Schneider Lift & Escalator
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ASIA SCHNEIDER (THAILAND) CO., LTD.

BASIC KNOWLEDGE

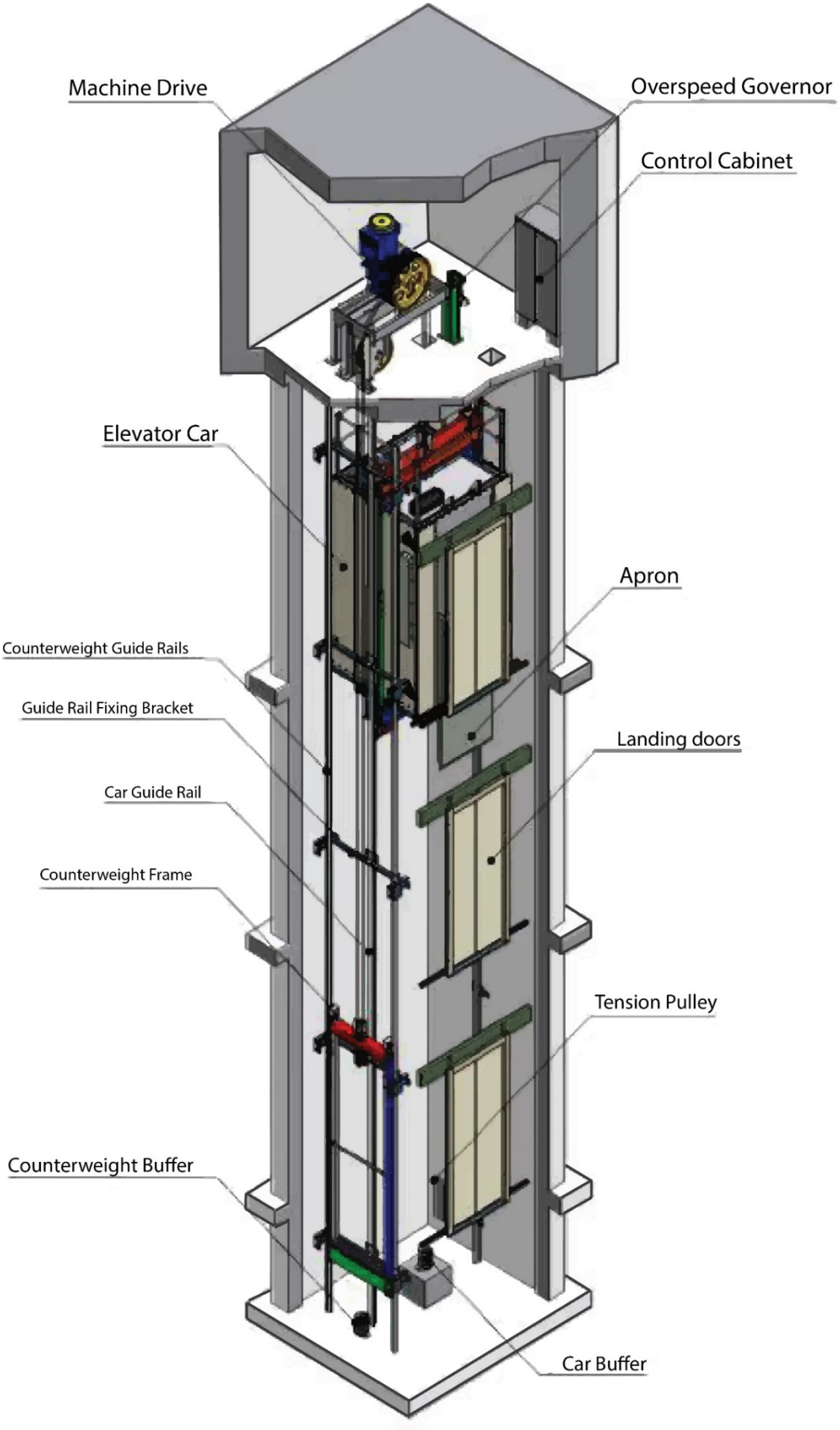
ABOUT

ELEVATORS

REVISION (101016)

PART 1 - ELEVATOR COMPONENTS

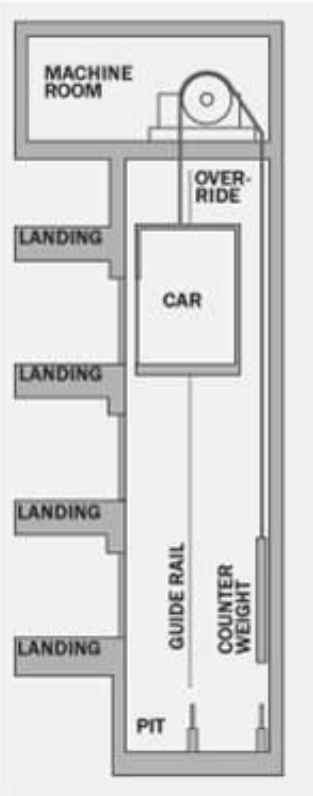
MACHINE ROOM



MMR

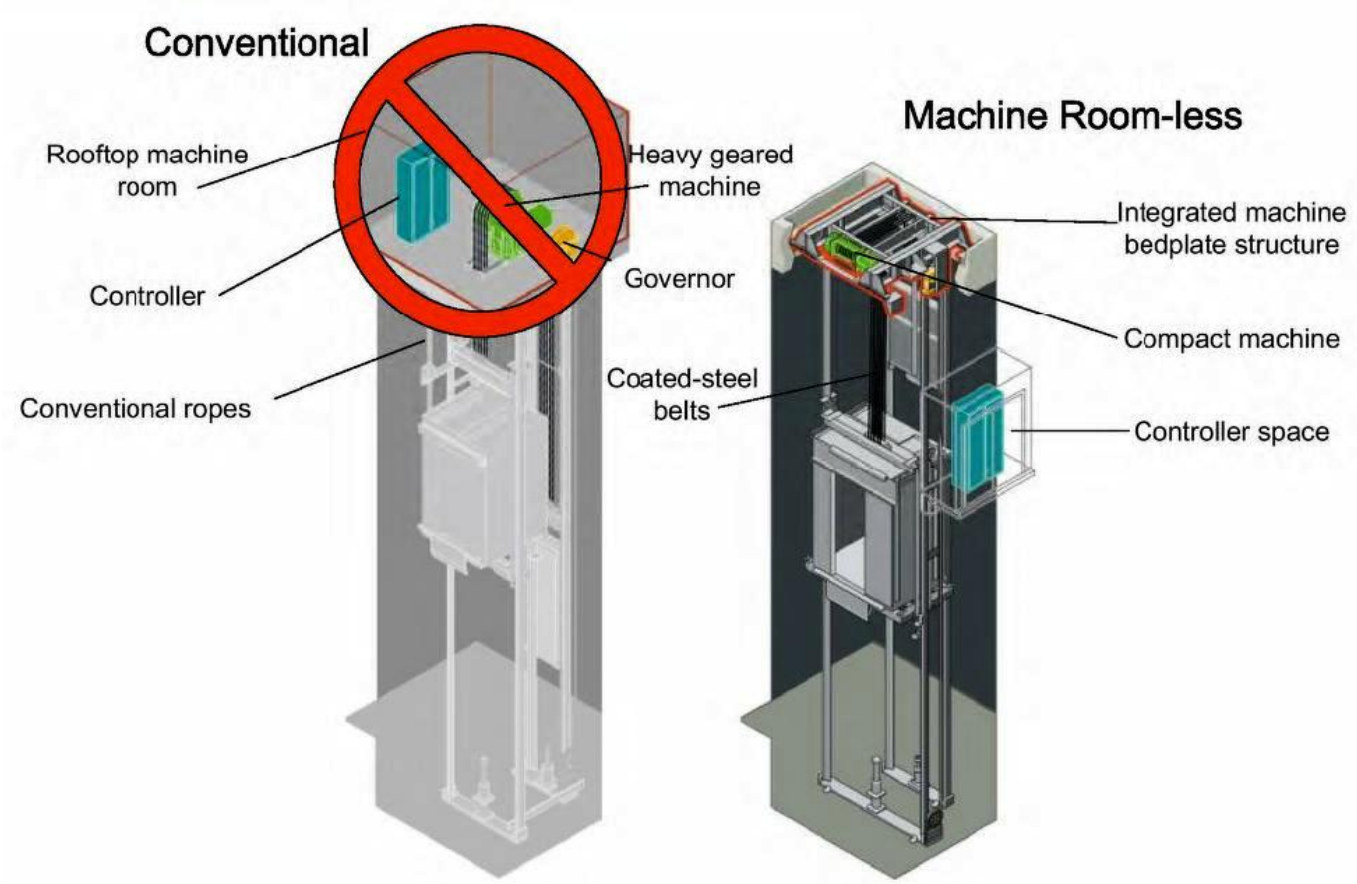
A Mini Machine Room (MMR) is almost the same as the typical Machine room, the only difference is the size. A Mini Machine Room has same size as its Shaft. While a Machine Room Area (Normal Machine room) is bigger than its shaft size. It's because of bigger Traction Unit & bigger controller which take more space.

Bigger load/speed or geared machine usually cause the machine and controller bigger. Besides that, An MRA must have enough space for technician to work around the area.



