panel (SS-1X) With transom panel (SL-2X)	Painted sheet steel		●
8				Stainless steel hairline		●
9				Stainless steel mirror		●
10	Sill	Extruded hard aluminum			●	
11	Door	Painted sheet steel			●	
12		Stainless steel hairline				●
13		Stainless steel hairline etched (Hitachi standard pattern)				●
14		Stainless steel mirror				●
15		Stainless steel mirror etched (Hitachi standard pattern)				●
16	Hall button and Indicator (*2)	Incorporated type	Surface-mount type (*3)	(VIB-10A) (VIB-10AD)	●	
17				(VIB-10B) (VIB-10BD)		●
18		Button	Surface-mount type (*3)	(BN)		●
19				(BL)		●
20		Indicator	LCD, surface-mount type	(HNLX)		●
21			LCD type	(HFLX)		●
22			Dot matrix type	(HSDX)		●
23	Hall button	Stainless steel surface plate without Braille		(TNS3)	●	
24		Stainless steel surface plate without Braille		(DMD3)		●
25		Stainless steel surface plate with Braille		(TNS7) (DMD7)		●
26		Plastic surface plate without Braille		(B95) (A98-1)		●
27	Hall lantern	Vertical type	Surface-mount type	(HYD-93) (HYD-94)		●
28				(VLS-115) (VLS-90S)		●
29		Horizontal type		(HLS-025S)		●

(*1) In case the number of floor buttons is more than 20, OPE-10**B**-TNS3 shall be applied.
(*2) Hall indicator is not recommended for FI-600 and FI-100 operations.
(*3) Only TNS3 and TNS7 buttons are applicable for surface-mount type.

Research and development



Hitachi is always in the process of developing new technologies for next generation products through continuous research and development activities.

Excellence and flexibility in design at manufacturing plant in Singapore



This modern manufacturing plant in Singapore boasts a complete team of local and Japanese engineers geared towards providing maximum flexibility in design and manufacturing to suit the customer requirements.

High accuracy and efficiency in planning of equipment layout is made possible by the most advanced CAD system.

Equipment is made to the highest standard of quality and reliability with modern CNC machinery.

An integrated engineering system - from development, to design and production



Head office, research centers and plants work closely together to develop new technologies
Staff throughout the company work together as one team to conduct research and develop technologies.

High performance simulator enhances overall elevator system efficiency
A high performance simulator is utilized for all stages of elevator development, from planning through system design. Planning, research and development are carried out according to the results of this statistical analysis.

Cutting-edge CAD/CAM systems
The latest in CAD/CAM systems help us carry out elevator layout and various other design and production steps more quickly and efficiently.

One of the tallest elevator research towers. (Left: Photo)
Hitachi has one of the tallest elevator research towers, enabling the research and development of ultra-high speed and large-capacity elevators.

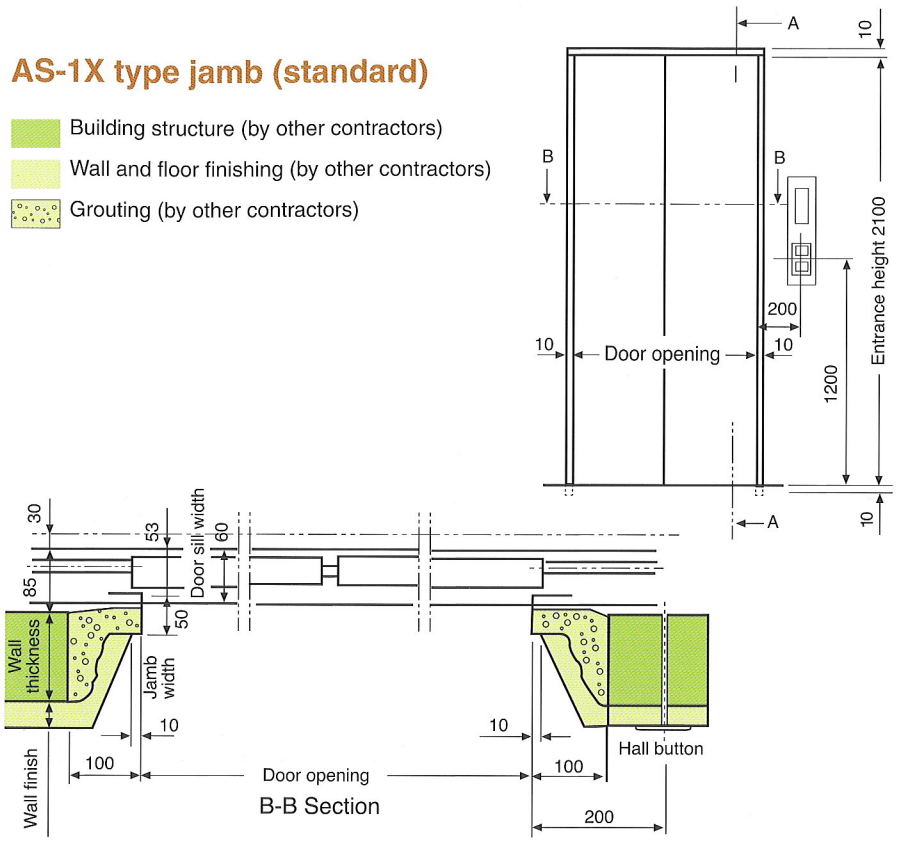
Entrance details

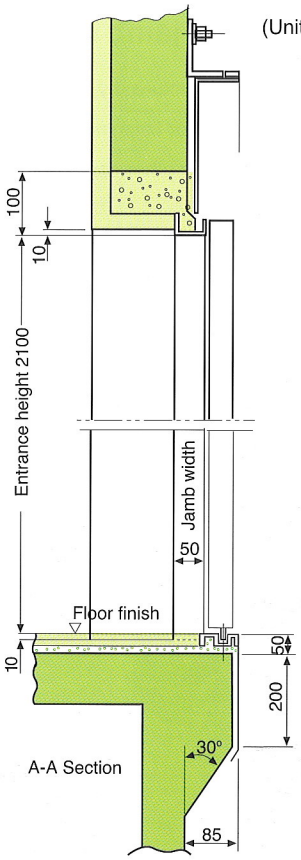
(For two panel center opening door)

