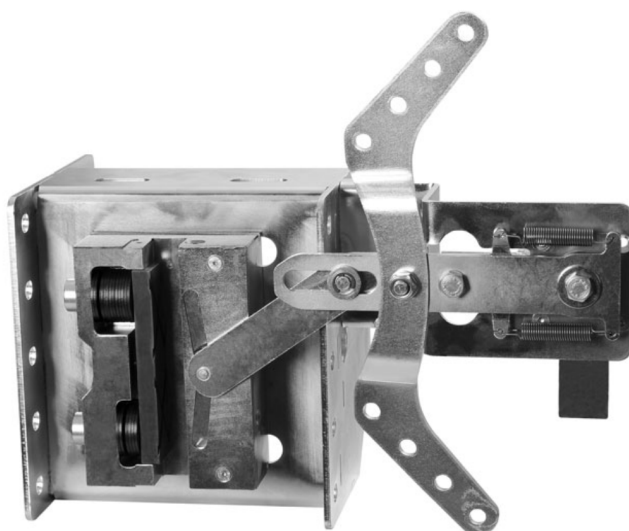




Sky Elevator[®]

Elevator Spare Parts Manufacturing



SKY 500SG-P

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sky@sky-elevator.com

SKY ELEVATOR SKY 500SG-P PROGRESSIVE SAFETY GEAR INSTALLATION – ADJUSTMENT – MAINTENANCE USER MANUAL

SKY ELEVATOR progressive safety gears are referred to as safety gear in this description. The engine brakes are referred to as electromechanical brakes so that the mechanical safety gears are not confused with the engine brakes. The ones which are referred to as safety gear are mechanical safety gear (parachute safety gear) in the elevator car.

The safety gears are mainly the safety gears used against free dropping risk of the elevator car. Its primary direction of operation is downwards. As acceleration does not occur due to failure of ropes in upward direction, the safety gears ensuring safety requirements against unexpected movements in the elevator car can be set with other gears outside of the elevator car. However, the safety gear as safety gears against free dropping must be in the elevator car.

A double safety gear assembly is required to operate together on both rails to stop the elevator car level in downward direction. Therefore, the correct operation of the safety gear depends on a speed control device (overspeed governor) which is activated at the specified trigger speed and which generates pulling force, a synchronization system distributing the force to both safety gears equally and a group of safety gears that are correctly adjusted to act equally on the rails. The descriptions on these matters shall be made in the following articles. All conditions must be met for the safety gears to operate correctly and efficiently.

DESCRIPTION OF THE SAFETY GEARS

SKY ELEVATOR progressive safety gears are designed to operate as descending and ascending. In case of special order, only the safety gears that operate as descending can be provided. The main purpose of the safety gears is to stop the total weight of the loaded elevator car and the carcass and the equipment with the nominal load in the event of a free dropping, with the desired deceleration acceleration at the trigger speed of the overspeed governor. Therefore, while the load values of the safety gears are calculated

$M = (\text{elevator car, suspension and doors}) (P) + (\text{nominal load}) (Q) + 0,4 * (\text{balance chain, rope related to the elevator car and control cable weights}) (K) \text{ kg}$




$M = P+Q+0,4*K$ should be calculated as kg. (TS EN 81-20 M 5.6.2.1.1.1.)

The maximum nominal speed of SKY ELEVATOR to be used in this safety gear assembly is defined as 2,5 m/sn. These safety gear assemblies are designed for the use of 9 mm, 10 mm, 14mm and 16 mm thick rails.

The upper load limits for the safety gears are given for various types of rails based on various nominal speeds in accordance with the maximum and minimum M values. These values are calculated as 0.55 g_n for average acceleration to stop on TS ISO 4765 machined rails (B) and 0.50 g_n for cold rolled rails (A), and given in tables. In addition, the minimum M values required not to exceed 1 g_n , the value of deceleration to stop, are also given for these rails. In case of free dropping below minimum M values, it cannot be expected that the safety gears will maintain the nominal progressing distances and acceleration below 1 g_n .

It should be noted that the M values are within the maximum and minimum curves given in the tables according to the nominal speed of the safety gears that shall be used. The progressing distances given in the tables are the maximum and minimum values of M and the values that can be reached with free dropping and triggering speed. These values cannot be reached in the rope tests performed with the nominal speed. The values should be taken from tables according to the test speed for such tests. However, these values are calculated depending on the friction values of the rails. The difference that may occur in rail casting material and change in surface roughness can change these distances at certain percentages.

Although it gives the standard minimum descending acceleration value as 0,2 g_n , the minimum acceleration calculations are made as 0.3 g_n due to the fact that this value extends the stopping distance too much.

 Skyelevator®		www.sky-elevator.EU	
PRODUCT NAME BIDIRECTIONAL PROGRESSIVE SAFETY GEAR		PRODUCT CODE SKY 500SG-P-U-GR3-T11	
NOMINAL SPEED 1 m/s	TRIPPING SPEED 1,5 m/s	 k	16mm
P+Q (max) B OILED A OILED	DATE	SERIAL NUMBER	
3400 Kg 2650 Kg	TYPE EXAMINATION CERTIFICATE NR I-61-00691/19/ZZ		

 Skyelevator®		www.sky-elevator.EU	
PRODUCT NAME UNIDIRECTIONAL PROGRESSIVE SAFETY GEAR		PRODUCT CODE SKY 500SG-P-U-GR3-T21	
NOMINAL SPEED 1 m/s	TRIPPING SPEED 1,5 m/s	 k	16mm
P+Q (max) B OILED A OILED	DATE	SERIAL NUMBER	
3400 Kg 2650 Kg	TYPE EXAMINATION CERTIFICATE NR I-61-00691/19/ZZ		

LABEL DESCRIPTION

When you got the product, check whether the label information is in accordance with your order or not. If there is a difference between the label values and your order values, please do not use the product and contact our company.

There is more information on the product label than the information specified in the standard. The reason for this is to make a mutual agreement easier.

When you got the product, check the information on the label on;

Firstly, check whether the safety gear is bi or unidirectional. Make sure which system is compatible with your system.

Secondly, check (**P+Q**) value. An incorrectly selected safety gear will not safely stop the elevator car and the people in it in case of need.

Thirdly, compare the nominal speed and locking speed with the system speed to make sure they are equal. If the speed values are not equal, the safety gear will not stop with correct acceleration based on the load P+Q.

As fourth, see the guide rail size (k), the type of rail production (A cold rolled, B machined) and the way the guide rail works (oily). If the system specifications and the label specifications are compatible, you got the correct safety gear.

You can use it by properly assembling.

PRODUCT CODE DESCRIPTION

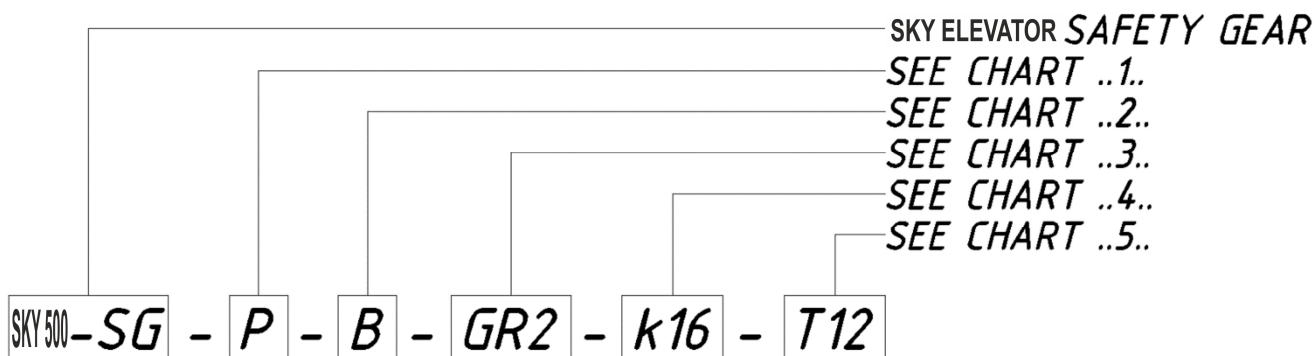


CHART 1

P:	PROGRESSIVE
PH:	PROGRESSIVE HEAVY DUTY
I:	INSTANTANEOUS
IH:	INSTANTANEOUS HEAVY DUTY

CHART 2

B:	BIDIRECTIONAL
U:	UNIDIRECTIONAL

CHART 3

CAPACITIES OF CANLIFT SAFETY GEAR ASSEMBLY TYPES

GROUP 1

Machined Rail

Speed v m/sc	TS ISO 7465 / B P+Q	
	Max m kg	Min m kg
0.8	1450	825
1	1400	800
1.2	1325	775
1.6	1300	750
1.75	1250	725
2	1250	725

Cold Rolled Rail

Speed v m/sc	TS ISO 7465 / A P+Q	
	Max m kg	Min m kg
0.8	1350	800
1	1300	775
1.2	1250	750
1.6	1225	725
1.75	1200	700
2	1200	700

GROUP 2

Machined Rail

Speed v m/sc	TS ISO 7465 / B P+Q	
	Max m kg	Min m kg
0.8	2500	1625
1	2400	1550
1.2	2300	1500
1.6	2150	1400
1.75	2050	1350
2	2000	1325
2.25	1950	1275
2.5	1900	1250

Cold Rolled Rail

Speed v m/sc	TS ISO 7465 / A P+Q	
	Max m kg	Min m kg
0.8	2250	1450
1	2150	1400
1.2	2100	1375
1.6	2000	1325
1.75	1900	1250
2	1850	1200
2.25	1800	1175
2.5	1750	1150

GROUP 3

Machined Rail

Speed v m/sc	TS ISO 7465 / B P+Q	
	Max m kg	Min m kg
0.8	3550	2000
1	3400	1900
1.2	3250	1850
1.6	3050	1750
1.75	2900	1650
2	2750	1600
2.25	2600	1500
2.5	2450	1400

Cold Rolled Rail

Speed v m/sc	TS ISO 7465 / A P+Q	
	Max m kg	Min m kg
0.8	2750	1575
1	2650	1525
1.2	2550	1475
1.6	2450	1425
1.75	2375	1375
2	2300	1325
2.25	2250	1275
2.5	2200	1250

CHART 4


GUIDE RAIL THICKNESS k:	9
	10
	14
	16


CHART 5

ASSEMBLY TYPE T	1	WITH SUPPORT PLATE	1	WITH SUPPORT PLATE CENTER LEVER	T11
			2	WITH SUPPORT PLATE ECCENTRIC LEVER	T12
	2	WITH SUPPORT FRAME	1	WITH SUPPORT FRAME CENTER LEVER	T21
			2	WITH SUPPORT FRAME ECCENTRIC LEVER	T22

SECURITY WARNING

Key parts are highlighted in the user guide. In these parts;

General hazard warnings 

Important points 

Risk of injury 

Are specified with these signs. You should be more careful when you see these signs.

