

**DYNATECH
DYNAMICS AND TECHNOLOGY, S.L.**

ROPE TENSING SYSTEM OF STAR

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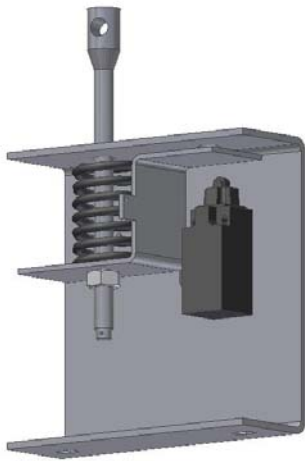
1 INTRODUCTION

The rope of an overspeed governor must be tensed with a concrete force, so as to it work properly if the cabin gets overspeed or a possible free fall.

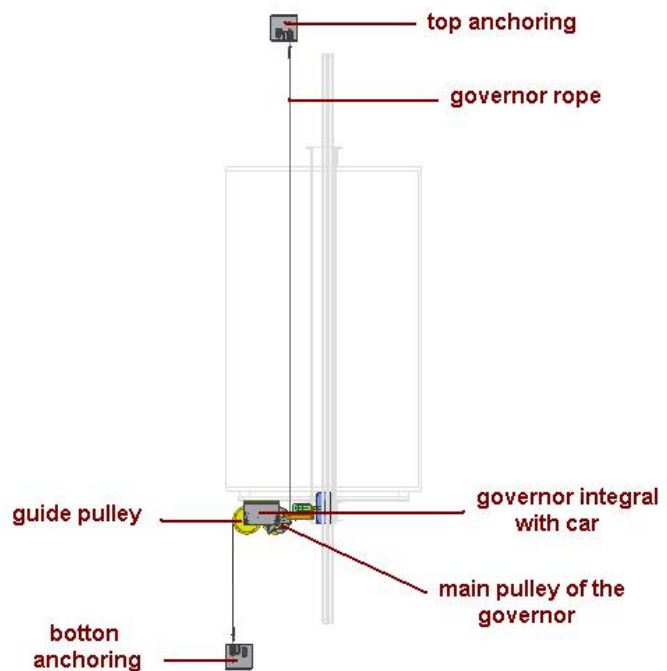
The overspeed governor STAR is characterized by traveling with the car, so it must have a special tension devices.

As seen in the figure of the STAR diagram, one tension device is on the top side and the other one, on the bottom side.

Once this devices are tensed with the needed force, the STAR can work in a proper way.



Conventional Tension Device



O.G. STAR installation sketch

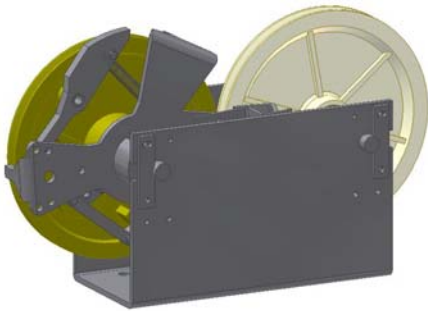
Besides this tension device, there are other possibilities to tense and anchor them.

Next they are described with detail.

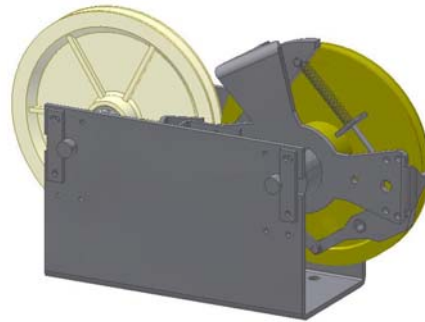
2 TYPES OF TENSION DEVICES.