(Unit : mm)

AS-1X type jamb (standard)

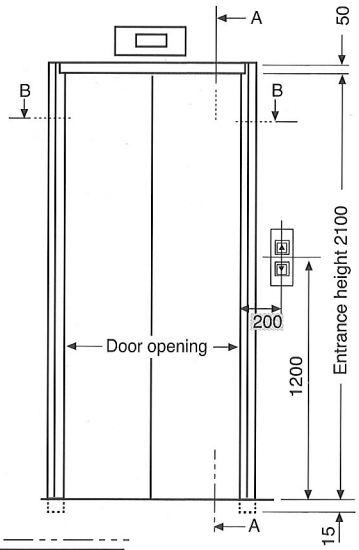
- Building structure (by other contractors)
- Wall and floor finishing (by other contractors)
- Grouting (by other contractors)

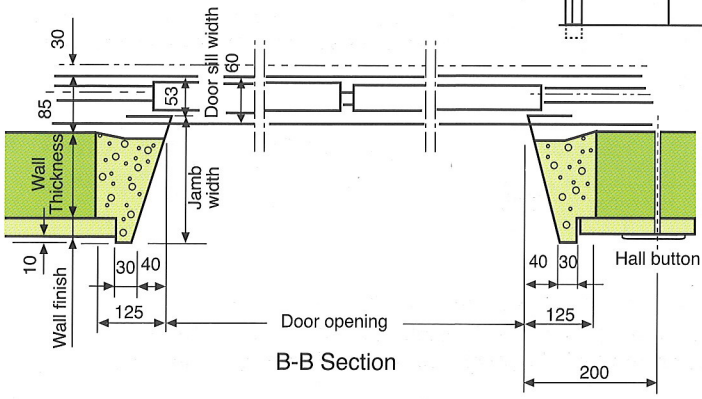


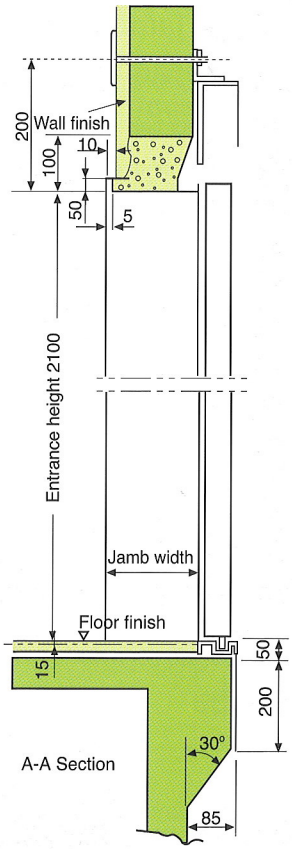


TS-1X type jamb (optional)

- Building structure (by other contractors)
- Wall and floor finishing (by other contractors)
- Grouting (by other contractors)







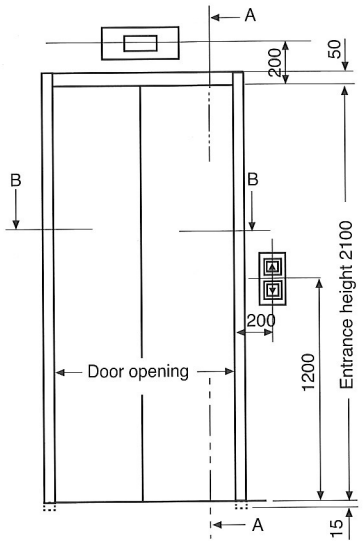
Note: Colors reproduced here may vary slightly from the actual.

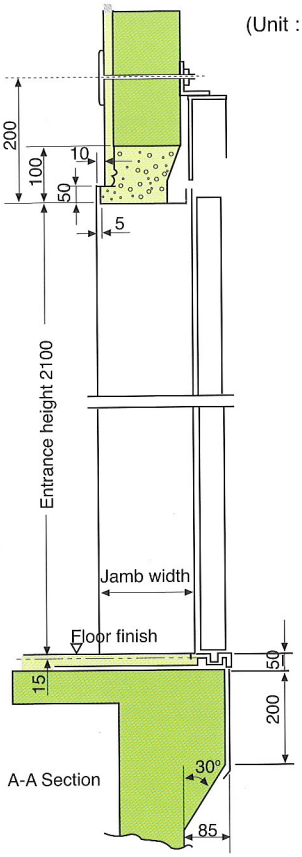
Entrance details
(For two panel center opening door)

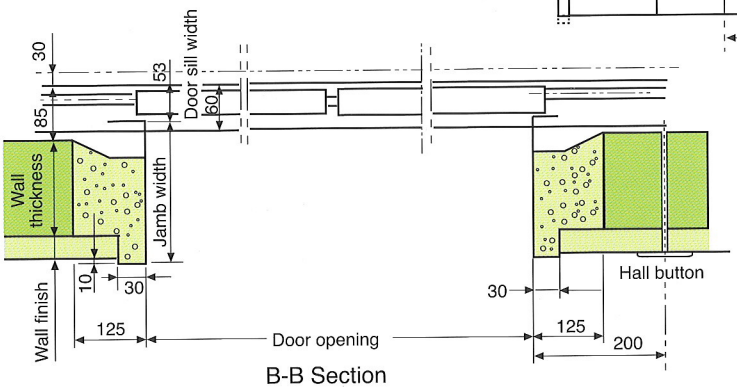
(Unit : mm)