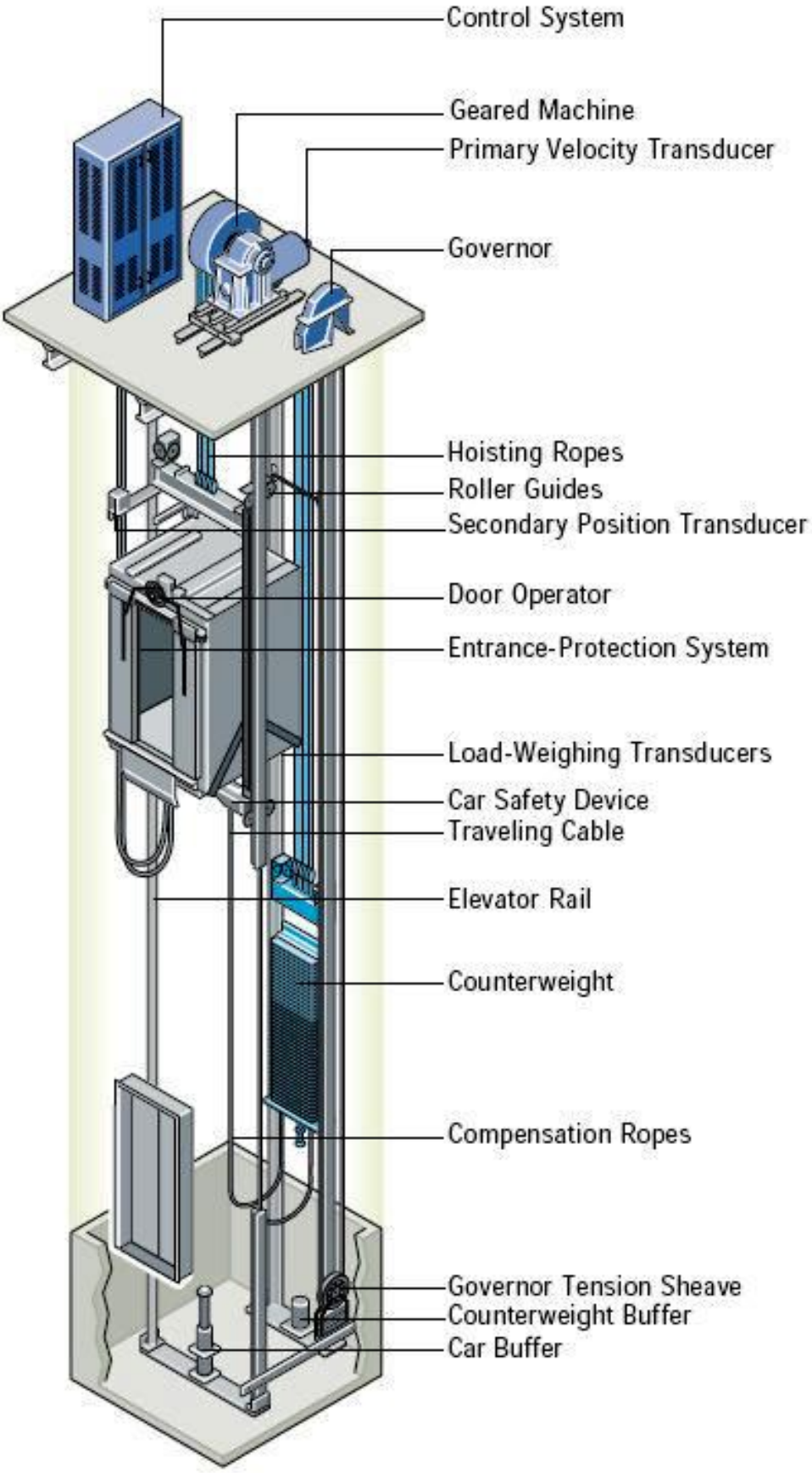
MRA

MACHINE ROOMLESS



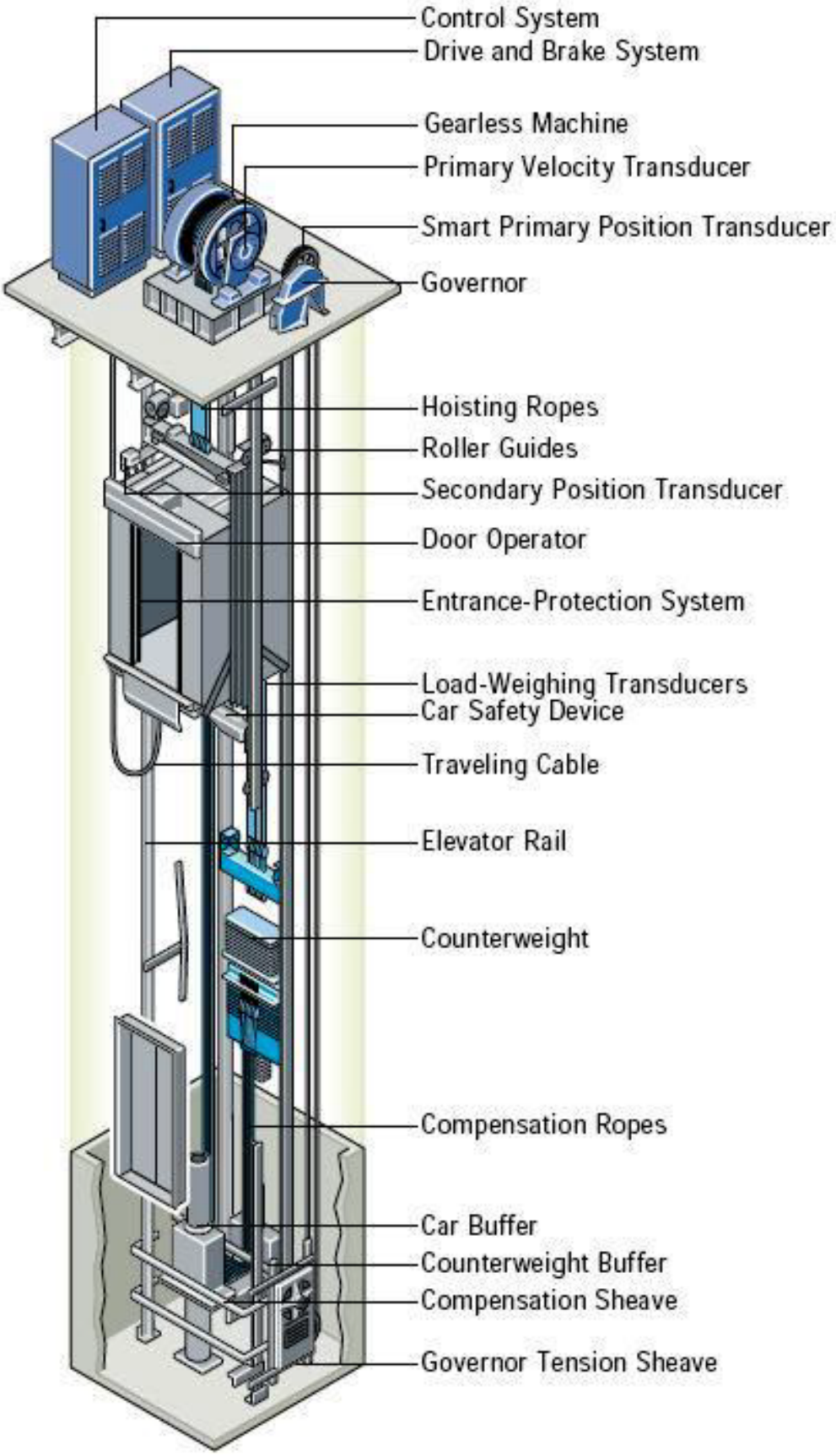
MACHINE ROOM-LESS ELEVATORS are typically traction elevators that do not have a dedicated machine room above the elevator shaft. The machine sits in the override space and the controls sit above the ceiling adjacent to the elevator shaft. MACHINE ROOM-LESS are becoming more common because it saves more space than conventional Machine Room Type.

GEARED MACHINE



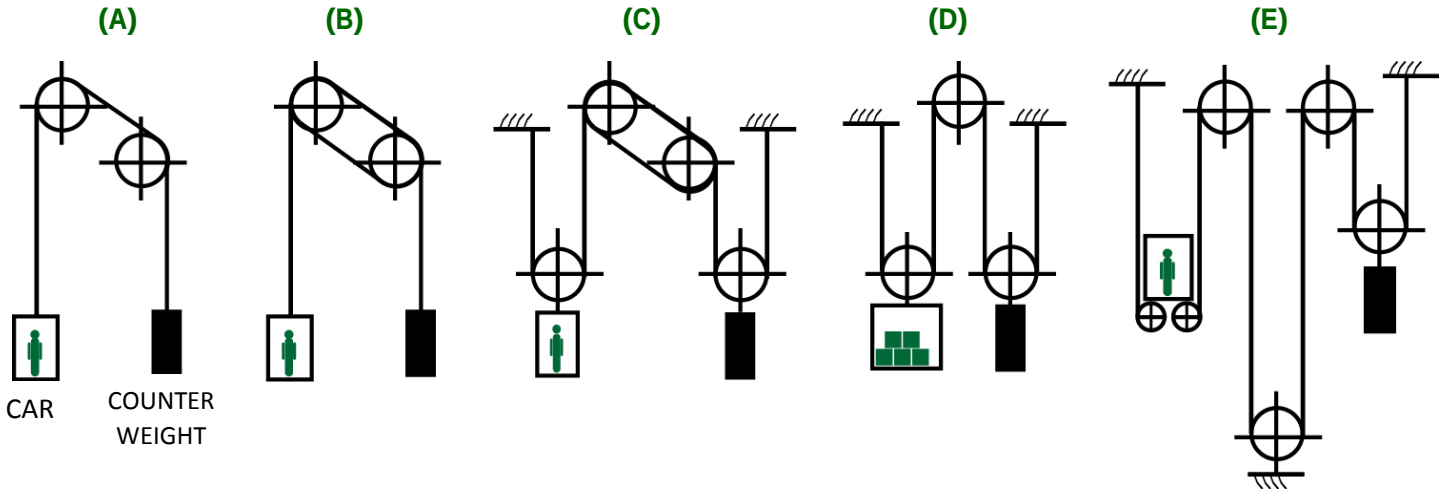
GEARED TRACTION ELEVATORS have a gearbox that is attached to the motor, which drives the wheel that moves the ropes. Geared traction elevators are capable of travel speeds up to 500 feet per minute. Buildings up to about 2 to 11 stories typically use Geared Traction Elevators.

GEARLESS MACHINE



GEARLESS TRACTION ELEVATORS have the wheel attached directly to the motor. Gear-less traction elevators are capable of speeds up to 2000 feet per minute. High-Rise Buildings or 12+ stories building typically use Gear-Less Traction Elevators. However it can also be used by Low-Rise buildings, depends on will.