2.1 TENSION DEVICE FITTING GUIDE

If there would be a problem with the anchoring of the tension devices on the floor or under the top side, there is a possibility to fit these ones to the guide. The overspeed governor STAR can be Right Hand or Left Hand, the fittings to the guide, must be assembled taking into account the side of the STAR with regard to the guide

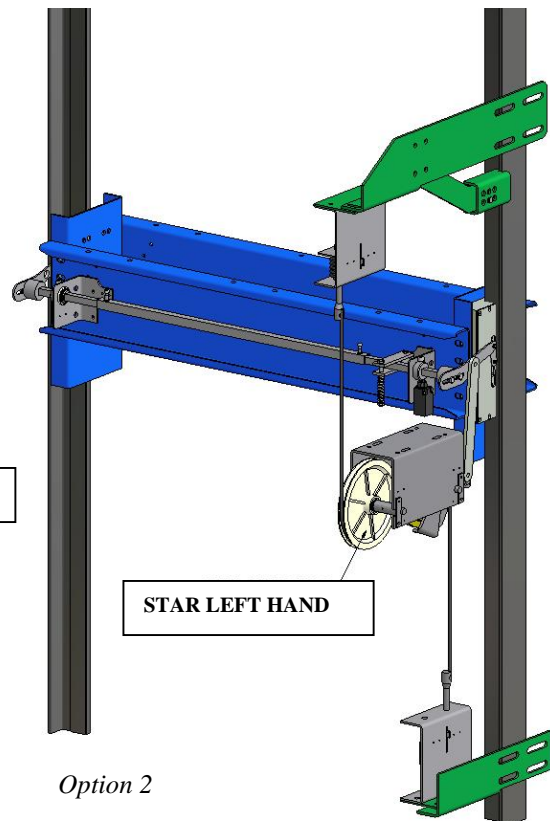
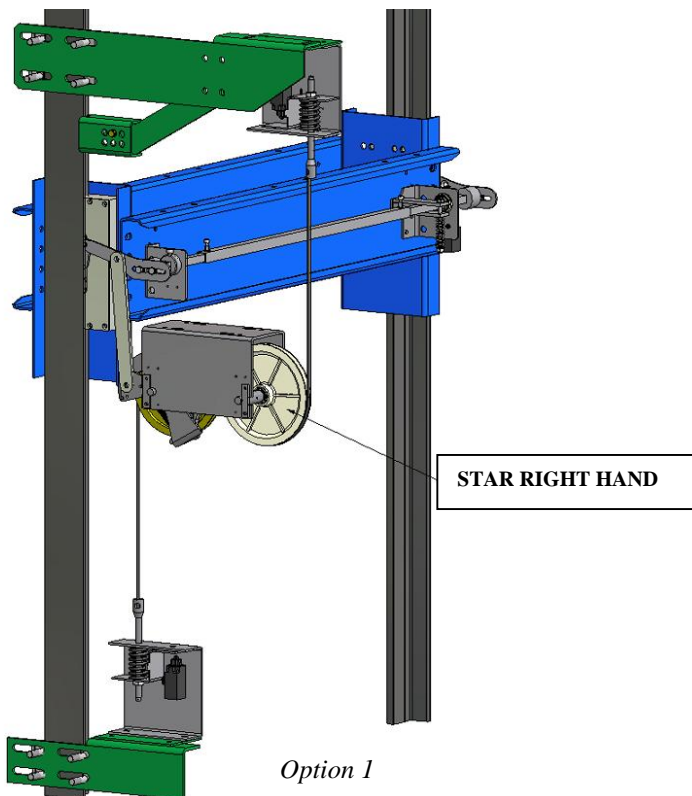


STAR Left Hand



STAR Right Hand

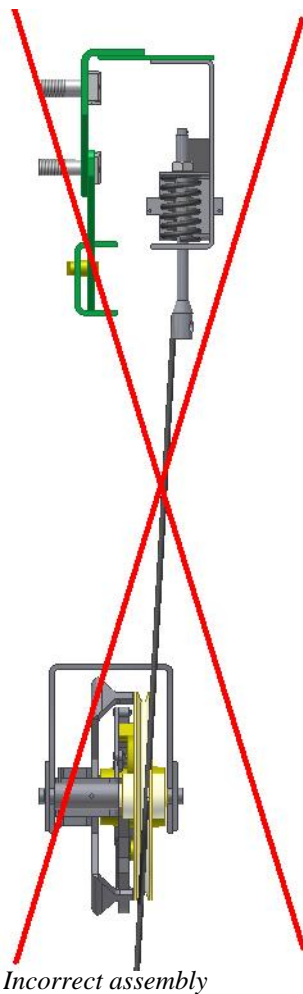
Below it's shown some pictures as examples.