SS-1X type jamb (optional)

- Building structure (by other contractors)
- Wall and floor finishing (by other contractors)
- Grouting (by other contractors)



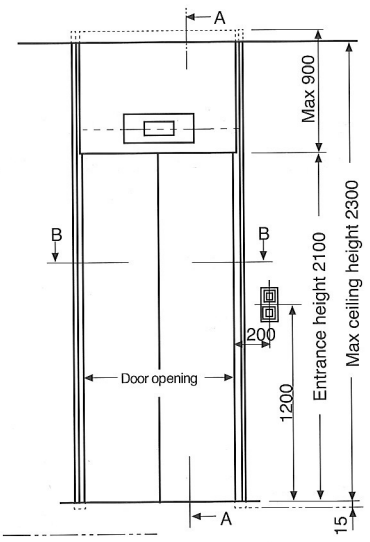


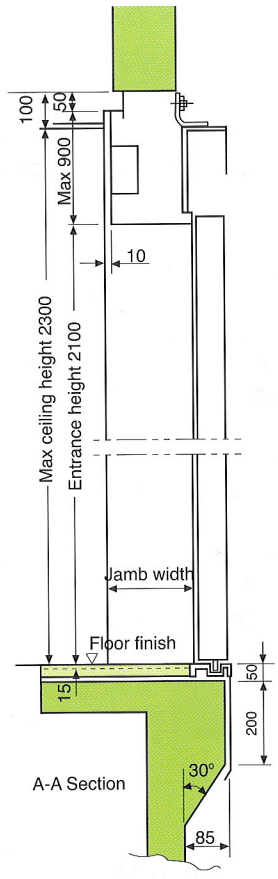


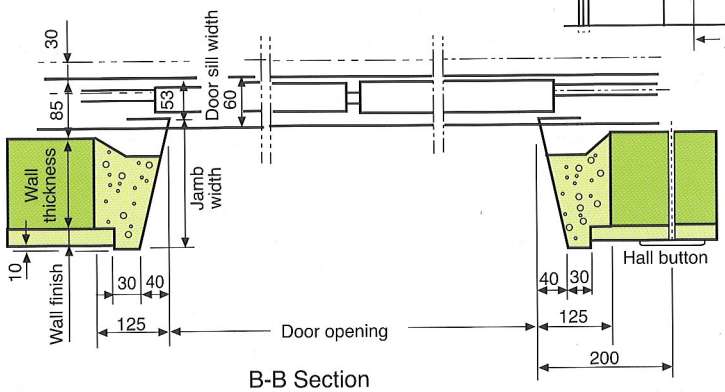
B-B Section

TL-2X type jamb (optional)

- Building structure (by other contractors)
- Wall and floor finishing (by other contractors)
- Grouting (by other contractors)







B-B Section

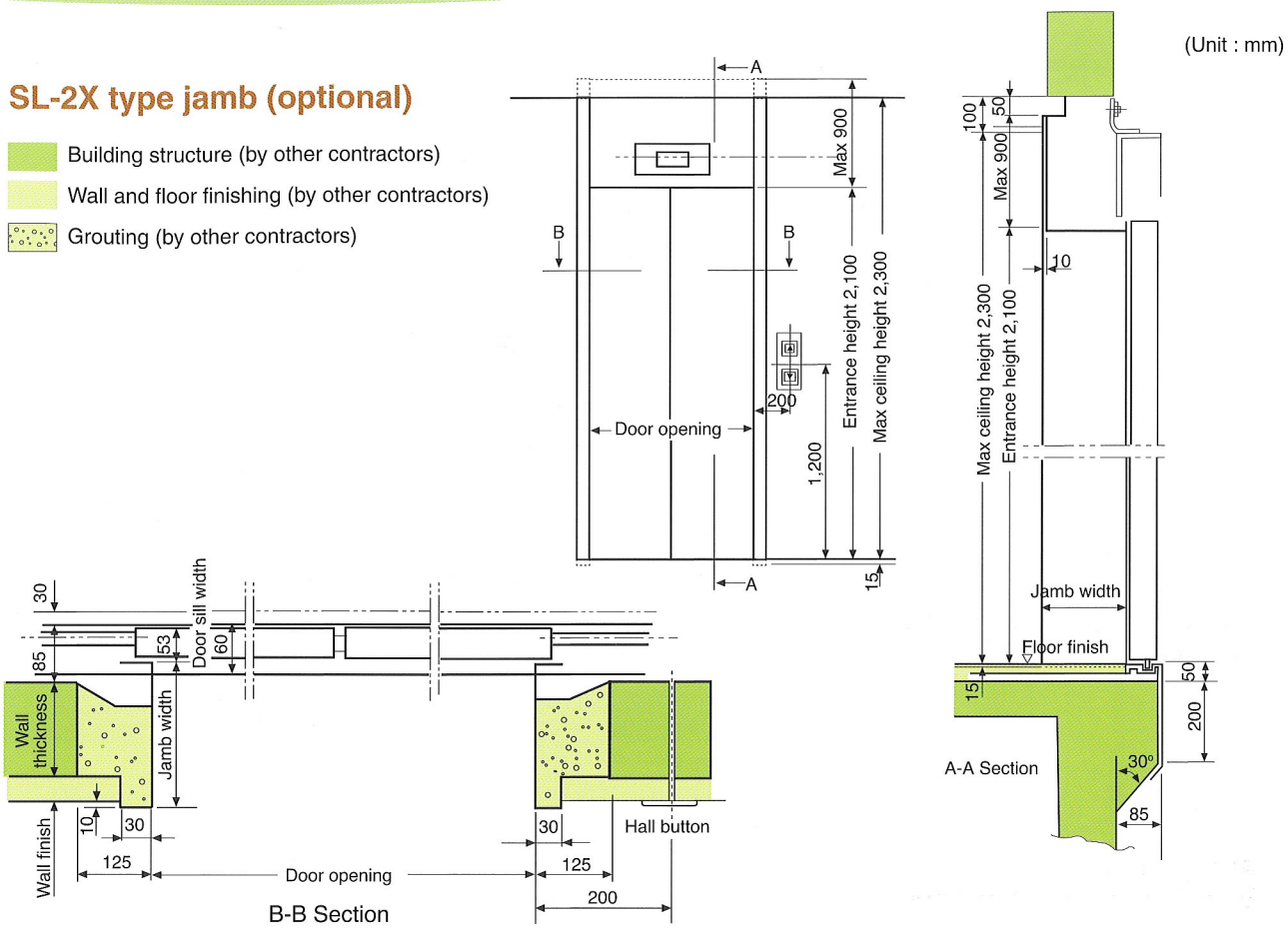
SL-2X type jamb (optional)