ROPING SYSTEM



COMMONLY USED ROPING SYSTEMS

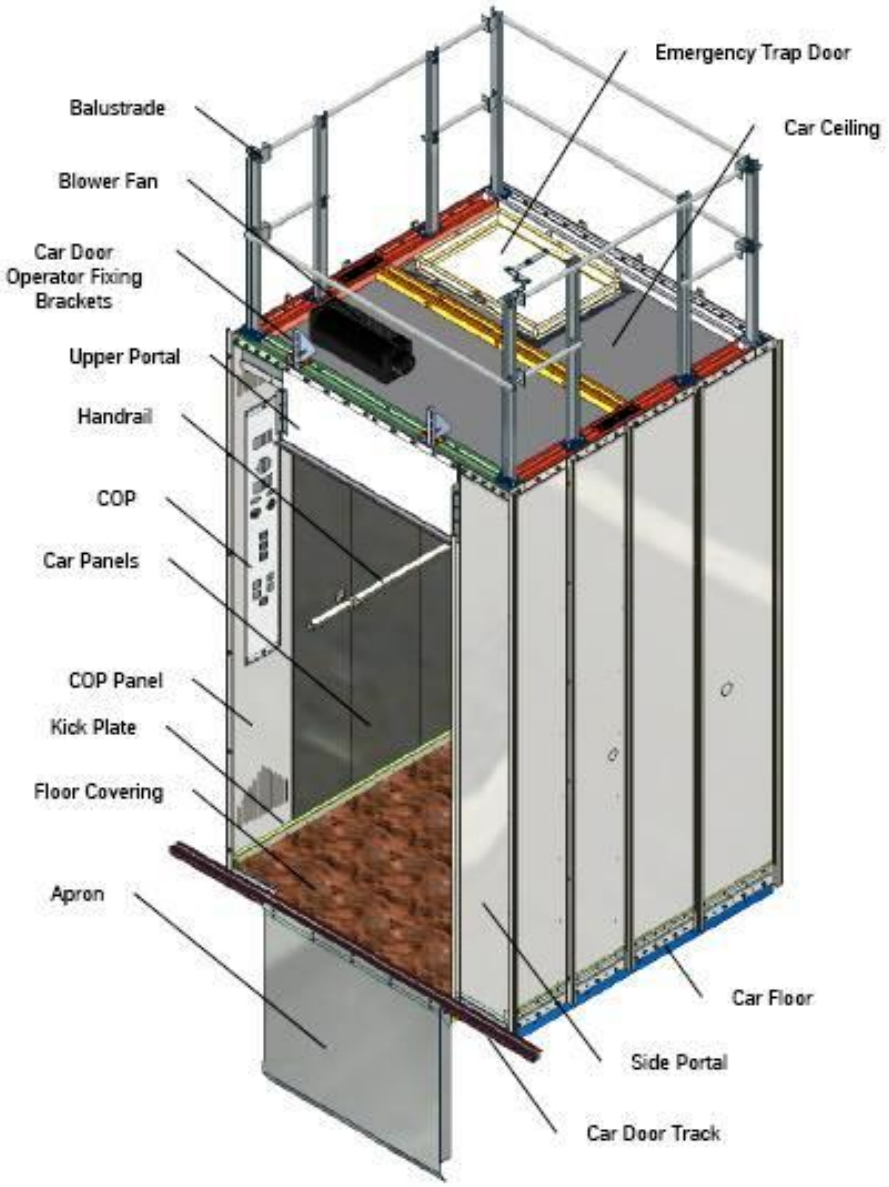
(A)	1:1	SINGLE WARP	MID-,LOW-SPEED LIFTS
(B)	1:1	DOUBLE WRAP	HIGH-SPEED LIFTS
(C)	2:1	DOUBLE WRAP	HIGH-SPEED LIFTS
(D)	2:1	SINGLE WRAP	FREIGHT LIFTS, MACHINE ROOMLESS LIFTS
(E)	2:1	SINGLE WRAP	MACHINE ROOMLESS LIFTS

PART 2.1 - ELEVATOR CAR COMPONENTS

ELEVATOR CAR is composed of the following components:

1. The elevator cabin
2. Car Sling, a metal framework connected to the means of suspension,
3. Mechanical accessories which are:
   - Car door and door operator.
   - Guide shoes.
   - Door Protective Device.

ELEVATOR CABIN



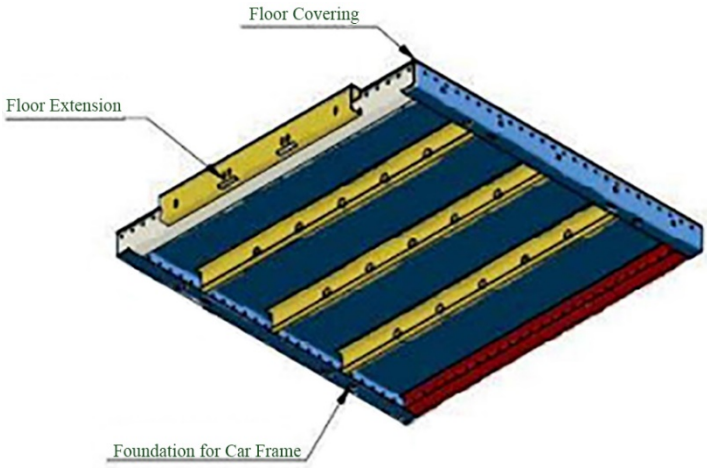
ELEVATOR CABIN shall be completely enclosed by walls, floors and ceiling, the only permissible opening being are the car door, emergency trap door and ventilation apertures.

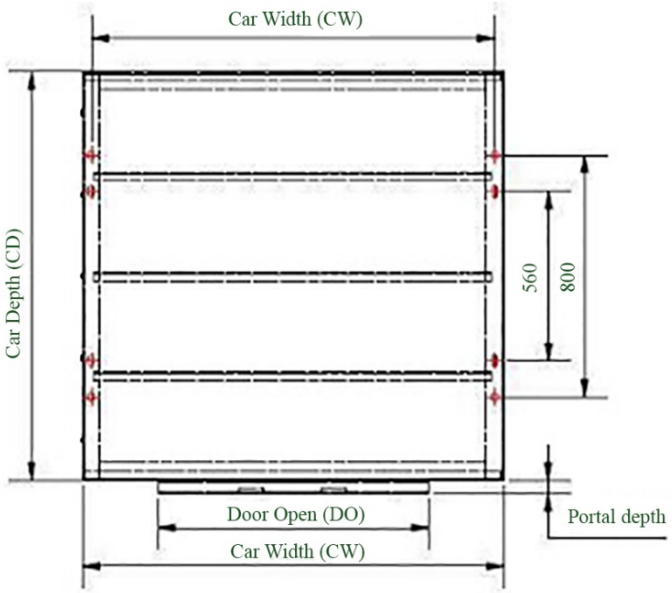
A – CAR FLOOR

Car floor shall have sufficient mechanical strength to sustain forces which will be applied during normal operation, safety gear operation and impact of the car to its buffers.

Floor size is the same size of the car (width & depth) and Floor extension defines door opening, location and side portal depth.

Floor will be recessed and covered by PVC covering or marble stone or granite and it can be also customized according to client requirements.

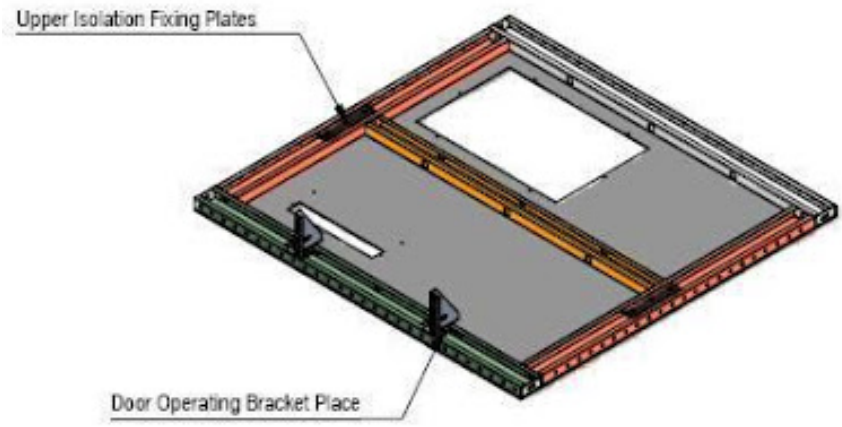


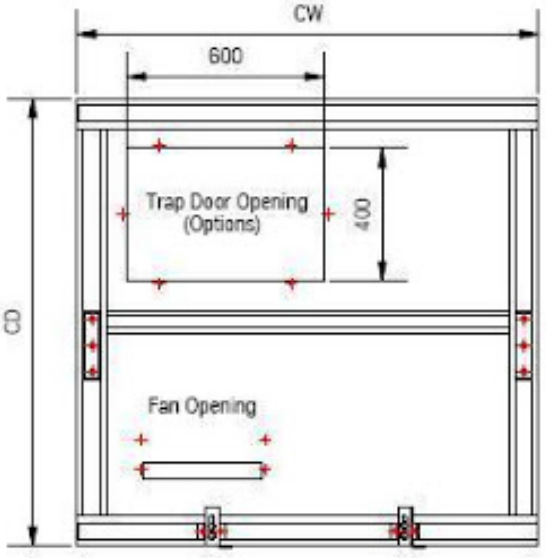


B – CAR CEILING

Car ceiling is designed to be able to support two persons during maintenance operation without permanent deformation.

Car ceiling is prepared also to mount emergency trap door, blower fan and balustrade.