IMPORTANT WARNING



If you use the SKY ELEVATOR bi-directional safety gear, the direction arrow on the safety gear must be mounted facing upwards. The safety gears do not operate within the desired values if the correct direction is not made as the descending and ascending direction forces are different.



After each installation, check that the synchronization system and the safety gear levers operate smoothly. Compacting and sticking prevents the safety component from performing its function. The mechanism can be operated with a force of 200 N.

ASSEMBLY DIMENSIONS

Our company manufactures bidirectional and unidirectional progressive safety gear models for various speeds and weights. These models can be used by installing them in place with two main assembly groups.

The first group is based on the models compatible with the method where suspension and elevator car suspension (carcass) group is manufactured by sheet metal bending. This model can be mounted inside the suspension column. The first assembly group has two types of product. The first one has center lever and the others have eccentric safety gear lever. The models with eccentric lever are designed for convenience where the safety gear lever is located on the side of pulley in bottom suspended models or the safety gear is used on the car with L carcass. The assembly dimensions do not change, but the distance for synchronization tube is different. They are progressive safety gears which are produced unidirectional and bidirectional. (Figure 1, Figure 2)

The second group is the models which are compatible with elevator cars whose suspension system has gusset and the suspended group is made of gusset material. The second assembly group has two types of product. The first one has center lever and the others have eccentric safety gear lever. The models with eccentric levers are designed to be used where safety gear lever is on pulley side in bottom suspended model as in the type of sheet material. The assembly dimensions do not change, but the distance for synchronization tube is different. They are progressive safety gears which are produced unidirectional and bidirectional. (Figure 3, Figure 4)

The shape of the safety gear lever is designed taking into account that the used rail lugs hit the safety gear lever during the course of the elevator car, or are dangerously close. This dangerous situation is more likely to occur on TS ISO 7465 T89 / B-type rails with less height. As a precaution, the movable joints of the safety gear lever are designed as far as possible on the rail lug and the potential hazards have been avoided.

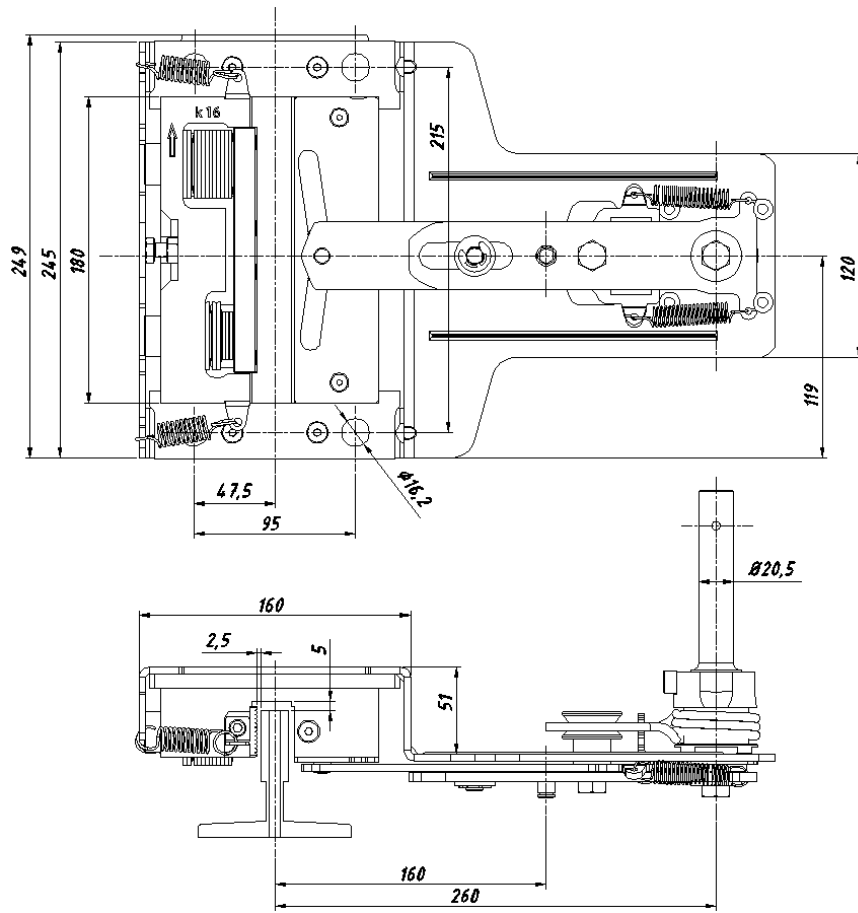


FIGURE 1 (T11)

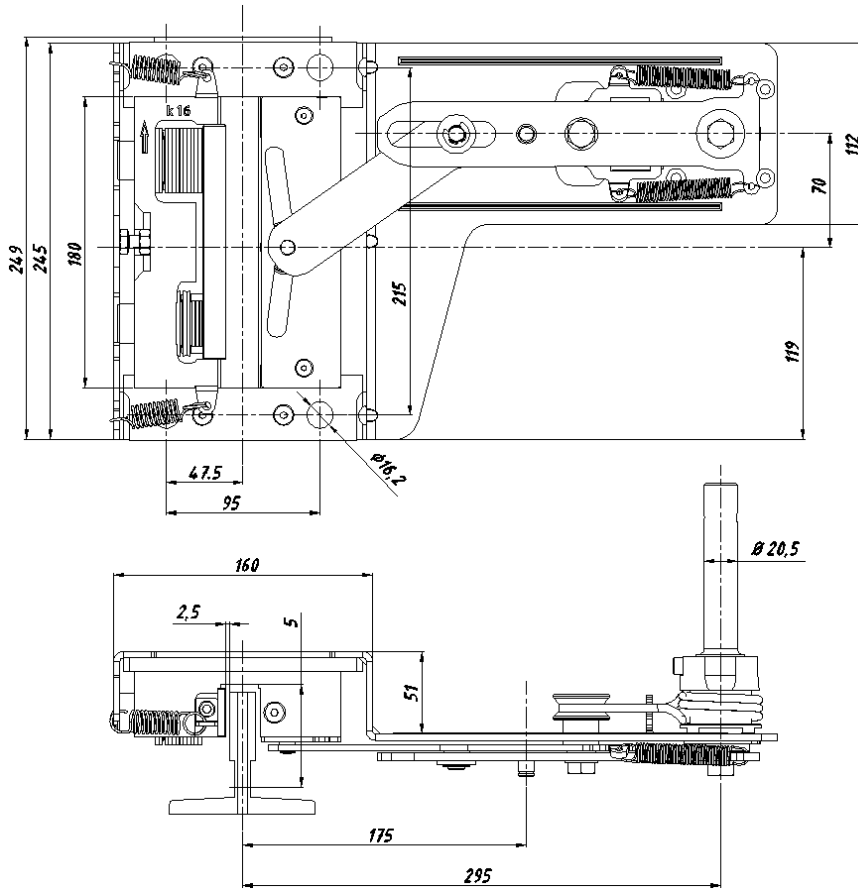


FIGURE 2 (T12)

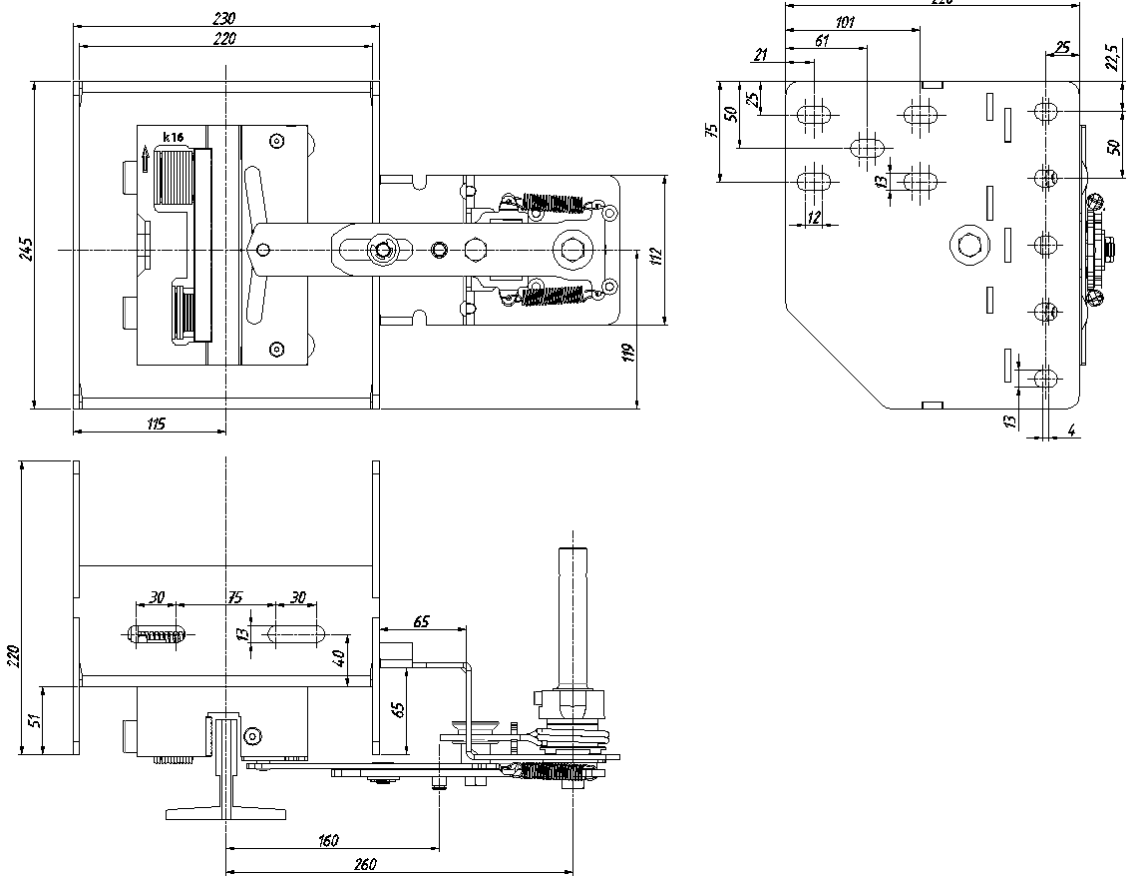


FIGURE 3 (T21)