Building structure (by other contractors)

Wall and floor finishing (by other contractors)

Grouting (by other contractors)

(Unit : mm)



Work to be done by building contractors

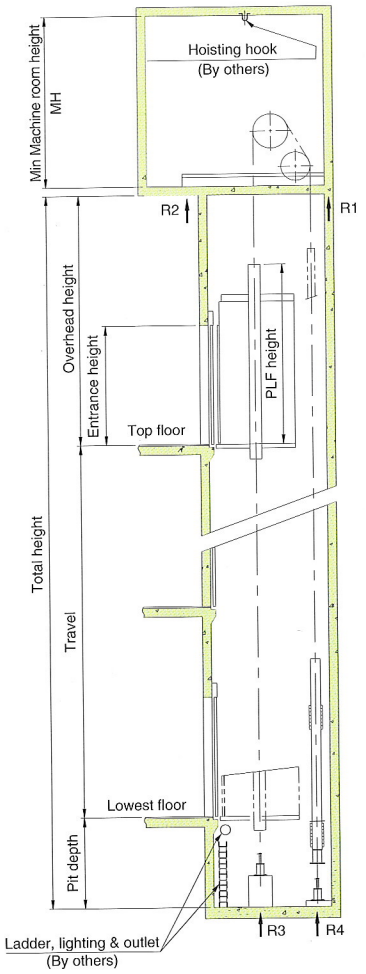
The preparatory work for elevator installation outlined below should be undertaken by building contractors in accordance with Hitachi drawings and applicable national or local codes and regulations.

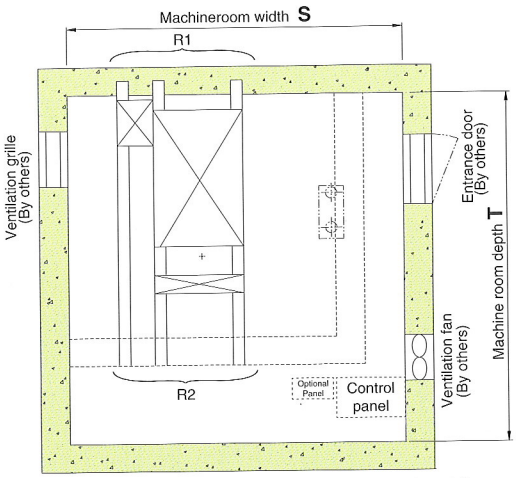
1. Prepare hoistway with proper framing and enclosure, suitable pit of proper depth with drains and water-proofing if required, properly lit and ventilated machine room of adequate size with concrete floors, access doors, ladders and guards as required.
2. Provide and/ or cut all necessary holes, chases, and openings and finishes after equipment installation.
3. Supply and secure all supports, reinforced concrete slabs, etc., necessary for installation of the machinery, doors, buffers, etc.
4. Furnish all necessary cement and/or concrete for grouting-in of brackets, bolts, machine beams, etc.
5. Prepare and erect suitable scaffolding and protective measures for the work in progress.
6. Furnish mains for three-phase electric power and single-phase lighting supply to machine room, following the instructions of the elevator contractor on outlet position and wire size.
7. Provide, free of charge, a suitable theft-proof storage area for materials and tools during erection work.
8. Supply electric power for lighting of work area, installation work, elevator testing and spray painting.
9. Hoisting hook for loading shown on page 26 at top of the machine room.

Maintenance parts

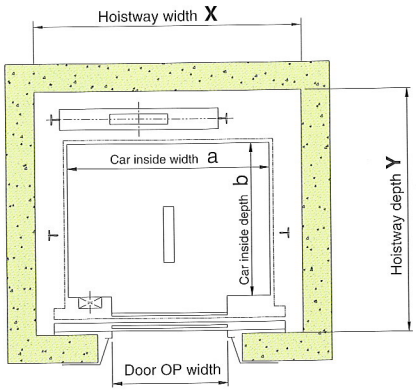
If a maintenance contract is signed with a Hitachi authorized maintenance company, Hitachi assures the repair and availability of replacement parts for 20 years from the date of FOB of the elevator.

Hoistway and machine room layout





Note: Machine room temperature should be maintained below 38°C with ventilating fan or air conditioner.