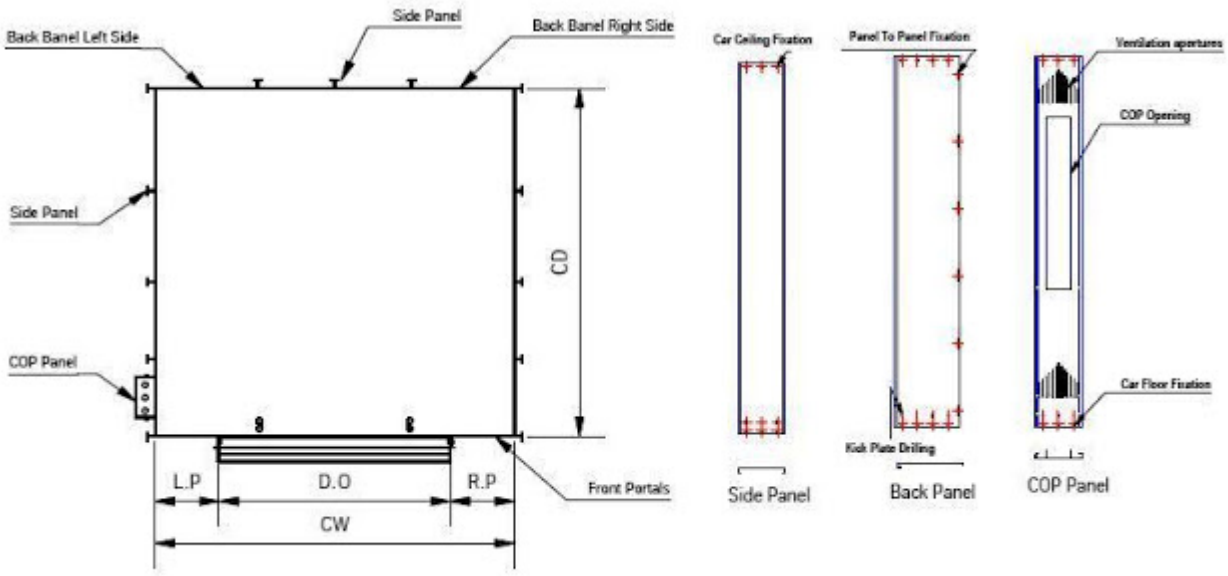
C – CAR WALLS

Folded steel panels are used to enclose elevator car with different types, sizes and finishing.

There are three main types of car panels as follows:

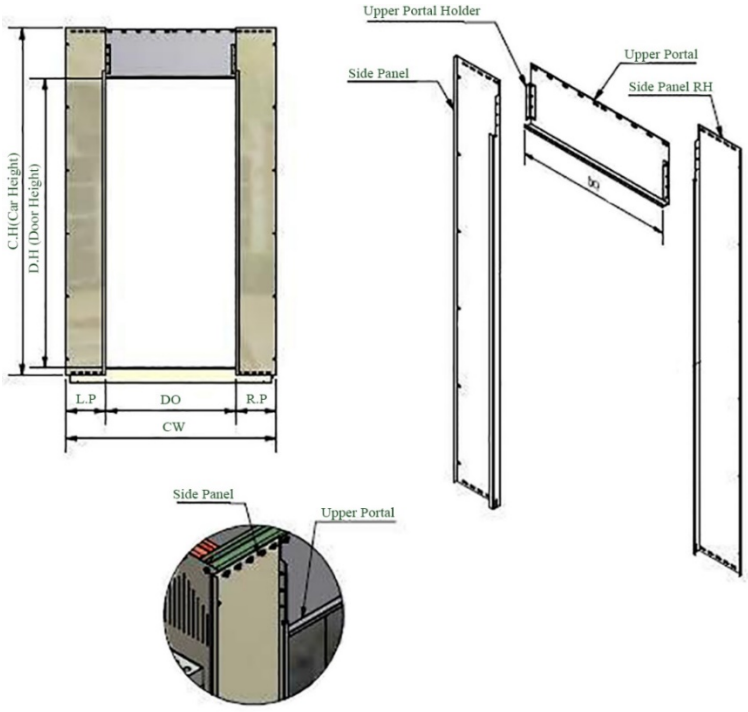
- **Side panels**, which are the most common used panels, they can be used in side walls and in the intermediate back wall.
- **Back panels**, which are used only in right hand and left hand back corners.
- **COP panels**, which is used to mount COP unit.

Car walls can be lined with stainless steel with different styles or painted in selected color upon client requirements.



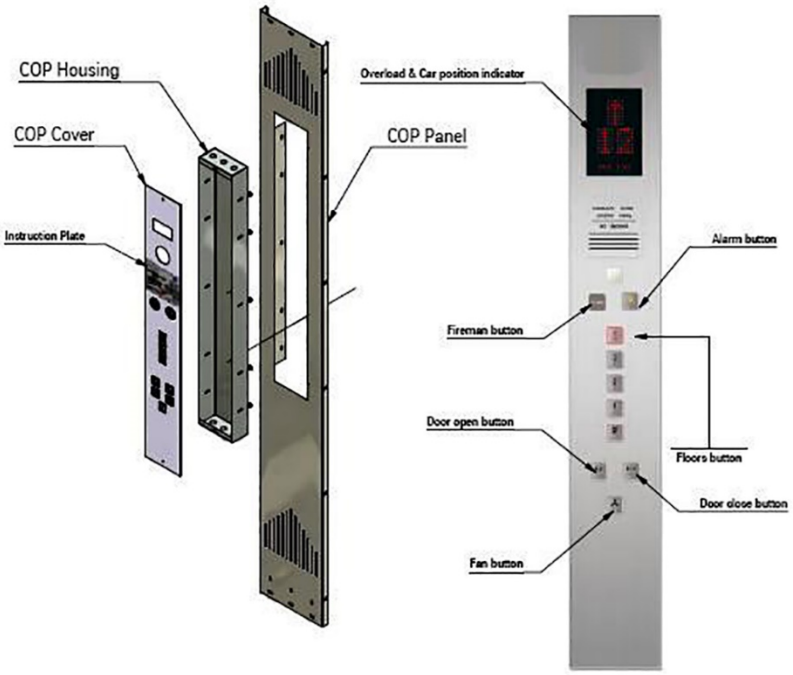
D – FRONT PANELS

The front panel assembly defines door opening height and location. There are two types of front panels, side and upper panels.

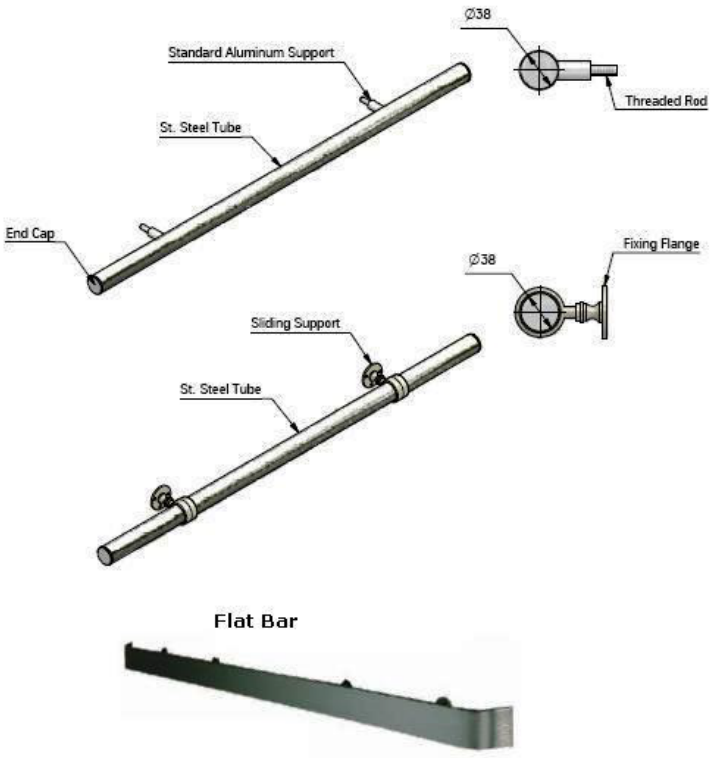


E – CAR OPERATING PANEL (COP)

Car operating panel COP is A panel mounted in the car containing the car operating controls, such as call register buttons, door open and close, alarm emergency stop and whatever other buttons or key switches are required for operation.