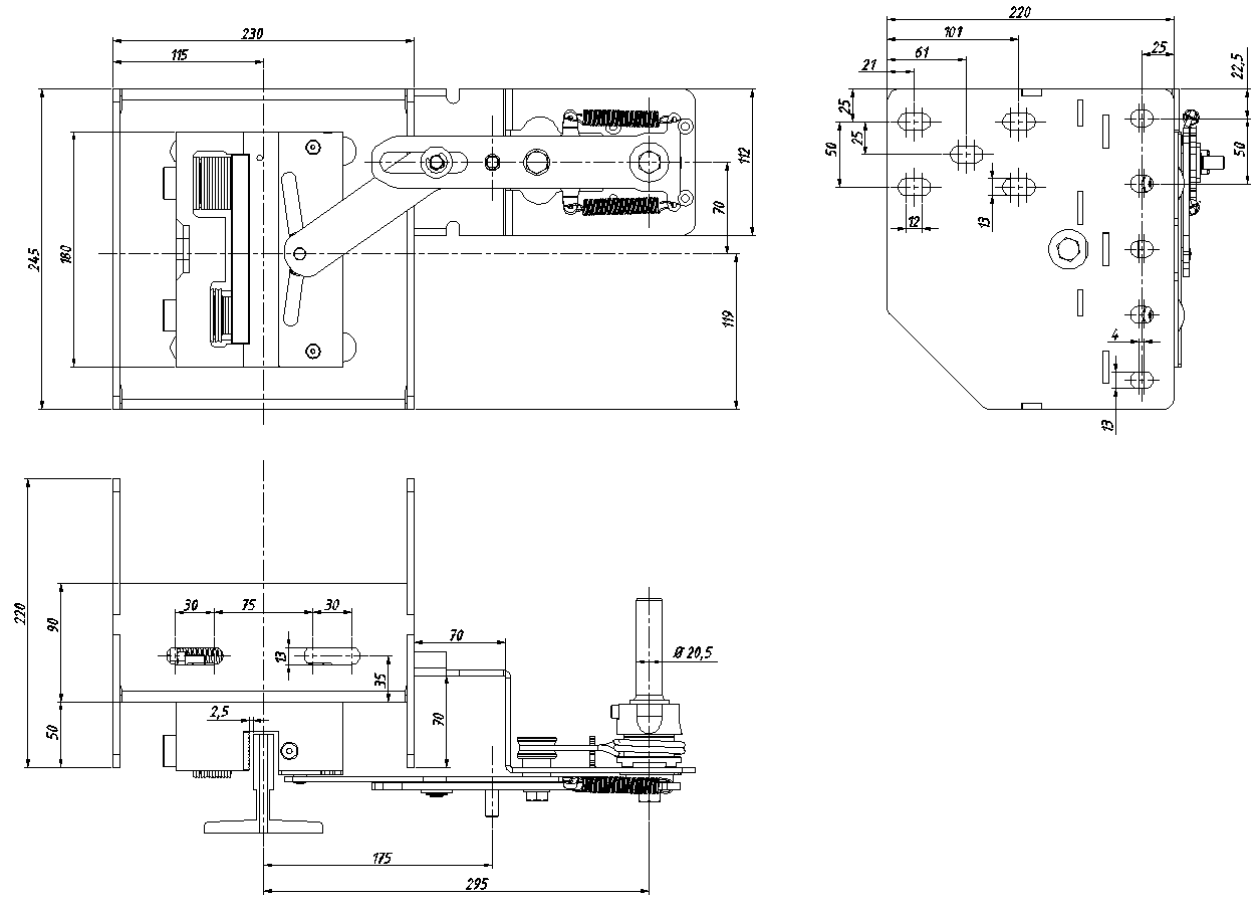


FIGURE 4 (T22)

ASSEMBLY OF SAFETY GEAR SYNCHRONIZATION TUBE



After the safety gears are mounted on the suspension, the synchronization tube and the safety gears on both rails must be connected to each other. If the synchronization tube is installed incorrectly and when the safety gears are activated, they will not hold the rail at the same time or one of them will not be activated.



When one of them is activated firstly and later or when none of them activates, the load will be on one safety gear. Since the load is not distributed equally, there shall be extra deflections and distortions in suspension, suspended models, elevator car and rails and it may even cause the safety gear to be destroyed.

Therefore, the tube providing the synchronization must be correctly installed on both safety gear lever shafts. For the synchronization tube, each safety gear manufacturer company uses a material in a different profile. This causes elevator car manufacturers to experience difficulties in providing this profile.

Our company uses TS EN ISO 3183 3/4" natural gas tube which can be found easily anywhere as a synchronous tube. It is rigid both as for diameter and wall thickness.

External diameter of the tube is $d = 26.7\text{mm}$, the wall thickness is $s = 2,9\text{mm}$.

Instead of this tube, DIN 2448 - TS EN 10220 3/4" seamless steel pull tube can also be used. However, the wall thickness is 2.3mm in standard production. You should choose special production which has a wall thickness of 2.6mm or 2.9mm as it will make much space in the safety gear lever shaft with this wall thickness.

To perform the assembly of the synchronization tube;

- 1- Measure the distance A between the safety gear lever shafts of the safety gears mounted on the suspension. (Figure 5)

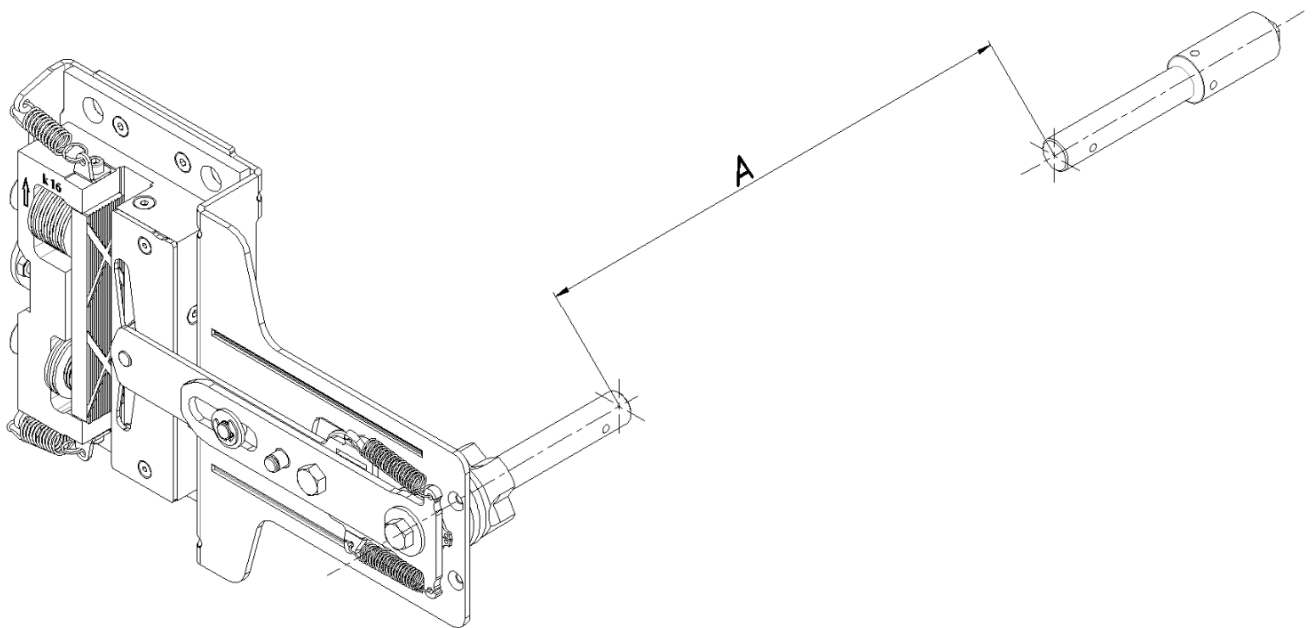


FIGURE 5

- 2- Cut a piece 90 mm longer than the measured distance A using the tube described above. (Figure 6)