Minimum machine room height & hoisting hook capacity

No.	Reated load (kg)	Rated speed (m/min.)	Min. Machine room heigh MH (mm)	hoisting hook capacity (Ton)
1	450~700	60, 90, 105	2100	3
2	750~1000	60, 90, 105	2100	3
3		120, 150	2450	4
4	1150	60, 90, 105, 120, 150	2450	4
5	1350~1600	60, 90, 105, 120, 150	2500	4

Minimum dimensions for overhead height, pit depth and other specifications

No.	Elevator rated load (kg)	Rated speed (m/min)	Travel (m)	Overhead height (mm) (*1)			Pit depth (mm)	Maximum number of stops	Minimum floor to floor height (mm)
				JIS/SS550 /Malaysia/India	EN81-1	KFB			
1	450	60	Travel ≦ max.60	4450	4450	4550	1500	16	2700
2	550~700	60	Travel ≦ max.60	4450	4450	4550	1500	16	
3		90	Travel ≦ max.100	4550	4550	4700	1600	32	
4		105		4600	4600	4750			
5	750~1000	60	Travel ≦ max.60	4450	4450	4550	1500	16	
6		90	Travel ≦ max.100	4550	4550	4700	1600	32	
7		105		4600	4600	4750			
8		120	Travel ≦ 100	5100	5050		1900	40	
			100 < Travel ≦ max.140				2050		
9		150	Travel ≦ 100	5300	5250		2100		
			100 < Travel ≦ max.140				2300		
10	1150~1350	60	Travel ≦ max.60	4850	4850		1650	16	
11		90	Travel ≦ max.100	4950	4950		1750	32	
12		105		5100	5100		1850		
13		120	Travel ≦ 100	5100	5050		2050	40	
			100 < Travel ≦ max.140				2300		
14		150	Travel ≦ 100	5350	5250		2300		
			100 < Travel ≦ max.140				2500		
15	1600	60	Travel ≦ max.60	4850	4850		1750	16	
16		90	Travel ≦ max.100	4950	5050		1850	32	
17		105		5100	5100		1950		
18		120	Travel ≦ 100	5100	5050		2050	40	
			100 < Travel ≦ max.140	5200	5100		2450		
19		150	Travel ≦ 100	5300	5200		2250		
			100 < Travel ≦ max.140	5400	5300		2600		

(*1) Minimum overhead height shall be increased by 200mm if the ceiling design is EX-series type.

Dimensions and reaction loading (for 1 elevator)

Based on SS550:2009 Singapore and Malaysia regulations (with fire rated door)

No.	Rated load (kg)	Per-sons	Rated speed (m/min)	Model	Door OP width (mm)	Car inside	Hoistway	Machine room	Machine room and pit reaction loading (kN)			
						a x b (mm)	X x Y (mm)	S x T (mm)	R1	R2	R3	R4
1	450	6	60	VFI-450-CO60	800	1400 x 850	1850 x 1465	2300 x 2300	43	25	81	71
2	550	8	60	VFI-550-CO60		1400 x 1030	1850 x 1630	2300 x 2350	46	27	90	78
3			90	VFI-550-CO90			1850 x 1680	2400 x 2350	49	29	90	79
4			105	VFI-550-CO105							107	93
5	600 (615)	9	60	VFI-600-CO60 (VFI-615-CO60)		1400 x 1150	1850 x 1750	2300 x 2450	47	28	93	80
6			90	VFI-600-CO90 (VFI-615-CO90)			1850 x 1800	2400 x 2450	50	29	93	81
7			105	VFI-600 CO105 (VFI-615-CO105)							110	96
8	700	10	60	VFI-700-CO60		1400 x 1250	1850 x 1850	2300 x 2500	51	30	105	89
9			90	VFI-700-CO90			1850 x 1900	2400 x 2500	54	32	103	89
10			105	VFI-700-CO105							122	106
11	750	11	60	VFI-750-CO60	900 (800)	1350 x 1400 (1400x1350)	2050x 2000 (1850 x 1950)	2550 x 2600 (2300 x 2550)	52	31	108	94
12			90	VFI-750-CO90			2050 x 2050 (1850 x 2000)	2650 x 2600 (2400 x 2550)	55	32	106	93
13			105	VFI-750-CO105							126	110
14			120	VFI-750-CO120			2100 x 2110 (1900 x 2060)	2350 x 3450 (2300 x 3400)	105	61	149	134
15			150	VFI-750-CO150								
16	900	13	60	VFI-900-CO60	900	1600 x 1400	2050 x 2050	2550 x 2800	57	33	122	102
17			90	VFI-900-CO90			2100 x 2100	2650 x 2800	61	36	120	101
18			105	VFI-900-CO105							142	120
19			120	VFI-900-CO120			2100 x 2110	2500 x 3450	108	64	159	142
20			150	VFI-900-CO150								
21	1000 (1025)	15	60	VFI-1000-CO60 (VFI-1025-CO60)		1600 x 1550	2050 x 2200	2550 x 2850	59	35	128	106
22			90	VFI-1000-CO90 (VFI-1025-CO90)			2100 x 2250	2650 x 2850	63	37	125	104
23			105	VFI-1000-CO105 (VFI-1025-CO105)							148	124
24			120	VFI-1000-CO120 (VFI-1025-CO120)			2100 x 2260	2500 x 3600	110	67	165	146
25			150	VFI-1000-CO150 (VFI-1025-CO150)								
26	1150	17	60	VFI-1150-CO60		1600 x 1700	2050 x 2360	2450 x 3700	112	70	155	101
27			90	VFI-1150-CO90			2100 x 2410	2500 x 3750			192	169
28			105	VFI-1150-CO105								
29			120	VFI-1150-CO120	1000	1800 x 1500	2300 x 2210	2700 x 3550	120	73	194	171
30			150	VFI-1150-CO150								
31	1350	20	60	VFI-1350-CO60	1100	2000 x 1500	2520 x 2210	2900 x 3550	120	75	172	111
32			90	VFI-1350-CO90			2520 x 2260	2900 x 3600			205	177
33			105	VFI-1350-CO105								
34			120	VFI-1350-CO120					125	78	207	179
35			150	VFI-1350-CO150								
36	1600	23	60	VFI-1600-CO60	1100	2000 x 1750	2520 x 2410	2900 x 3750	125	80	209	124
37			90	VFI-1600-CO90			2520 x 2460	2900 x 3800			223	198
38			105	VFI-1600-CO105								
39			120	VFI-1600-CO120					131	83	226	202
40			150	VFI-1600-CO150								