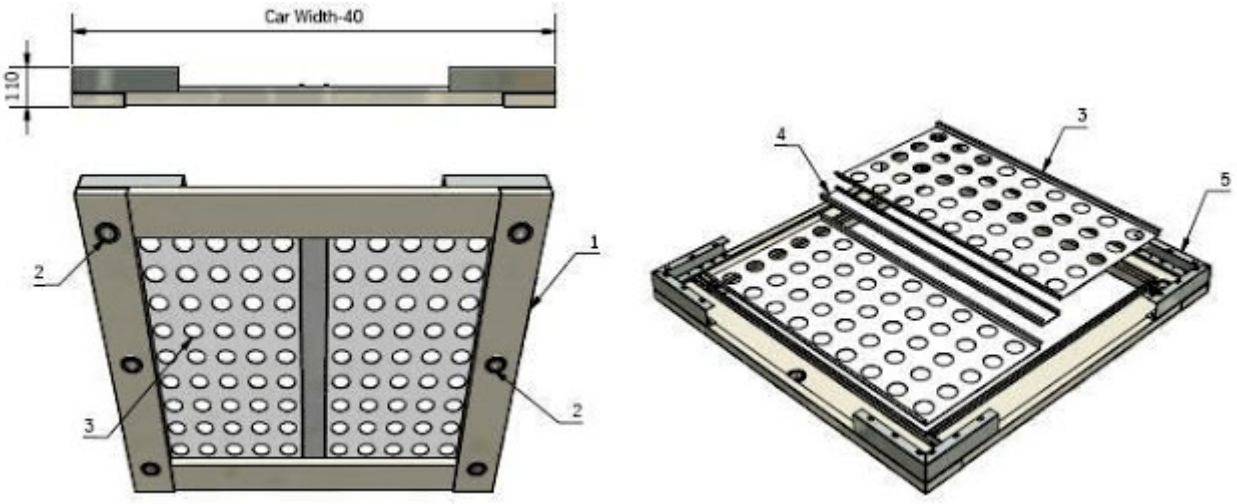


F – HAND RAIL



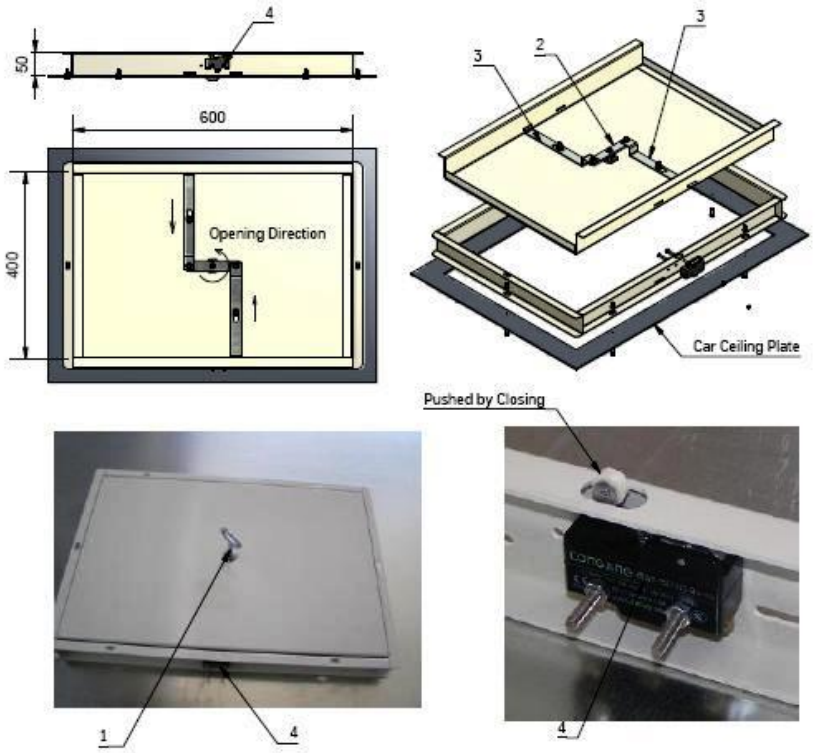
- Hand Rail is a rail within the elevator car which passengers can use for support.
- Elevator car in most cases is provided by a handrail at one side, two sides or on all sides of the cabin.
- At least one side of the car has a hand rail installed in case of using the elevator for passengers including persons with disabilities.
- Hand Rails come with different finishes like stainless steel styles or painted in selected color upon client requirements.
- There are two types of hand rail, cylindrical handrail and flat type hand rail.

G – FALSE CEILING



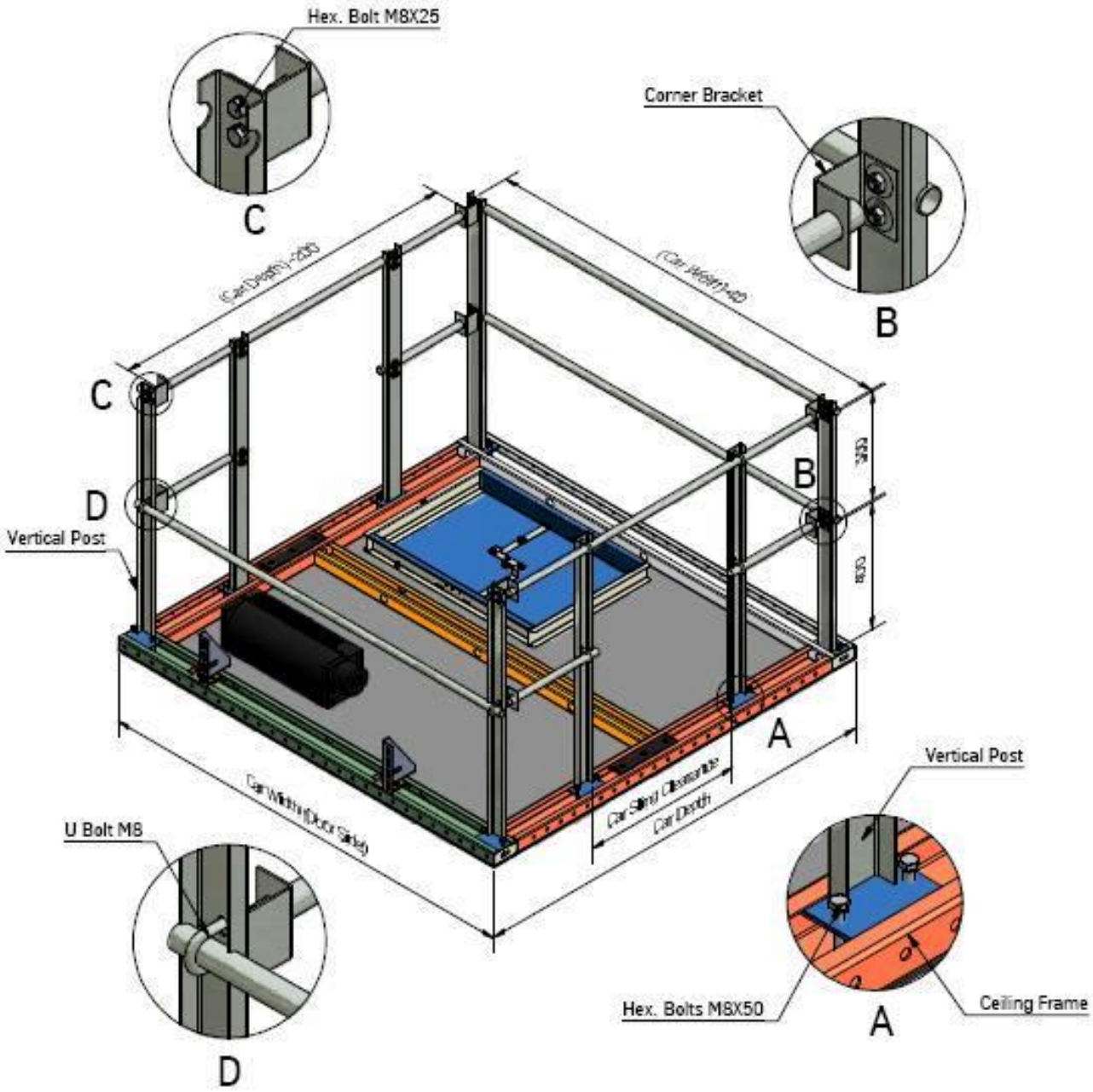
- False ceiling is the main source of lighting in the elevator car, there are many different designs for elevator lighting.
- Fluorescent lighting and spot lights are the most common lighting elements used for elevator lighting and a combination of the two types can be used also.

H – EMERGENCY TRAP DOOR ASSEMBLY



- Emergency trap door can be easily opened from inside the car by using triangular key **(1)** and from outside the car without a key by turning the link **(2)** to pull locking arms **(3).**
- Electrical safety switches **(4)** that is fixed to the side frame of trap door causes the lift to stop if the locking ceases to be effective; restoring the lift to service shall only be possible after deliberate relocking.
- Emergency trap door size is 600x400 mm to permit the rescue and evacuation of passengers.