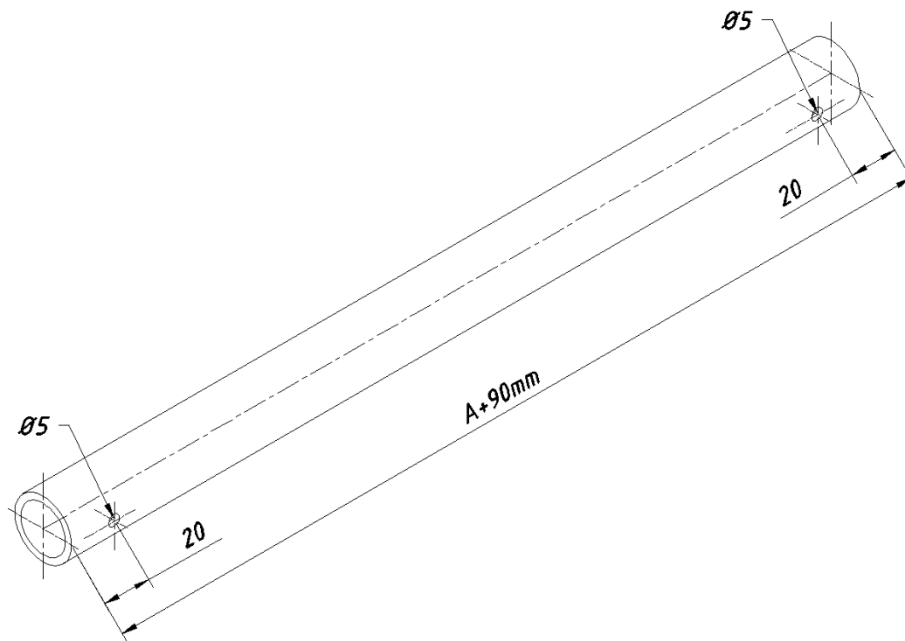


FIGURE 6

- 3- Drill only the single wall thickness of the tube with a $\varnothing 5$ drill from 15mm from both ends of the tube. Do not drill the tube completely. These half-holes will function as a guide hole when drilling the safety gear lever shaft. Try to drill holes in the same axis as possible along the tube's axis. (Figure 6)
- 4- Center the tube by mounting it to the safety gear lever shafts. Ensure that the tube is mounted equally on both safety gear lever shafts. Insert the two twisted-pair plates (Figure 7) with the twist-off synchronization tube drill and the rail gap adjustment apparatus from the safety gear box as shown in the illustration (Figure

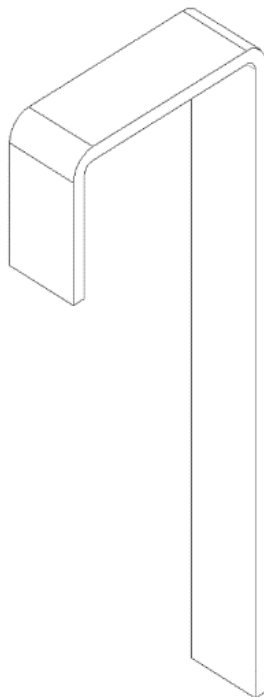


FIGURE 7

8).

5- This will ensure that the safety gear levers remain in the correct position when drilling through the synchronization tube pin holes and prevent it from playing during the drilling process. (Figure 8)

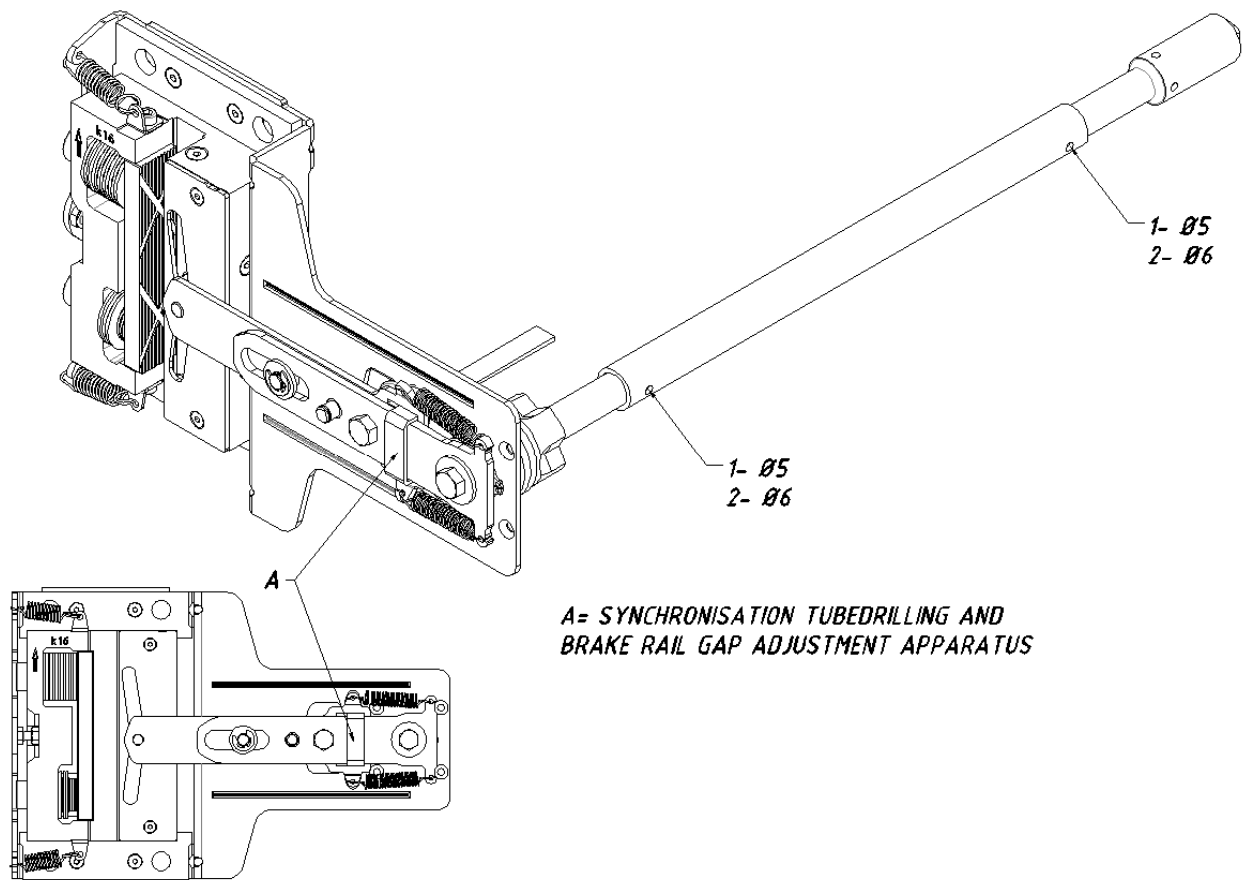


FIGURE 8

6- Drill through the holes in the tube with the Ø5 drill and use one of the guide holes you drilled before. Drill this hole with a drill bit Ø6 after drilling the tube and shaft fully. This ensures that the pinhole is not in the correct size and free from looseness. Punch the Ø6 slotted pin out of the safety gear box in this hole. In this way, the synchronization tube is connected to a safety gear lever shaft and fixed.

7- Then repeat the same procedure as described in Article 6 at the other end of the tube. At the end of the pin fastening, the synchronization tube and the safety gear levers are connected to each other correctly.

8- Finally, remove the U-twist sheet apparatus that secures the position of the safety gear levers. Otherwise, the safety gear will not operate. This apparatus will only help you during the correct drilling process.

These apparatuses will then be used by the installer in the well to adjust the space between the braking-rail surface. Help the installer by attaching both of them to the appropriate position of the suspension.

NOTE: You can install the synchronization tube on the safety gear lever shaft using drills on the safety gear lever shaft. However, pinning will be incorrect if you make mistakes in drilling axis and the distance between axis while drilling the tube. This will negatively affect the braking operation. Our company recommends the method described step by step above.

THE GAP ADJUSTMENT BETWEEN SAFETY GEAR-RAIL

The safety gear plate which rubs against the rail while braking must not contact with the rail during the normal course of the elevator car. There must be a certain amount of gap between them. This gap is specified as 2.5mm by our company.

This gap must be adjusted during shaft installation of the elevator.

There are two ways for connecting the safety gears to suspension and suspension group. The first description is the method to be applied in the elevator cars made by means of sheet twisting of the suspension group, and the second is the method to be applied for the safety gears compatible with the head system under the suspension group.

In order to make the adjustment process easier, our company provided a U-shaped spacer shown in Figure 7 and indicated by A in Figure 8. This spacer is also used by the elevator car manufacturer in the process of drilling the synchronization tube and installing the pin. (Figure 7)

1- With sheet twisting system, install the long side of this spacer from the gap between the friction plate and rail on the side of the safety gear springs. Push into the intermediate gap until the short end contacts the safety gear body. (Figure 9)

If the spacer with a thickness of 2.5mm cannot be pushed in, the gap is very small. If it moves too much when pushed in, it means the gap is very huge. It means the rail is too close to the pulley. The pulley may contact with rail and activate the safety gear as a result of wear in roller over time.

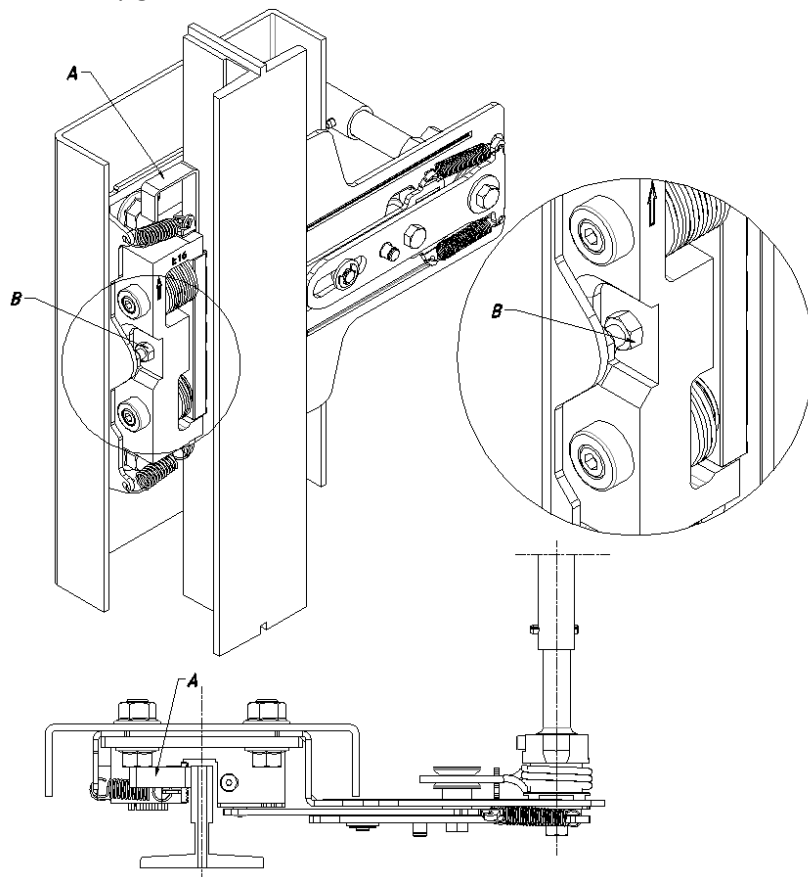


FIGURE 9

Open the bolt specified with the letter B in the Figure and the lock nut on the top with the key AA13. Move the bolt using the key. Check the clearance by moving the sheet apparatus in the intermediate gap with your hand. The tightness that you can remove from the gap with your hand is enough for adjustment. When you find this setting, tighten the lock nut and secure the condition.