( ): For Malaysia use only.

Dimensions and reaction loading (for 1 elevator)

Based on JIS regulation (non-fire rated door)

No.	Rated load (kg)	Persons	Rated speed m/s (m/min)	Model	Door OP width (mm)	Car inside	Hoistway	Machine room	Machine room and pit reaction loading (KN)			
						a x b (mm)	X x Y (mm)	S x T (mm)	R1	R2	R3	R4
1	450	6	60	VFI-450-CO60	800	1400 x 850	1750 x 1465	2300 x 2300	43	25	81	71
2	550	8	60	VFI-550-CO60		1400 x 1030	1750 x 1630	2300 x 2350	46	27	90	78
3			90	VFI-550-CO90			1850 x 1680	2400 x 2350	49	29	90	79
4			105	VFI-550-CO105							107	93
5	600	9	60	VFI-600-CO60		1400 x 1100	1750 x 1700	2300 x 2400	47	28	93	80
6			90	VFI-600-CO90			1850 x 1750	2400 x 2400	50	29	93	81
7			105	VFI-600-CO105							110	96
8	700	10	60	VFI-700-CO60		1400 x 1250	1750 x 1850	2300 x 2500	51	30	105	89
9			90	VFI-700-CO90			1850 x 1900	2400 x 2500	54	32	103	89
10			105	VFI-700-CO105							122	106
11	750	11	60	VFI-750-CO60		1400 x 1350	1750 x 1950	2300 x 2550	52	31	108	94
12			90	VFI-750-CO90			1850 x 2000	2400 x 2550	55	32	106	93
13			105	VFI-750-CO105							126	110
14			120	VFI-750-CO120			1900 x 2060	2300 x 3400	105	61	149	134
15			150	VFI-750-CO150								
16	900	13	60	VFI-900-CO60	900	1600 x 1350	2000 x 2000	2550 x 2750	57	33	122	102
17			90	VFI-900-CO90			2100 x 2050	2550 x 2750	61	36	120	101
18			105	VFI-900-CO105							142	120
19			120	VFI-900-CO120			2100 x 2060	2500 x 3400	108	64	159	142
20			150	VFI-900-CO150								
21	1000	15	60	VFI-1000-CO60		1600 x 1500	2000 x 2150	2550 x 2800	59	35	128	106
22			90	VFI-1000-CO90			2100 x 2200	2650 x 2800	63	37	125	104
23			105	VFI-1000-CO105							148	124
24			120	VFI-1000-CO120			2100 x 2210	2500 x 3550	110	67	165	146
25			150	VFI-1000-CO150								
26	1150	17	60	VFI-1150-CO60		1600 x 1600	2000 x 2260	2450 x 3600	112	70	155	101
27			90	VFI-1150-CO90			2100 x 2310	2500 x 3650			192	169
28			105	VFI-1150-CO105								
29			120	VFI-1150-CO120	1000	1800 x 1500	2300 x 2210	2700 x 3550	120	73	194	171
30			150	VFI-1150-CO150								
31	1350	20	60	VFI-1350-CO60	1100	2000 x 1500	2520 x 2160	2900 x 3500	120	75	172	111
32			90	VFI-1350-CO90			2520 x 2210	2900 x 3550			205	171
33			105	VFI-1350-CO105								
34			120	VFI-1350-CO120					125	78	207	179
35			150	VFI-1350-CO150								
36	1600	24	60	VFI-1600-CO60	1100	2000 x 1750	2520 x 2410	2900 x 3750	125	80	209	124
37			90	VFI-1600-CO90			2520 x 2460	2900 x 3800			223	198
38			105	VFI-1600-CO105								
39			120	VFI-1600-CO120					131	83	226	202
40			150	VFI-1600-CO150								

Electrical Information

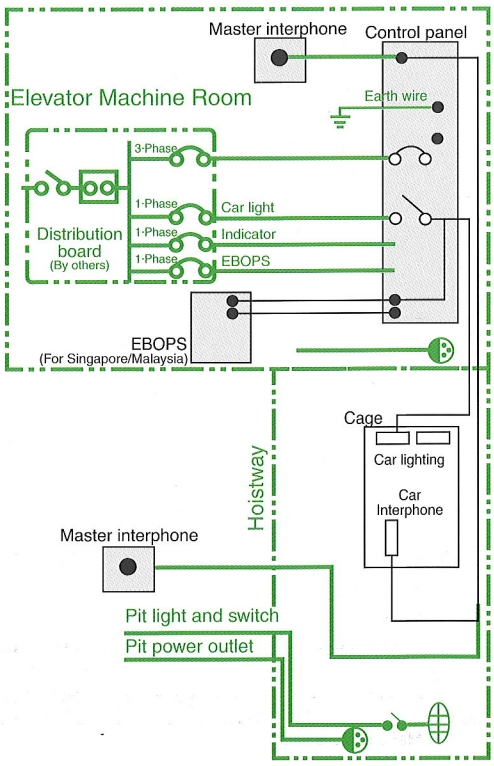
Wiring diagram

shows the works to be done by others.