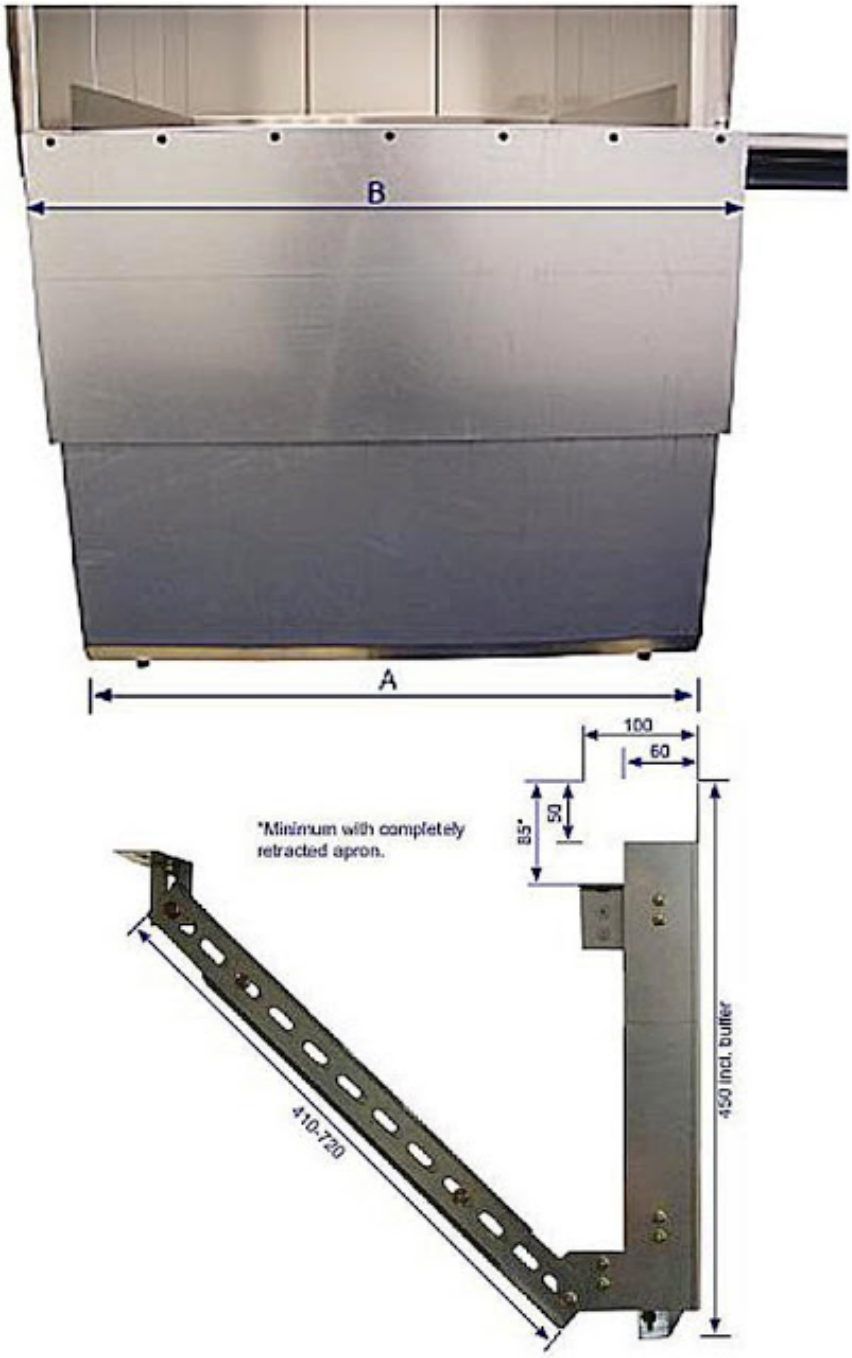
I - BALUSTRADE



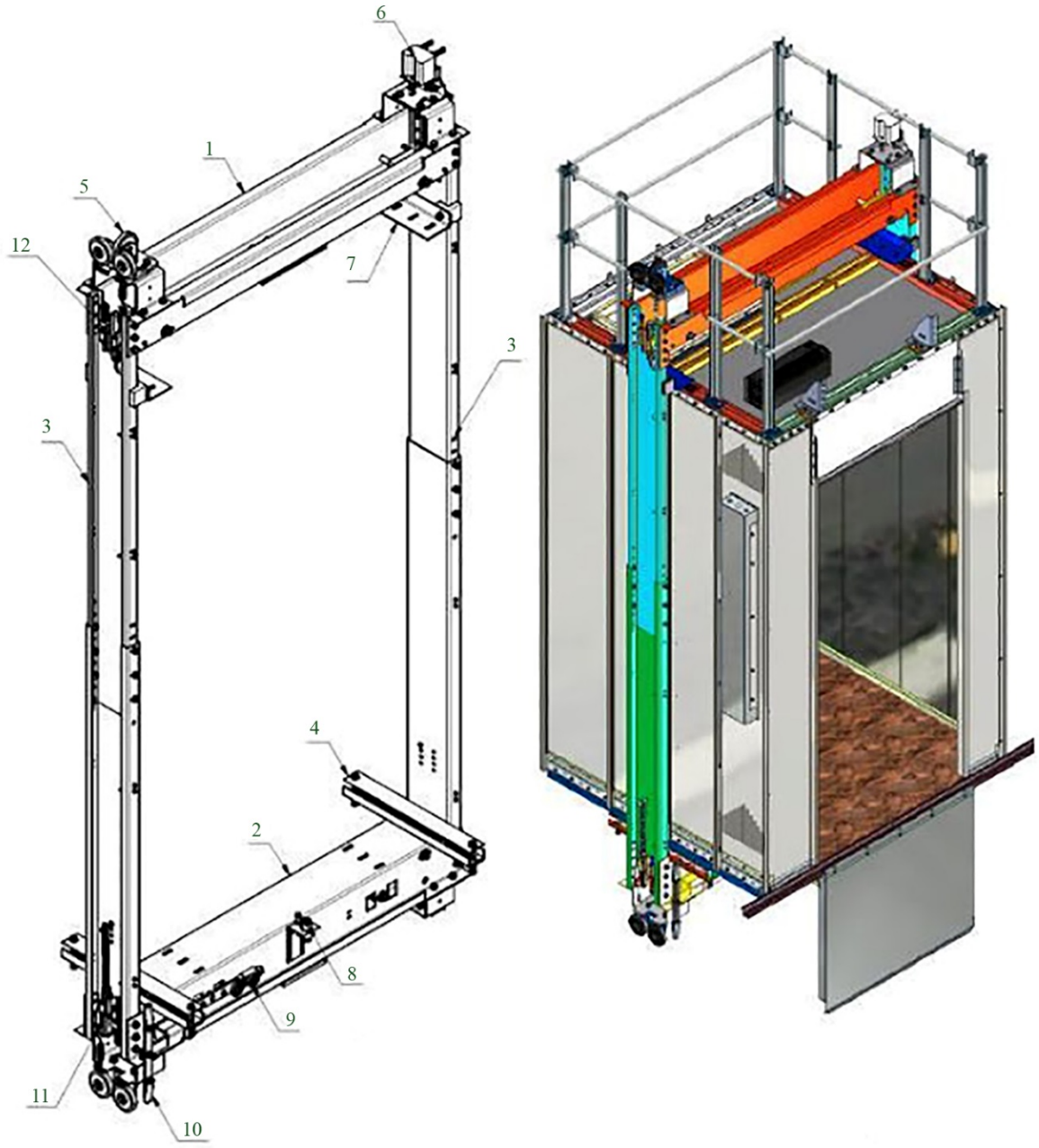
Car roof shall be provided with a balustrade where the free distance between the car ceiling and the shaft wall exceeds 0.3 m.

J – CAR APRON/TOE GUARD

CAR APRON/TOE GUARD is present at the bottom of some cars. This guard protects the passengers from being exposed to the open hoistway under the car if the doors are opened when it is not at the landing. The guard is between 21” and 48” long.



CAR SLING



SHEET METAL CAR SLING			
NO	PART NAME	NO	PART NAME
1	Upper Transom	7	Upper Isolation
2	Lower Transom	8	Overload inductive Sensor
3	Adjustable Height side Frame	9	Limit Switch
4	Lower Isolation	10	Actuation lever
5	Roller Guide Shoe	11	Safety Gear (Catch Clamp)
6	Sliding Guide Shoe With Lubricator	12	Braking System (Catch Clamp)

CAR SLING is load carrier element in the elevator car as well as its function of isolating vibrations due to running.

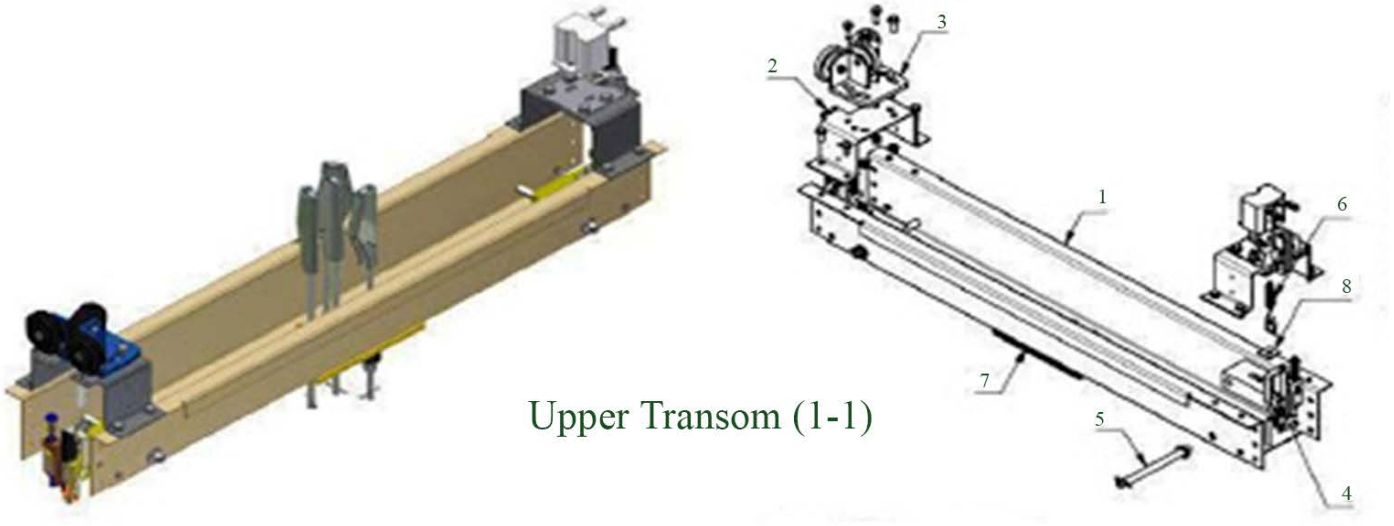
Car slings have two main types as follows:

- (1-1) Suspension.
- (2-1) suspension.

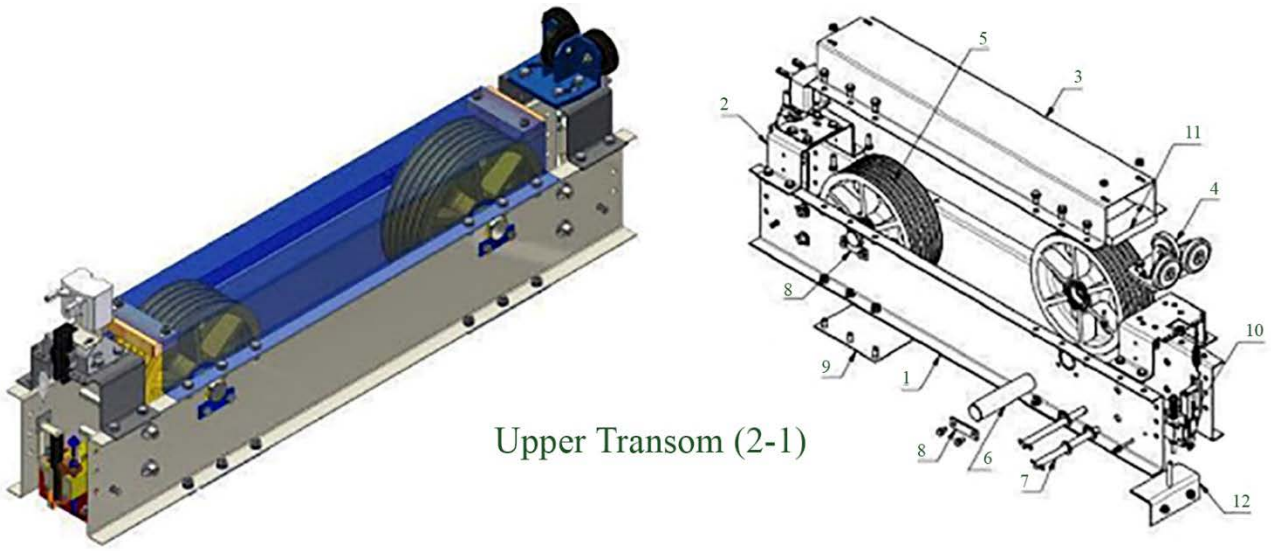
They may come with braking or without braking system.