Do this for the other safety gear.

2- With head system, install the long side of this spacer from the gap between the friction plate and rail on the side of the safety gear springs. Push into the intermediate gap until the short end contacts the safety gear body. (Figure 10)

If the spacer with a thickness of 2.5mm cannot be pushed in, the gap is very small. If it moves too much when pushed in, it means the gap is very huge. It means the rail is too close to the pulley. The pulley may contact with rail and activate the safety gear as a result of wear in roller over time.

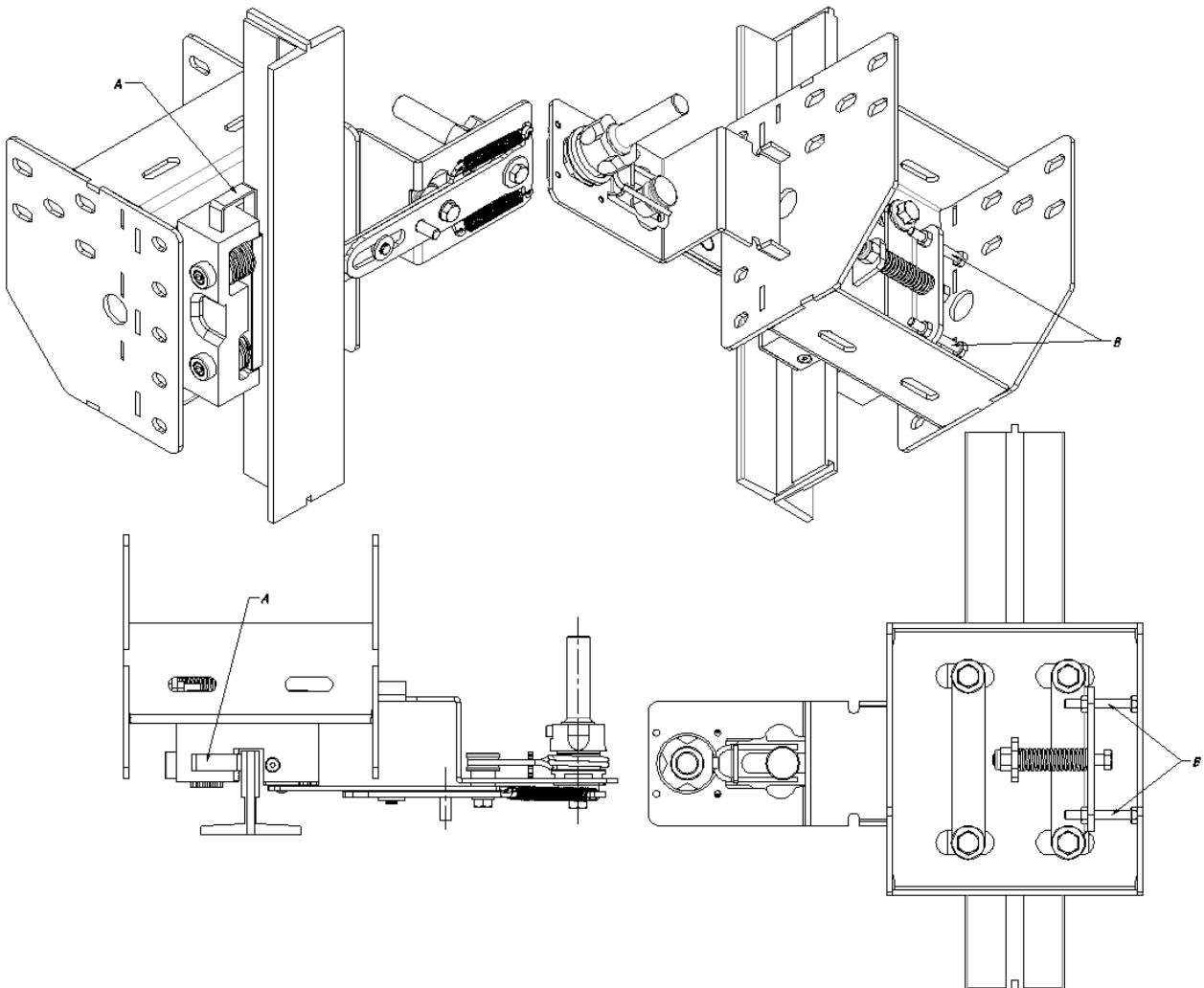


FIGURE 10

Open the bolts located on the back of the head specified with the letter B in the Figure and the lock nuts on the top of the head with the key AA13. Move the bolt using the key. Check the clearance by moving the sheet apparatus in the intermediate gap with your hand. The tightness that you can remove from the gap with your hand is enough for adjustment. When you find this setting, tighten the lock nut and secure the condition. Do this for the other safety gear.

SAFETY GEAR SWITCH ASSEMBLY

The function of the safety gear switch is to cut off the safety circuit current when the safety gear is triggered for any reason to prevent the engine from being stopped and to prevent the elevator from restarting.

The safety gear switch should be installed in its place around the safety gear lever shaft in safety gear carrier plate or headed models.

Shaft designs may sometimes cause problems in the position of connecting the switch.

In our design, the overspeed governor switch can be mounted to both safety gears in four positions. That's why it comes in a box as demounted. The switch is only mounted so that it is not tight to the switch stand that assists in the assembly.

As can be seen in the Figure, it can be mounted around the switch safety gear lever shaft at positions A - B - C. (FIGURE 11)

The A and B positions are the easiest to place. C position can also be preferred if required. Note that the carcass base of the elevator car is not a problem for position C and that there is nothing to prevent the switch from operating.

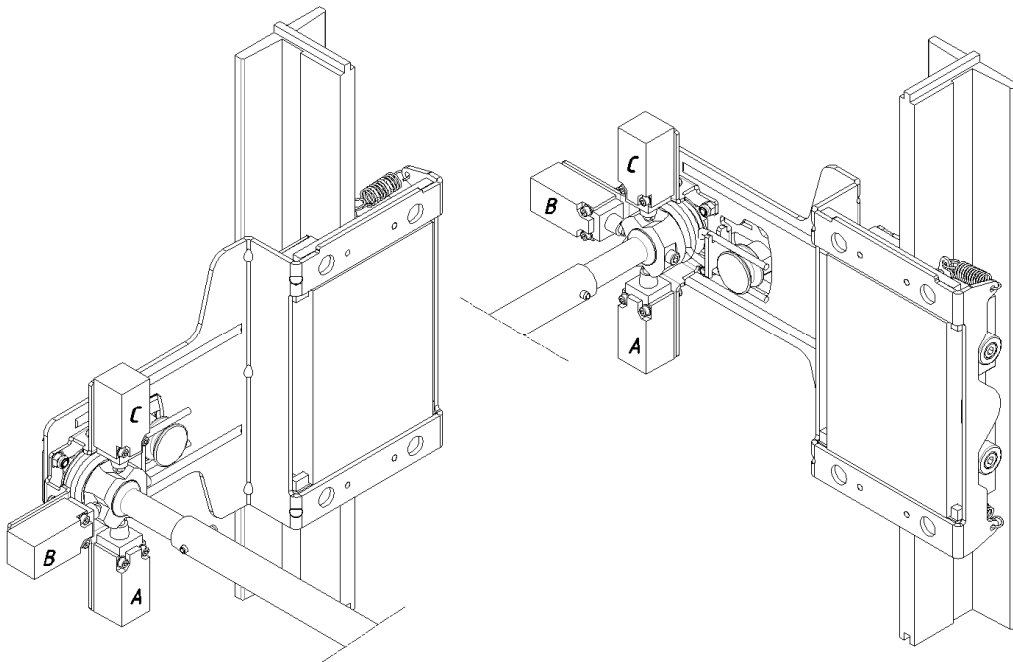


FIGURE 11

Remove the two countersunk head bolts and the fiber nut at the end of the contact stand to secure the overspeed governor contact at the A - B - C positions.

After the switch is in the proper place, fit the countersunk bolt to the rail supporting the safety gear lever. Tighten the fiber nut by mounting it to the bolt. Secure both sides of the stand by tightening both the fiber nut. The switch stand may be in a moving position to make adjustments on it.

After the safety gear switch is positioned and the switch stand is fixed, the operation of the safety gear switch is adjusted and fixed.

Push the safety gear switch forward so that it is inserted into the slot on the pressure wheel. Leave a clearance as shown in the illustration without touching the wheel presser seat at the end of the ignition. This gap is necessary to avoid minor vibrations during operation. (Figure 12)



The switch must not be loose and change its position by shaft movements over time. Thus, tightening for fixing must be performed carefully to avoid any change in switch position in the future.