Pit lightings, including wiring and piping, are to be provided by others (minimum 200 lux at floor level). Power socket outlet, including wiring and piping in pit, are to be provided by others.

Item	Work to be provided by others
Main power supply (*1)	To install facilities to ensure that power does not fluctuate outside the range of -10% to +5% of the normal voltage rating and to ensure that the unbalance factor of voltage does not exceed 5%.
Lighting power supply (*1)	To provide lighting power supply for car lighting indicators and maintenance work.
Interphone	To provide pipes and wiring located outside hoistway. To provide 12 interphone wires of 0.9mm²/ elevator.
Ventilation	To provide mechanical ventilation to the machine room to ensure that the temperature in the machine room is maintained at below 38°C.
Pit light, power outlet	To provide single-phase AC 200V, 10A power outlet and pit lighting with switch below the entrance floor level for maintenance purposes.

(*1) Main and lighting supply shall lead into the elevator machine room.



Electrical data

Required capacity of circuit breaker, transformer and starting power at building side.

No.	Model	Rated load (kg)	Rated speed (m/s)	Electrical data (For 1 elevator unless specified)							
				Motor capacity (kW)	Main supply voltage (3-phase) (V)	Circuit breaker bapacity per unit (A)	Transformer capacity (kVA) 1 unit	2 units	3 units	Starting power (kVA/ unit)	Calorific value for 1 lift (kcal/ hr)
1	VFI-450-CO60	450	60	4.5	200~220	32	4	7	9	13	600
					380~480	20					
2	VFI-550-CO60	550	60	4.5	200~220	32	5	7	10	14	734
					380~480	20					
3	VFI-550-CO90		90	6.7	200~220	40	6	10	13	18	1100
					380~480	20					
4	VFI-550-CO105		105	7.8	200~220	40	6	11	15	20	1284
					380~415	32					
					440~480	20					
5	VFI-600-CO60 (VFI-615-CO60)	600 (615)	60	4.5	200~220	40	5	8	10	15	800
					380~480	20					
6	VFI-600-CO90 (VFI-615-CO90)		90	6.7	200~220	40	6	10	14	19	1200
					380~480	20					
7	VFI-600-CO105 (VFI-615-CO105)		105	7.8	200~220	40	7	11	15	22	1400
					380~415	32					
					440~480	20					
8	VFI-700-CO60	700	60	5.5	200~220	40	5	9	12	17	934
					380~480	20					
9	VFI-700-CO90		90	8.3	200~220	40	7	11	15	22	1400
					380~415	32					
					440~480	20					
10	VFI-700-CO105		105	9.7	200~220	50	8	13	17	24	1634
					380~415	40					
					440~480	20					
11	VFI-750-CO60	750	60	5.5	200~415	40	6	9	12	17	1000
					380~480	20					
12	VFI-750-CO90		90	8.3	200~220	50	7	12	16	23	1500
					380~415	32					
					440~480	20					
13	VFI-750-CO105		105	9.7	200~220	50	8	13	18	26	1750
					380~415	40					
					440~480	32					
14	VFI-750-CO120		120	11	200~220	63	8	13	18	29	2000
					380~415	40					
					440~480	32					
15	VFI-750-CO150		150	14	200~220	75	10	16	22	36	2500
					380~480	40					
16	VFI-900-CO60	900	60	5.9	200~220	40	6	10	14	20	1200
					380~480	20					
17	VFI-900-CO90		90	8.9	200~220	50	8	14	19	26	1800
					380~480	32					
18	VFI-900-CO105		105	10.4	200~220	63	8	14	19	30	2100
					380~415	40					
					440~480	32					
19	VFI-900-CO120		120	11.8	200~220	63	9	15	21	33	2400
					380~480	40					
20	VFI-900-CO150		150	14.7	200~220	75	11	19	25	40	3000
					380~480	40					
21	VFI-1000-CO60 (VFI-1025-CO60)	1000 (1025)	60	6.7	200~220	40	7	11	15	21	1334
					380~480	20					
22	VFI-1000-CO90 (VFI-1025-CO90)		90	10.2	200~220	63	8	13	18	28	2000
					380~480	40					
23	VFI-1000-CO105 (VFI-1025-CO105)		105	11.7	200~220	63	9	15	20	32	2334
					380~480	40					
24	VFI-1000-CO120 (VFI-1025-CO120)		120	14	200~220	75	10	17	23	36	2667
					380~480	40					
25	VFI-1000-CO150 (VFI-1025-CO150)		150	17	200~220	75	12	20	28	44	3334
					380~415	50					
					440~480	40					
26	VFI-1150-CO60	1150	60	7.5	200~220	50	7	12	16	23	1534
					380~415	32					
					440~480	20					
27	VFI-1150-CO90		90	11.2	200~220	63	9	15	20	32	2300
					380~480	40					
28	VFI-1150-CO105		105	13	200~220	75	10	17	23	36	2684
					380~480	40					
29	VFI-1150-CO120		120	15	200~220	75	11	19	25	41	3067
					380~480	40					
30	VFI-1150-CO150		150	18.5	200~220	100	14	23	31	50	3834
					380~480	50					
31	VFI-1350-CO60	1350	60	9	200~220	50	8	13	18	26	1800
					380~480	32					
32	VFI-1350-CO90		90	13	200~220	75	10	17	23	36	2700
					380~480	40					
33	VFI-1350-CO105		105	15	200~220	75	11	19	26	42	3150
					380~415	50					
					440~480	40					
34	VFI-1350-CO120		120	17.5	200~220	100	13	21	29	47	3600
					380~415	50					
					440~480	40					
35	VFI-1350-CO150		150	22	200~220	125	16	26	36	58	4500
					380~415	63					
					440~480	50					
36	VFI-1600-CO60	1600	60	10.5	200~220	63	8	14	19	30	2134
					380~415	40					
					440~480	32					
37	VFI-1600-CO90		90	15.5	200~220	75	12	19	26	42	3200
					380~415	50					
					440~480	40					
38	VFI-1600-CO105		105	18	200~220	100	13	22	30	48	3734
					380~415	50					
					440~480	40					
39	VFI-1600-CO120		120	21	200~220	125	15	25	34	55	4267
					380~415	63					
					440~480	50					
40	VFI-1600-CO150		150	26	200~220	125	18	31	42	67	5334
					380~415	75					
					440~480	63					