PART 2.2 - CAR SLING MAIN COMPONENTS

A – UPPER TRANSOM



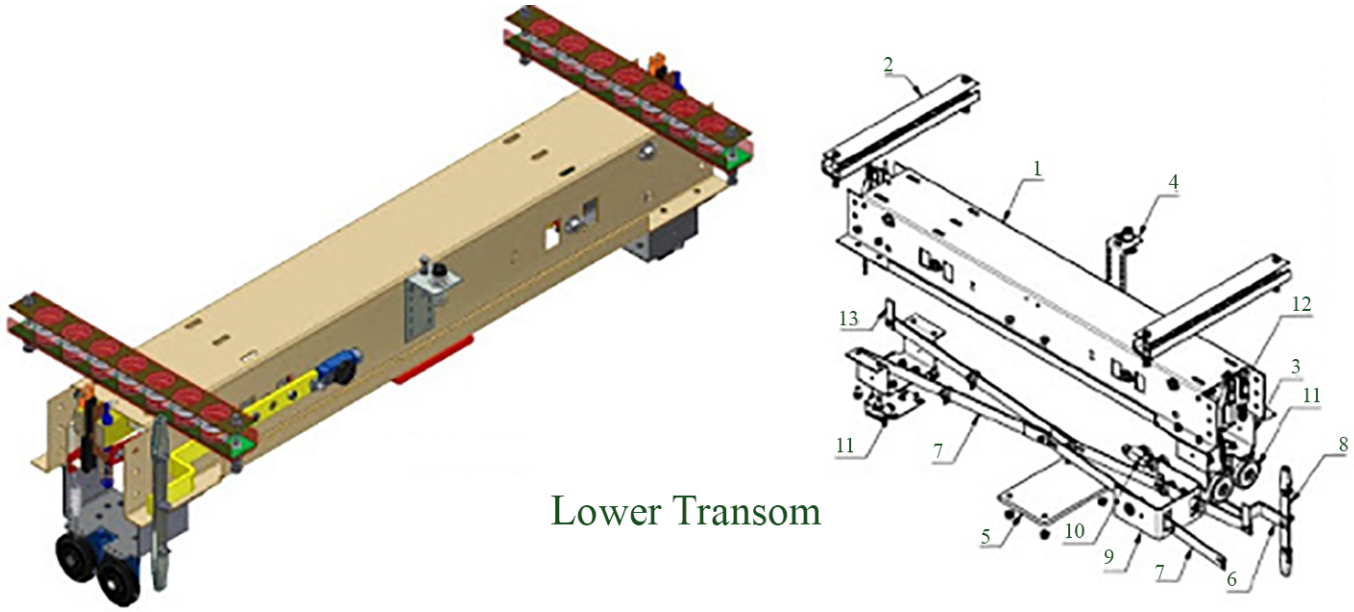
UPPER TRANSOM 1:1			
NO	**PART NAME**	**NO**	**PART NAME**
1	Upper transom Main Profile	**5**	Catch Clamp Pin
2	Guide Show Holder	**6**	Tension Spring
3	Guide Shoe (Roller or Sliding)	**7**	Rope Plate
4	Braking System Catch Clamp	**8**	Square Nut



UPPER TRANSOM 2:1			
NO	**PART NAME**	**NO**	**PART NAME**
1	Upper transom C Profile	**7**	Rope Protection Pin
2	Guide Shape Holder	**8**	Axle Locking Plate
3	Pulleys Top Cover	**9**	Pulles Lower Cover
4	Guide Shoe (Roller or Sliding)	**10**	Braking System Catch Clamp
5	300mm Diameter Pulley	**11**	Ropes Wooden Protection
6	Pulley 50 mm Axle	**12**	Catch Clamp Seat Angle

THE UPPER TRANSOM is the suspension element of the car it can be (1-1) type or (2-1) using a couple of polyamide pulleys 360 mm diameter, it is designed also to mount sliding or roller guide shoes. Braking system catch clamps are mounted also in the upper transom.

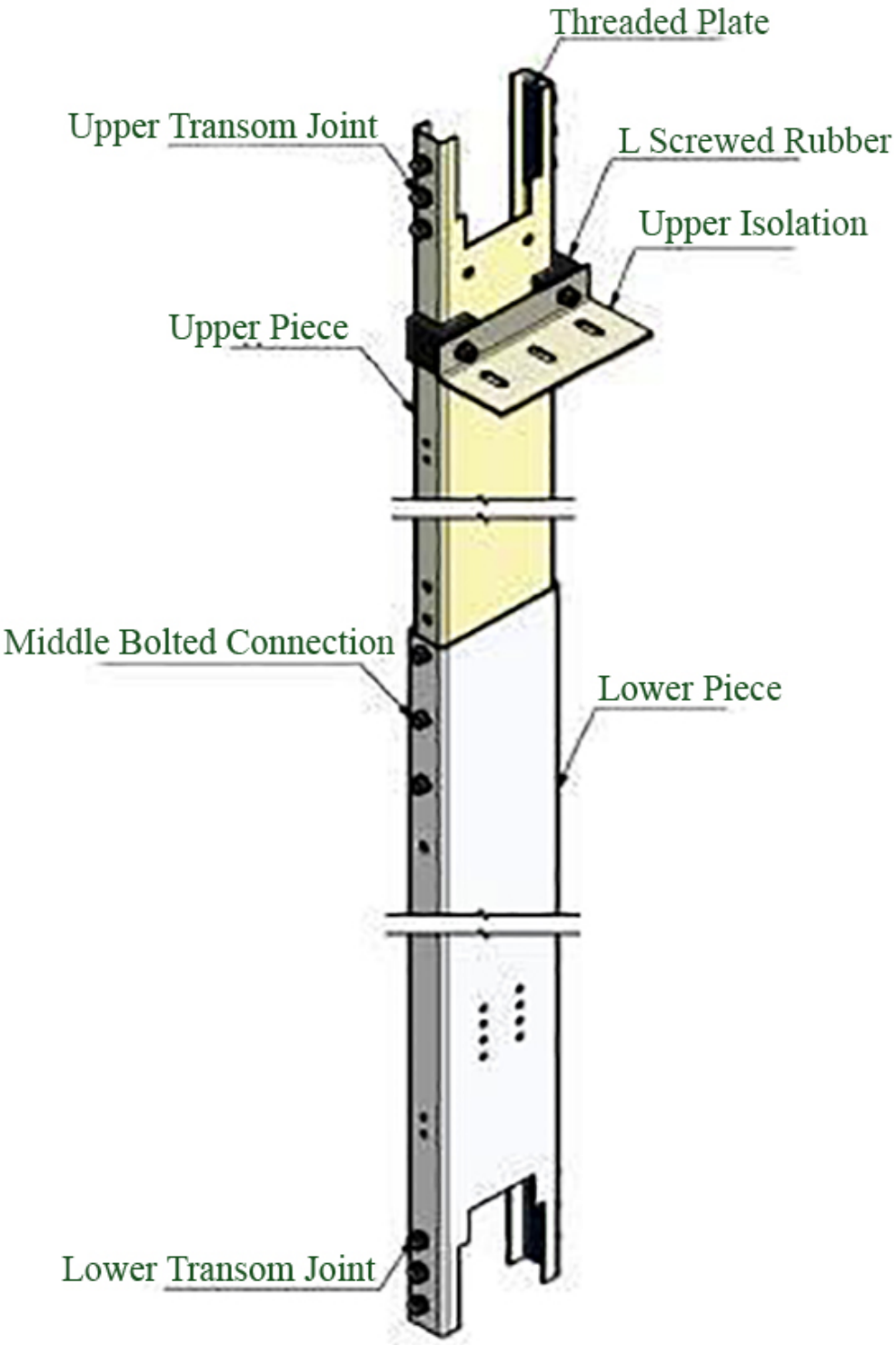
B – LOWER TRANSOM



LOWER TRANSOM			
NO	**PART NAME**	**NO**	**PART NAME**
1	Lower transom Main Profile	**8**	Speed Governor Rope Attachment
2	Lower Isolation	**9**	Actuation Rocker
3	Guide Shoe Holder	**10**	Safety Limit Switch
4	Overload Inductive Sensor Holder	**11**	Guide Shoe (Sliding or Roller)
5	Buffer Plate	**12**	Safety Gear Catch Clamp
6	Release Lever	**13**	Braking System Vertical Link
7	Actuation Linkage		

LOWER TRANSOM is the carrier of car flooring through an exactly arranged pressure springs mounted in the lower isolation subassembly. Safety gear catch clamps are also mounted in the lower transom and their actuation action is done by a shearing linkage system.

C – SIDE FRAME



Side Frame Assembly

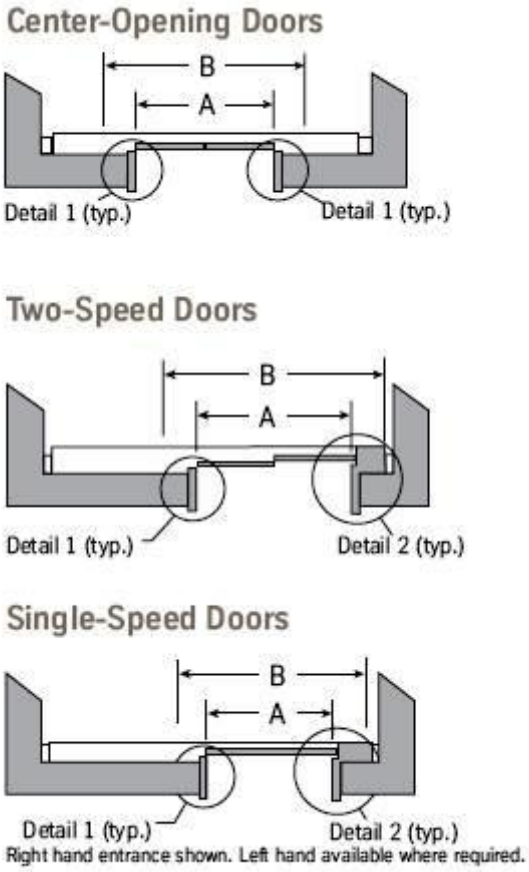
The adjustable height side frame is two pieces bolted together and fastened to both upper and lower transom.

MECHANICAL ACCESSORIES

A – CAR DOOR AND DOOR OPERATOR

CAR DOOR TYPES

- **Single slide door:** consists of one power operated single panel sliding doors.
- **Single speed center opening**: consist of two power operated panels that part simultaneously with a brisk, noiseless motion. faster passenger loading than side opening
- **Two speed side opening:** consist of two power operated panels that are geared together. One door moves twice as fast as the other door so that both doors will meet concurrently in the open position.
- **Two speed center opening doors:** same as one speed center opening doors but it consist of four power operated panels.



Door operation method:
Elevator doors are normally opened by a power unit that is located on top of the elevator car. When an elevator car is level with a floor landing, the power unit moves the car door open or closed. A pick-up arm (clutch, vane, bayonet, or cam) contacts rollers on the hoistway door which releases the door latch on the hoistway door. The power unit opens the car door which in turn opens the hoistway door. The door rollers and pick-up arm may be different on various elevators but they all work on the same principle.