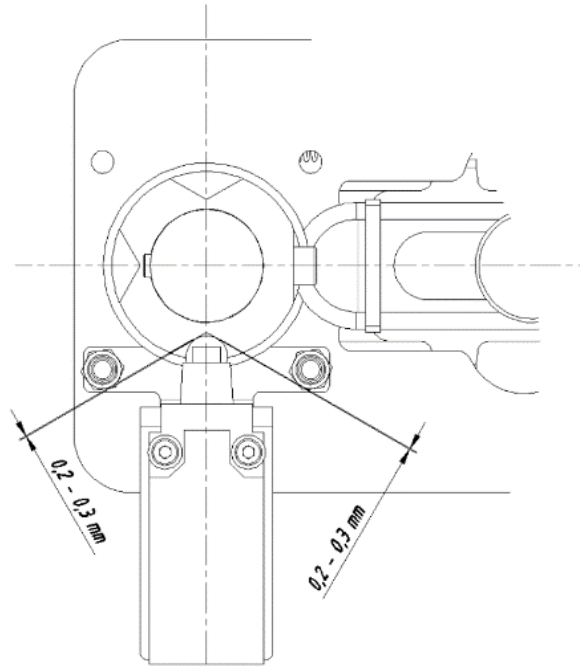


FIGURE 12

Finally, make the electrical connection of the switch properly. The switches that we use are in the form of (NC). Pay attention to this feature when connecting the cables.

CONNECTING THE OVERSPEED GOVERNOR ROPE

In order to connect the overspeed governor rope to the safety gear lever, our company has designed a different plate.

The significance of this plate is that it minimizes the errors caused by positioning of the overspeed governor and lower tensioning group at different distances from the rail axis due to their dimensions while positioning in shaft.

This designed plate provides convenience to avoid problems in its use with our SKY 200 Overspeed Governors and other overspeed governor brands.

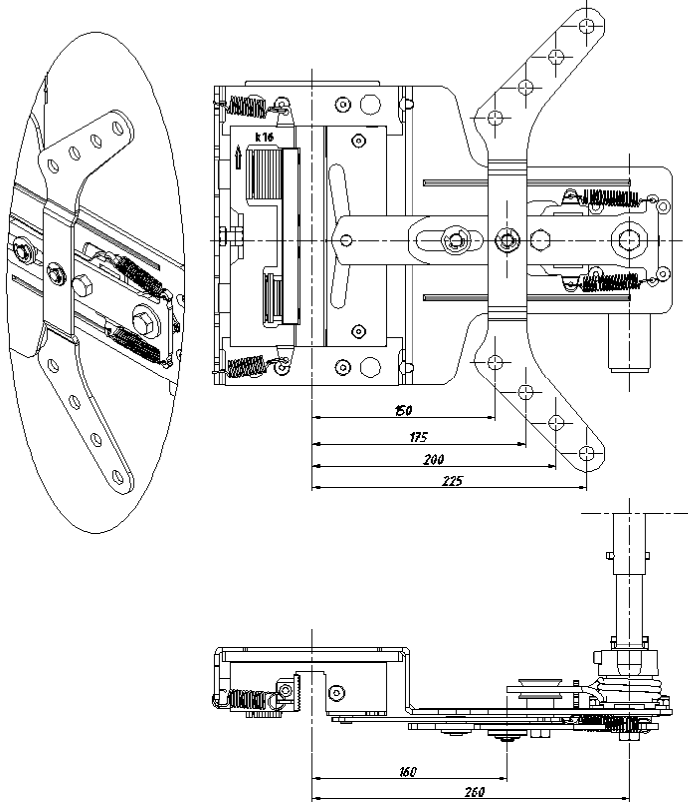
In our models with standard center lever in the safety gear design, the rail axis and rope axis is 160 mm. However, in our models with eccentric lever to be used with different designs, rail axis and rope axis is 175 mm.

You can attach the rope assembly plate to the safety gear lever with regular or rotated position.

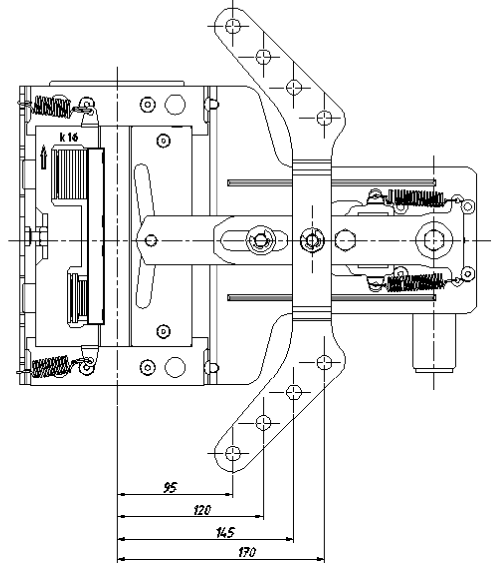
When you look at the figure, you can see that it is possible to connect the overspeed governor rope to the safety gear lever with a clearance of 25 mm at the distance of 95 mm to 225 mm from the rail by bi-directional installation of the plate in models with **center lever**.

In the other figure, it is possible to connect the overspeed governor rope to the safety gear lever with a clearance of 25 mm at the distance of 110 mm to 240 mm from the rail by bi-directional installation of the plate in models with **eccentric lever**. (Figure 13)

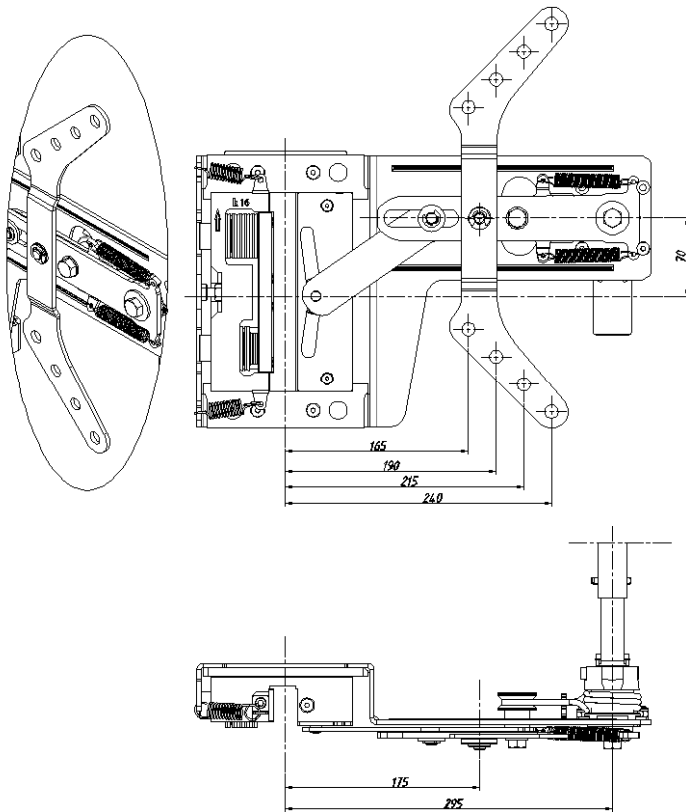
*BRAKE LEVER ROPE ASSEMBLY PLATE
IN REGULAR POSITION*



*BRAKE LEVER ROPE ASSEMBLY PLATE
IN ROTATED POSITION*



*BRAKE LEVER ROPE ASSEMBLY PLATE
IN REGULAR POSITION*



*BRAKE LEVER ROPE ASSEMBLY PLATE
IN ROTATED POSITION*

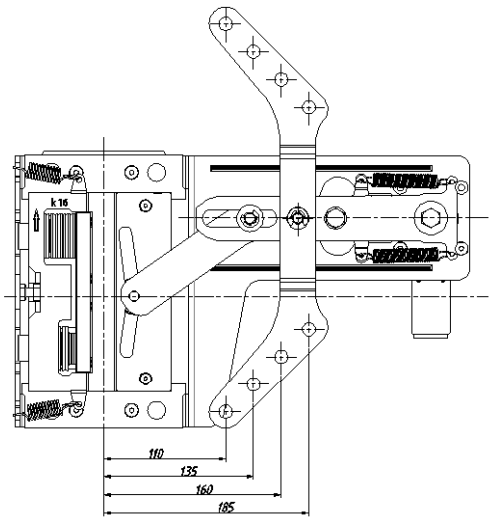


FIGURE 13

Mount the rope assembly plate to the pin for the safety gear lever in accordance with the required size. There are two washers and one C-ring on the pin located on the safety gear lever. Install one of the washers under the rope assembly plate and the other between the top of the plate and C-ring.

Use the thimbles attached on the rope assembly plate. If the thimbles are not in the desired holes for the rope size, remove and insert to the desired hole.

Connect one end of the overspeed governor rope to the plate hole corresponding to the shaft design in accordance with the standard TS EN 13411-3 A1.

Connect the other end in the same way by adjusting the rope length according to the position of the lever for tensioning pulley as specified by the overspeed governor manufacturer.

SAFETY GEAR TESTS

FIRST CONNECTION CONTROL TEST



After the elevator installation is completed, the elevator control must be carried out by the persons who are authorized to control. The purpose of the first test is to check the correctness of connections and settings.

Before testing the safety gear, the protective oil on the rails must be cleaned. The protective agent on the rails should be cleaned with a degreasing solution and mechanical cleaning should be avoided. Since the mechanical cleaning may cause deterioration of the rail surface, it causes problems in the operation of the safety gears, the operation and comfort of the elevator.



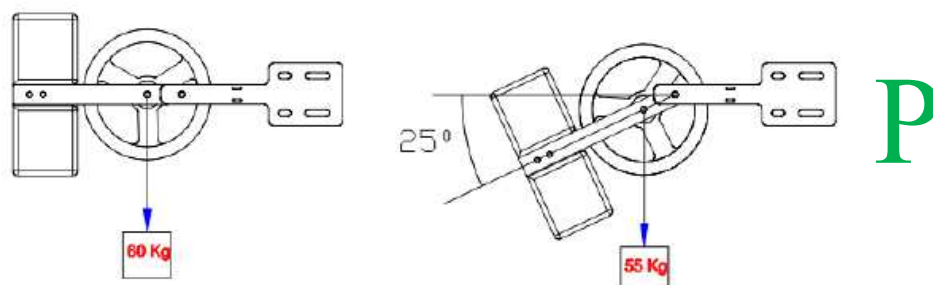
Before starting the safety gear test, all the materials in the shaft should be taken and there should be no one in the shaft. Incorrect or incomplete installation should be avoided.