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Dimensions and reaction loading (for 1 elevator)

Based on EN81-1:1998 and KFB (Kuwait) regulations (with fire rated door)

No.	Rated load (kg)	Per-sons	Rated speed (m/min)	Model	Door OP width (mm)	Car inside	Hoistway	Machine room	Machine room and pit reaction loading (kN)			
						a x b (mm)	X x Y (mm)	S x T (mm)	R1	R2	R3	R4
1	450	6	60	VFI-450-CO60	800	1400 x 850	1850 x 1465	2300x 2300 (2300 x 2500)	43	25	72 (81)	63 (71)
2	550	7	60	VFI-550-CO60		1400 x 1000	1850 x 1630	2300 x 2350 (2300 x 2550)	46	27	80 (90)	69 (78)
3			90	VFI-550-CO90			1850 x 1680	2400 x 2350 (2400 x 2550)	49	29	87 (90)	76 (79)
4			105	VFI-550-CO105							87 (107)	76 (93)
5	600	8	60	VFI-600-CO60		1400 x 1050	1850 x 1700	2300 x 2400 (2300 x 2600)	47	28	83 (93)	71 (80)
6			90	VFI-600-CO90			1850 x 1750	2400 x 2400 (2400 x 2600)	50	29	90 (93)	78 (81)
7			105	VFI-600-CO105							90 (110)	78 (96)
8	700	9	60	VFI-700-CO60		1400 x 1200	1850 x 1850	2300 x 2500 (2300 x 2700)	51	30	93 (105)	89 (96)
9			90	VFI-700-CO90			1850 x 1900	2400 x 2500 (2400 x 2700)	54	32	100 (103)	86 (89)
10			105	VFI-700-CO105							100 (122)	86 (106)
11	750	10	60	VFI-750-CO60		1400 x 1300	1850 x 1950	2300 x 2550 (2300 x 2750)	52	31	96 (108)	81 (91)
12			90	VFI-750-CO90			1850 x 2000	2400 x 2550 (2400 x 2750)	55	32	102 (106)	88 (93)
13			105	VFI-750-CO105							102 (126)	88 (110)
14			120	VFI-750-CO120			1900 x 2060	2300 x 3400	105	61	155 (149)	134 (134)
15			150	VFI-750-CO150								
16	900	12	60	VFI-900-CO60	900	1600 x 1300	2050 x 2000	2550x 2750 (2550 x 2950)	57	33	109 (122)	91 (102)
17			90	VFI-900-CO90			2100 x 2050	2650x 2750 (2650 x 2950)	61	36	115 (120)	98 (101)
18			105	VFI-900-CO105							115 (142)	98 (120)
19			120	VFI-900-CO120			2100 x 2060	2500 x 3400	108	64	159 (159)	138 (142)
20			150	VFI-900-CO150								
21	1000	13	60	VFI-1000-CO60	900 [1000]	1600 x 1450 [1600 x 1400]	2050 x 2150 [2250 x 2150]	2550x 2800 (2550 x 3000)	58 (59)	34 (35)	114 (128)	94 (105)
22			90	VFI-1000-CO90			2100 x 2200 [2250 x 2200]	2650x 2800 (2650 x 3000)	63	37	120 (125)	101 (104)
23			105	VFI-1000-CO105							120 (148)	101 (124)
24			120	VFI-1000-CO120			2100 x 2210 [2250 x 2210]	2500 x 3550	110	67	165 (165)	142 (146)
25			150	VFI-1000-CO150								
26	1150	15	60	VFI-1150-CO60		1600 x 1600	2050 x 2260 [2250 x 2260]	2450 x 3600	112	70	158 (192)	133 (169)
27			90	VFI-1150-CO90			2100 x 2310 [2250 x 2310]	2500 x 3650				
28			105	VFI-1150-CO105								
29			120	VFI-1150-CO120	1000	1800 x 1450	2300 x 2210	2700 x 3550	120	73	188 (194)	162 (171)
30			150	VFI-1150-CO150								
31	1350	18	60	VFI-1350-CO60	1100	2000 x 1500	2520 x 2210	2900 x 3500	120	75	172 (205)	144 (177)
32			90	VFI-1350-CO90			2520 x 2210	2900 x 3550				
33			105	VFI-1350-CO105								
34			120	VFI-1350-CO120					125	78	198 (207)	169 (179)
35			150	VFI-1350-CO150								
36	1600	21	60	VFI-1600-CO60	1100	2000 x 1700	2520 x 2410	2900 x 3750	125	80	205 (223)	171 (198)
37			90	VFI-1600-CO90			2520 x 2460	2900 x 3800				
38			105	VFI-1600-CO105								
39			120	VFI-1600-CO120					131	83	213 (226)	179 (202)
40			150	VFI-1600-CO150								

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