Door Operator: A motor-driven device mounted on the elevator car that opens and closes the car doors.

B – GUIDE SHOES

Guide shoes are Devices used mainly to guide the car and counterweight along the path of the guide rails. They also assure that the lateral motion of the car and counterweight is kept at a minimum as they travel along the guide rails.

There are two types of guiding shoes as follows:

1- Roller Guides: Guide shoes which use rollers that rotate on guide rails (A set of three wheels that roll against the guide rails) rather than sliding on the rails.

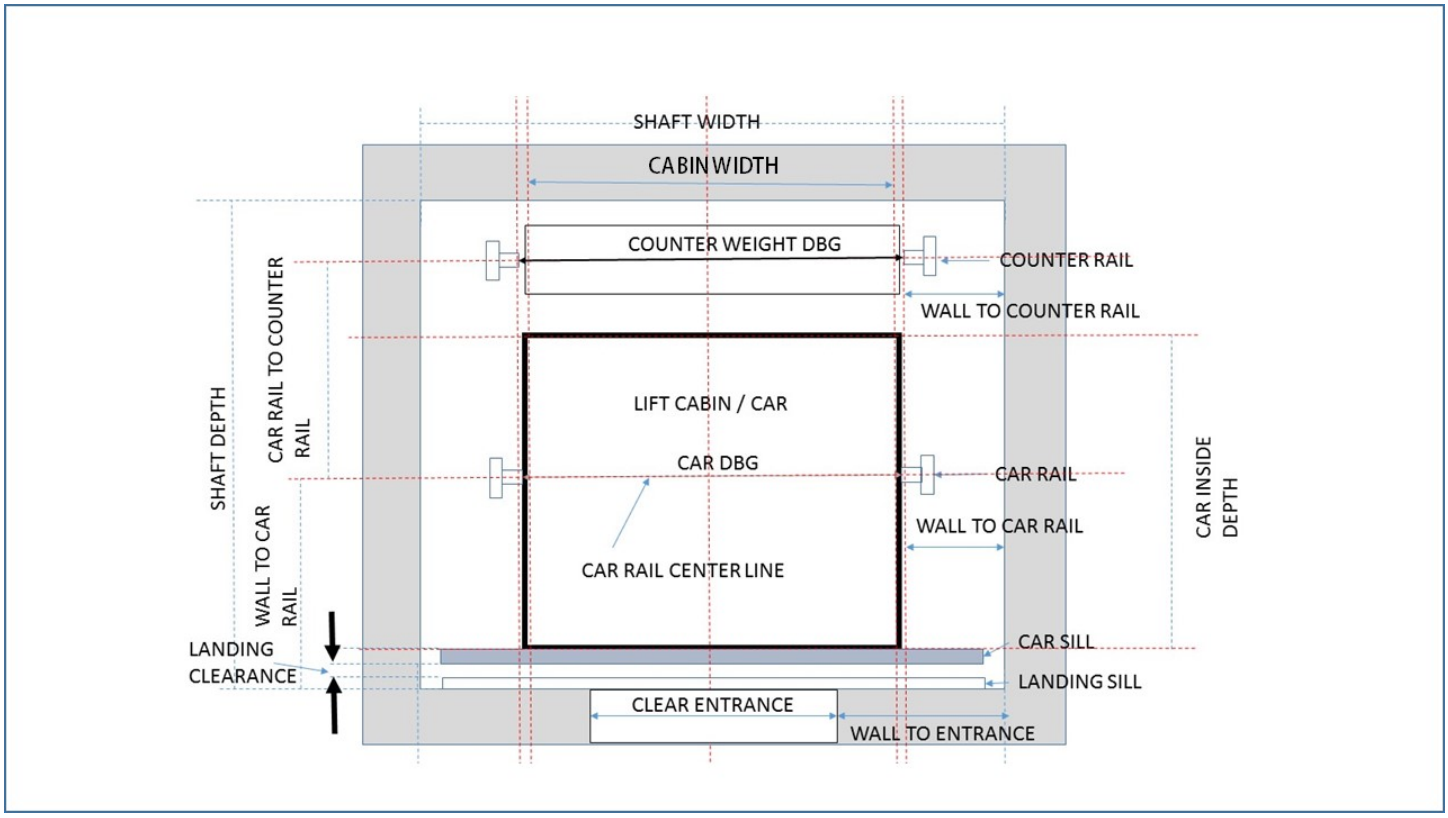
2- Sliding Guides: guide shoes which simply slide along the faces of the rails; the sliding insert or gib may be metal, requiring the guide rails to be lubricated, or may be plastic material which is self-lubricating.

C – DOOR PROTECTIVE DEVICE

any type of device used with automatic power operated doors that detect obstructions to the normal closing of the elevator doors (though contact may occur) and either causes the doors to change the door motion by either stopping it, or causing it to reverse (reopen) or go into some other mode of operation, such as nudging. A safe edge, a safety astragal, a photoelectric device (safe ray), and electrostatic field device are examples of door protective devices.

STUDYING ELEVATOR DRAWING

1. **Shaft top view (shaft plan).** Some will say hoist-way for the shaft. This drawing shows the main bone positions of elevator guide rails, distance between rails, cabin size, shaft size, entrance size, entrance position, running clearance, counter weight position. Counter-weight size, etc..



Car DBG

The measurement is the distance between two guide rails that guide the elevator cabin, other vise called elevator car or lift car. This is an important measurement because guide rails should be completely perpendicular and parallel without any twist. The DBG (DISTANCE BETWEEN GUIDE RAILS) must be exactly the value given in the drawing in all along the elevator shaft.
This will determine the quality of the elevator ride in the mechanical manner.

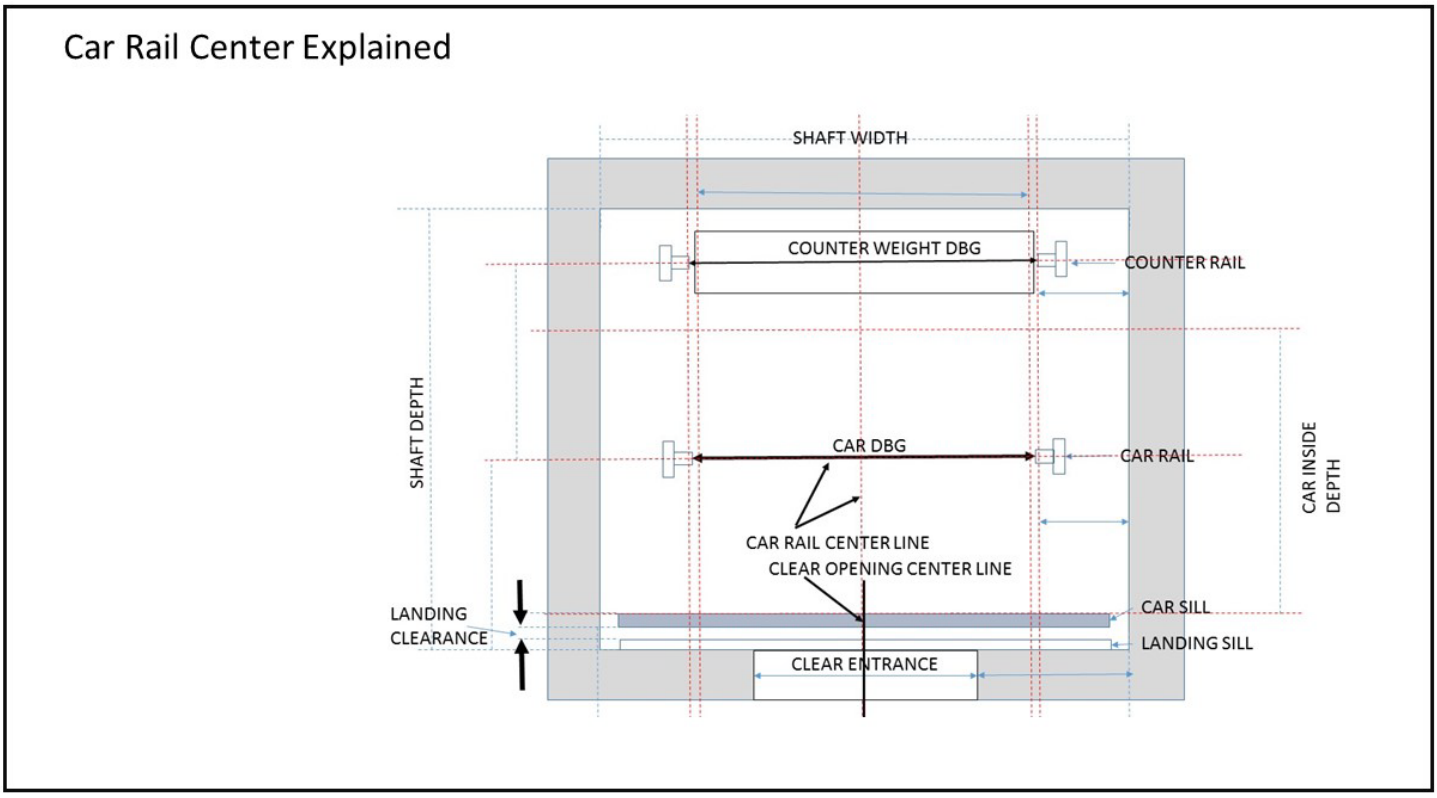
Counter weight DBG

As in the case of CAR DBG this is the displacement between two guide rails which are guiding the counter rails. As in the case of CAR DBG this measurement also will effect the quality of the elevator ride.

Landing clearance / Running clearance

This is the distance between landing sill and car sill. This measurement is universal. it will be always 30mm. Usually this will not be included in the drawing but we have to include this in our calculations. This measurement is so important because this small gap should be maintained all along the lift travel. Passenger safety and door coupling are depending up on it. The huge moving elevator car is moving in this clearance with the stationary lading entrance.

2. Car rail center line & Entrance center line



In the drawing you can see there is two car rail center line.
1. Horizontal
2. Vertical

both are important lines.

Entrance center line is also shown in the drawing. The importants of this is in some drawing the vertical car center line and the entrance center line(clear opening center line) may not be aligned. There may be an **offset** between these two. The **offset** is a very important measurement need to be considered during the installation. In the below drawing you can see the entrance offset explained.