Check the overspeed governor before proceeding with safety gear test; make sure that installation and direction of overspeed governor is correct and that the tension on its ropes complies with the standards.

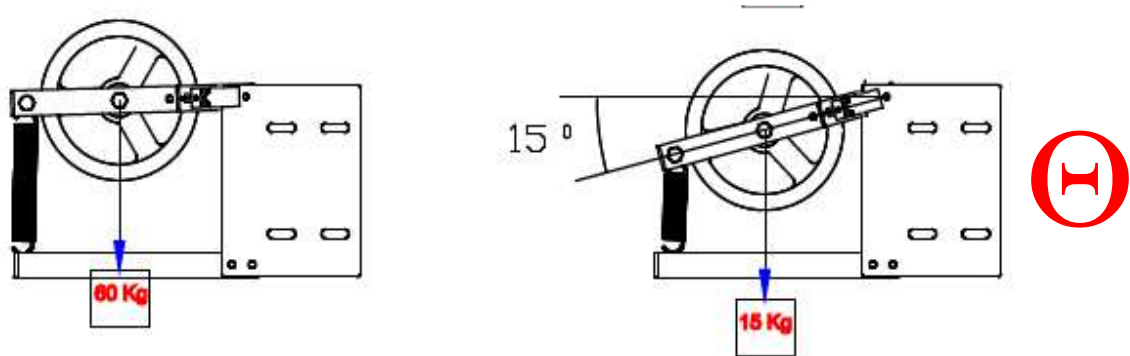
OVERSPEED GOVERNOR TENSION SYSTEM

The purpose of the tensioning system is to keep the overspeed governor rope tensioned and to provide a minimum pulling force of 300 N on each rope. This pulling force is the value specified by the standard TS EN 81-20 M 5.6.2.1.1.1.d. As a result of an approximate calculation, if at least 30 kg of tension load is required on each rope, a load of $30 + 30 = 60$ kg will be required on both ropes. Therefore, a suspension load over 60 kg should be created in the center of the tensioner pulley. This load tensioner pulley is required not only for the parallel position to the ground but also for the position where the rope elongation switch at the tensioner pulley will be engaged after rope elongation because the tension load should be able to maintain its capacity unless the rope tensioner switch cuts the circuit. In the systems with the knurled lever, the tension angle changes after rope elongation, but we can observe that 90% of the suspended load is still effective because the $\text{Cos}(25)$ value gives the value of 0.90 even at angles of 25° after elongation.



However, the situation is different in spring tensioning systems, so it is important. The one thing that should be provided in a spring system is that the springs at the last extension point where the contact will be activated still provide the desired tension load in the rope levers. In many spring systems, when the rope elongation starts, the load that will tension the rope in the tension pulley will decrease rapidly with the closing of the springs. After a while, there is a balance occurs between the pulling force of the springs and the elongation force of the rope and the rope elongation stops.

If the spring tensioner system is at the end of pulley lever as shown in the figure below, the suspension value at the end of the pulley lever is more than the suspension value of the pulley center when rope elongation occurs. The length of spring is closed and it cannot generate tension force. The proportion of the length of the spring itself to its operating length is important.



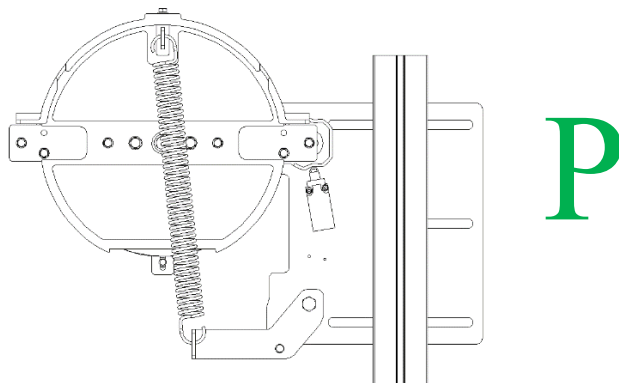
At this point, however, the tension force on the tension pulley has been reduced to almost 150 N instead of 600 N, and a value that is much lower than the tension value that will provide the braking force in the rope levers. The most deceptive part is that when the elongation of the rope reaches the equilibrium point, the overspeed governor rope still stands tense and does not show any need for intervention. However, the rope pulling force on the tension pulley has already lost the tension that can cause the safety gear to be activated. In this case, the safety gear cannot be activated.



Before the safety gear test, check whether the ropes provide sufficient tension and pulling force or not. In case of using spring tensioner, it is highly recommended to use the overspeed governor and lower tensioner systems of our company, if the safety gears do not operate in the upward direction, the tension system should be checked.

In the spring system produced by our company, the spring is positioned in the axis of pulley center. And a long spring is used. When the rope elongation occurs, it has still the capacity of adequate tension force equal to the suspension value of the pulley center providing the length of the spring gets shorter and proportioned to its own length.

CAN-LIFT SPRING
TENSIONER SYSTEM
CONFORMING TO THE STANDART



SHAFT CONTROL

Before starting the test, the elevator should be moved along the shaft and it should be checked whether the rails' cleaning, rail, console and flange connections, and bolt nuts are complete or not and whether there is an obstacle or not in the shaft. It should be ensured that the rails are lubricated in the friction skating elevators, the rails in the roller skating elevators are clean and the safety gear which is used is suitable for the features of the mounted elevator.

STATIC TEST

The first test should be done while the elevator car is not occupied and at revision speed. When the elevator is in revision speed, the electromechanical brake shall be open and the overspeed governor shall be locked if the remote control is used and if the remote control is not used, it is locked mechanically. This action can also be made using the locking coil in the UCM overspeed governors.

- Both safety gears are activated,
- connections are normal,
- synchronization works correctly,
- The safety gear switch is controlled by switching off the circuit.

The elevator is moved in the opposite direction at the revision speed, it is checked whether the safety gear switch is released from the rail or not and the safety gear switch turns to normal state and the synchronization system is restored. The safety gear track on the rails is measured to check that both safety gears are synchronized. There may be one or two cm differences, however, if the difference is greater, the rail distance and synchronization pipe settings must be reviewed.

If the test is positive on bi-directional safety gears, the same test must be carried out in the other direction.

DYNAMIC TEST



Before starting the test, check whether there is someone in the shaft, in the elevator car or on the elevator car. Considering that there may be mechanical damage to the machine or motor chassis during braking, necessary safety precautions should be taken in and around the machine and around the shaft.

This test is conducted at nominal speed in downward direction with the elevator car loaded by 125% of the nominal load. (TS EN 81-20 M 6.3.4. b)

In remote controlled overspeed governors, the 125% loaded elevator car can also be tested by means of a overspeed governor locking device or by mechanically actuating the overspeed governor manually while driving at the nominal speed.

After the test

- Both safety gears are activated,
- connections are normal,
- synchronization works correctly,
- The safety gear switch is controlled by switching off the circuit.

The elevator is moved in the opposite direction at the revision speed, it is checked whether the safety gear switch is released from the rail or not and the safety gear switch turns to normal state and the synchronization system is restored. The safety gear track on the rails is measured to check that both safety gears are synchronized.

If the test is carried out with a load of 125%, a portion of the load may need to be evacuated from the elevator car. Because there is no requirement that the engine pulls up the stuck braking and the 125% loaded elevator car.

The same test is also done when the empty elevator car goes upwards to accelerate in the upward direction. In the upward direction, the safety gear does not have to stop the elevator, it is sufficient that the elevator slows down to the speed of the bumper (TS EN 81-20 M 5.6.6).



After each test, check the elevator car, machine chassis, rails, and safety gears. There should be no deterioration in the system which will prevent the elevator from operating. The burrs on the rails should be cleaned.

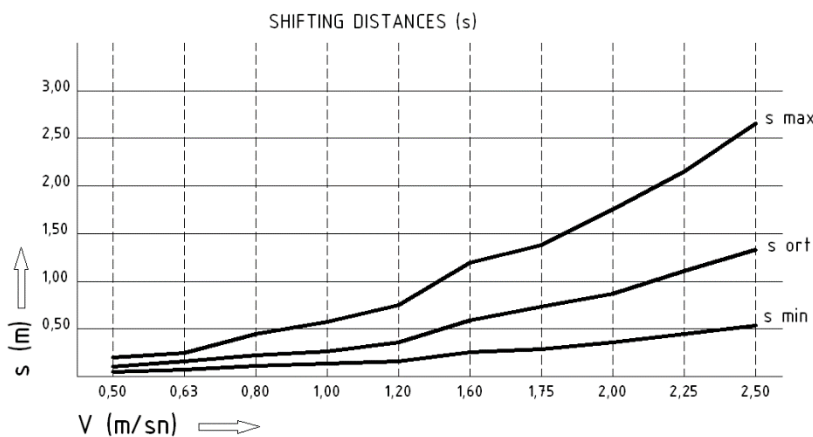


The safety gear systems must be reviewed and the safety gear pairs replaced if a fault is observed. In particular, the traces of friction, crushing, and visual inspection of the operation of the levers will be sufficient on the safety gear tubes and the pressure pieces.



It should be noted that the safety gears are designed based on the free dropping of the P + Q load, whereas in these tests only the Q / 2 load is effective.

For tests with rope, it is adequate to measure v_0 as nominal speed of the elevator and get a value just higher than the value of s_{min} as shifting distance is condition.



v	Tripping v	s min	s ort	s max
0,50	0,80	0,03	0,08	0,16
0,63	1,00	0,05	0,13	0,25
0,80	1,31	0,09	0,22	0,44
1,00	1,50	0,11	0,29	0,57
1,20	1,71	0,15	0,37	0,74
1,60	2,16	0,24	0,59	1,18
1,75	2,33	0,28	0,69	1,38
2,00	2,63	0,35	0,88	1,76
2,25	2,92	0,44	1,09	2,18
2,50	3,23	0,53	1,33	2,65

SAFETY AGAINST UNINTENDED CAR MOVEMENTS (UCM);

The Standard TS EN 81-20 requires that some measures must be taken against unexpected unintended car movements. This requirement is described in **TS EN 81-20 Article 5.6.7**.

“5.6.7.1 Lifts must be equipped with safety gears to prevent unintended car movements at positions away from the stop point, or to stop the car where the landing door is unlocked and the car door is not at closed position as a result of any failures that occur in the lift machine or drive control system which ensure safe movement of the car.

5.6.7.2 The safety gears must detect unintended car movements and stop the car and keep it at stopped position.”

It may be summarized as follows: after unintended car movement is detected, the car must be stopped at distances specified in **Article 5.6.7.5**.

One of the solution to this requirement of the standard is to stop unintended car movement (UCM) by enabling the mechanical safety gear mounted on the car through the overspeed governor and governor rope.

The overspeed governor models that we manufacture **SKY 200 (Φ 300)A3 (UCM)**, **SKY 200 (Φ 300) A3+UZ (UCM+RC)** are activated in case of unintended car movement, enabling mechanical safety gears mounted on the car.

With this overspeed governor model, the disc connected to the governor sheave through a coil is locked flexibly when the car stops at landing. The back-and-forth movement of the coil axle which performs locking is controlled by a limit switch. (These overspeed governors are locked whenever the car stops at a landing and kept locked during stop periods)

If an unintended car movement (UCM) occurs at locking position, the disc, after allowing some movement, locks the governor sheave and prevents its rotation. Thus, the governor rope passing through the sheave pulls the safety gear lever and enables the mechanical safety gear.

The amount of unintended movement allowed by the disc that flexibly locks through the coil is specified in the User Manual for **SKY 200 Overspeed Governor**, p. 27. These distances equals to the values that allow the lift to load/unload or perform leveling movements. When these values are exceeded, the governor is locked.

These features of the governors were tested and certified by the notified bodies.

The safety gears are required to be enabled easily at low speeds so that they can be used as safety gear in case of unintended car movements (UCM). Our safety gear models **SKY 500SG-P** allow braking by activating at low speeds of unintended car movement, as well.

The Overspeed Governors **SKY 200** and Progressive Safety Gears **SKY 500SG-P** in the models specified above, are certified individually for use as safety gear.

As specified in Lift Regulation 2014/33, Annex 3, Clause 2, the mechanisms that prevent fall or unintended movement of the car are required to be tested and certified by the Notified Bodies.

It was approved by testing that the two products of our company activate harmoniously at low speeds of unintended car movements and they were certified as a set by the Notified Body. They can be used for safety against unintended car movements (UCM).

If a set of SKY ELEVATOR SKY 200 Overspeed Governor used, no additional detection device is required as the governors have a continuously locked system when the car is at the landing.

For certification, it is checked if the lift car stops at the distance specified by the standard after an unintended movement (UCM). (TS EN 81-20 M 5.6.7.5) Once the test result is within the range of values specified by the standard, the safety gear and governor are certified as a set.

Where a set of SKY ELEVATOR SKY 200 Overspeed Governor specified above, and the tension mechanism and SKY 500SG-P Progressive Safety Gear are used together, no additional certification is required as they have an UCM test document and certificate as a set. They are included in the product line having the UCM certificate which is required to be issued by the Notified Body specified in Lift Regulation 2014/33, ANNEX 3, Clause 2.

In case our products are not used as a set, the installation company must have an authorized notified body carry out the certification process so that the products are approved as a safety gear against unintended car movements.

SAFETY TEST AGAINST UNINTENDED CAR MOVEMENTS

“Article 6.3.13 Safety against unintended car movements (Article 5.6.7)

The aim of this experiment is to check the sensing and stopping elements before putting them into service.

Requirements of experiment: In the experiments conducted for lift stopping, only the means defined in Article 5.6.7 must be used as stopping elements. Experiment must:

- include verification that the safety gear breaking element activates as required by type examination.
- be conducted with an empty car at the higher part of the hoistway is moved upwards (for example, from a landing, the highest landing) and a completely loaded car at the lower part of the hoistway is moved downwards (for example, from a landing, the lowest landing) at pre-adjusted speed (inspection speed, etc.) (as defined during type examination).

This experiment must verify that the distance for unintended movement will not exceed the value specified in Article 5.6.7.5.

If the devices require automatic monitoring (Article 5.6.7.3), the function must be checked.

Note: If the safety gear breaking elements include the elements located in landings, it may be required to repeat this experiment for each related landings."

MAINTENANCE CONTROL AND REPAIR

Apart from the routine checks determined by the standart and local rules, SKY 500SG-P Safety Gear should be properly checked and maintained at least once a year. This control essentially involves controlling that the mechanisms are active, that there is no compacting or sticking and the safety gear switch is active. The deformation that may occur due to the corrosion, moisture, compacting, impacts can prevent the operation of mechanisms. Safety gear materials may have suffered damage due to unintentional braking. There may also be damage caused by normal operation and maintenance. In this case, a relationship should be established with SKY ELEVATOR.

Excessive lubrication on the rails or improper greasing may be filled into the mechanism. In this case, the safety gears must be cleaned and their mechanisms should be operated. This should be part of the maintenance activity. In the case of rail lubrication, ISO VG 320 is to be used at temperatures between -5 and +35 degrees Celsius and ISO VG 460 oils are to be used between +5 and +50 degrees Celsius.



It is forbidden to replace any part of the safety gear material except for SKY ELEVATOR. They must be replaced in pairs in case of a deterioration of the safety gears. Even if the elevator is in a very short period of time during braking, it is forbidden to operate without a safety gear and is not permissible.



The safety gears have to be replaced after six tests as loaded and have to be replaced after two tests in free dropping. The tests must be recorded in the elevator book or in how the tests are performed. If there is a deficiency in these records or there is a defect in safety gear materials, SKY ELEVATOR cannot accept any responsibility.

CONTROL LIST

BUILDING:		DATE:		
NO	CONTROL MATERIAL	OK	NOT OK	DESCRIPTION
1	Overspeed Governor rope connection			
2	Synchronization			
3	Safety Gear switch			
4	Right safety gear lever			
5	Right safety gear spool and springs			
6	Right safety gear cleaning			
7	Left safety gear lever			
8	Left safety gear spool and springs			
9	Left safety gear cleaning			
10	General rust, compacting, cleaning			

After this check, non-deformation malfunction should be controlled and cleaning that will not interfere with the system's operation can be made. In addition, the interventions to be imposed disrupt the warranty and liability obligation. In case of a deterioration of the system, SKY ELEVATOR should be informed and new reliable material should be installed under technical responsibility.

PERIODIC CONTROLS AND EXPERIMENTS, IMPORTANT CHARACTERISTIC CHANGES OR CONTROLS AND EXPERIMENTS AFTER AN ACCIDENT (TS EN 81-20 APPENDIX C)

C.1 Periodic checks and experiments

Periodic inspections and tests should not be more comprehensive than inspection and tests carried out before the elevator is put into service. Periodic tests should not cause any stresses due to excessive wear or repetition due to repetition. This applies in particular to elements such as safety devices and bumpers. If tests are to be carried out on these components, these tests shall be carried out when the elevator car is empty and at low speeds.

RESPONSIBILITY AND WARRANTY

Warranty is for two years, subject to compliance with the terms and conditions.



Before starting the installation, it should be checked whether the features of the safety gear correspond to that of the elevator and that the rail thickness and the roller features correspond to that on the nameplate and that the safety gear numbers of the two safety gears are the same.



The capacity, speed and rail usage values of the safety gear assemblies are printed on the label. The safety gears will only function if they are used in accordance with these values. No changes can be made to the factory settings of the safety gears. The SKY ELEVATOR acknowledges that the person who will install, adjust and use this safety feature has good elevator information and is competent in elevator maintenance and testing.



It is prohibited for unauthorized persons to install, adjust, test, and operate the safety feature. In case of unauthorized persons interfering with the security components, the whole responsibility belongs to the installation company.



Installation and adjustment of the safety gears must be carried out in accordance with the operating instructions. SKY ELEVATOR is not responsible for the safety of the products which are damaged during the installation or that are improperly installed or damaged during transportation or not installed in accordance with the instruction manual and does not guarantee for these products.



Safety gear assemblies must be used with each other. Both identical products have the same serial numbers. Products that are not used together or have materials that have been added or have been modified or changed, or of which safety gear spool or compression pallet have been changed or damaged, of which maintenance and controls not made on time or which have been installed by using materials except original parts cannot be evaluated under the warranty and SKY ELEVATOR does not accept any responsibility for these products. The installation, maintenance, control and testing of these safety features must only be carried out by qualified personnel and all safety instructions must be strictly obeyed.



Take measures to prevent the material from being removed from the shaft openings before installing or adjusting the safety gears in the shaft. Close the shaft clearances. Take precautionary measures against falling of necessary hand tools. It is important for your safety that the safety gears and their equipment are installed and connected in a safe area outside the shaft before the elevator car carcass is placed in the shaft. Elevator car carcasses should be installed on the ground floor as much as possible and the safety gear adjustments should be made on the ground floor.



Elevator car carcass installation should be done on the ground floor, the overspeed governor assembly must be finished, overspeed governor rope safety gear connection must be made, carcasses should be taken to the last floor after these. If the elevator car is used as a scaffold, overspeed governor switch, as well as overspeed governor connections must be activated. **Before the safety gears and the overspeed governor are activated, the carcasses must never be moved in the shaft even with the crane.**



The relevant electrical connections must be made by authorized electricians. The connection and control of the safety gear switch must be connected by authorized persons to install the control panel. The safety gear switches are non-lock straight switches, and if the elevator is removed from the safety gear, they shall be in their original position and the elevator shall be mechanically ready for operation. (TS EN 81-20 M 5.66.2.1.4.1.)