In the previous pictures it's shown the fittings of the tension devices if we use a Left Hand STAR or a Right Hand STAR.

When installing the rope, it's important the rope to be aligned with the overspeed governor.

The left bottom picture shows how the rope mustn't be placed with regard to the overspeed governor, on the contrary the right picture shows how should be the rope assembled.



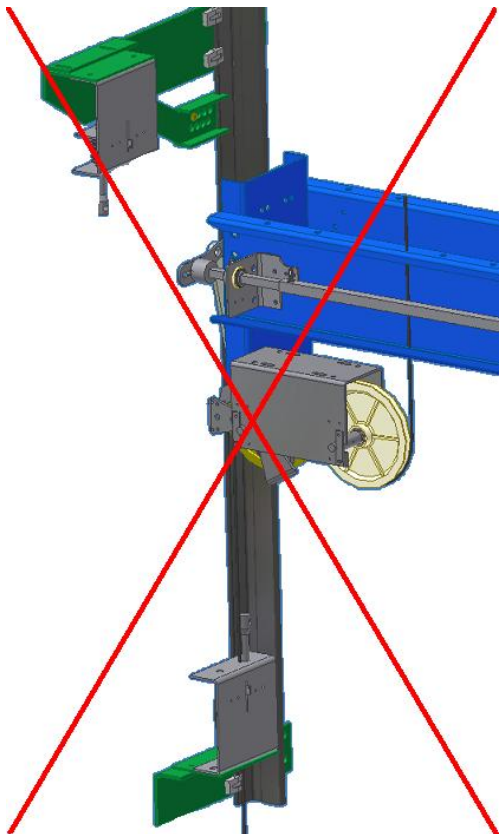
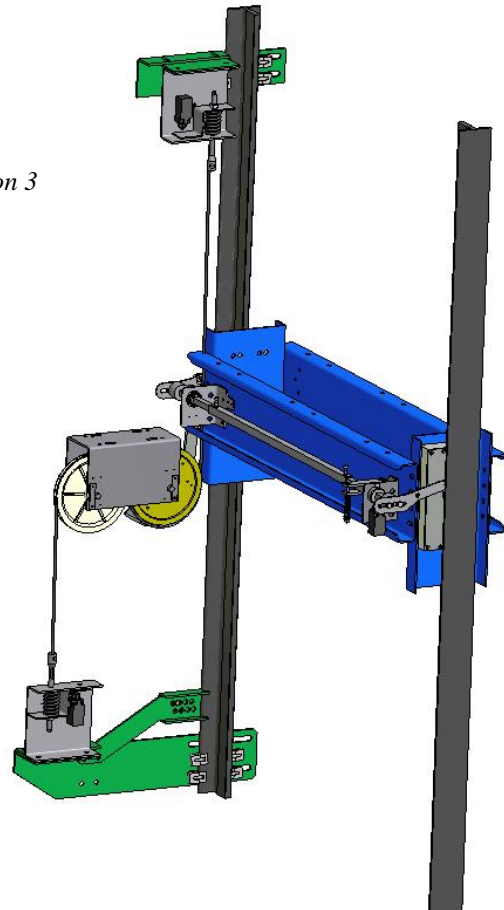
If the rope is slightly inclined, the working of the overspeed governor will be right, however it's not advisable to displace very much axial wise the point of anchoring of the tension device regarding with the pulley of the overspeed governor, since it should cause a malfunction of the governor as the wearing of the friction parts.

There are two ways of assembly of the fitting device, regarding with the position of the STAR.

This fitting to the guide can be assembled inverted, that is, the long anchor can be hitched in the bottom side and the short one in the top side. See the next picture.

Also valid for both hands of the overspeed governor

Option 3



Note: These fittings are not useful if the overspeed governor is placed perpendicular to the guide, since as it's shown in the picture, the rope in the top side is far from the anchoring.

ASSEMBLY OF THE FITTINGS OF THE TENSION DEVICES

Let's suppose that the overspeed governor STAR is placed as it appears in the picture Option 1. The assembly of the plates of the system will be as it follows.

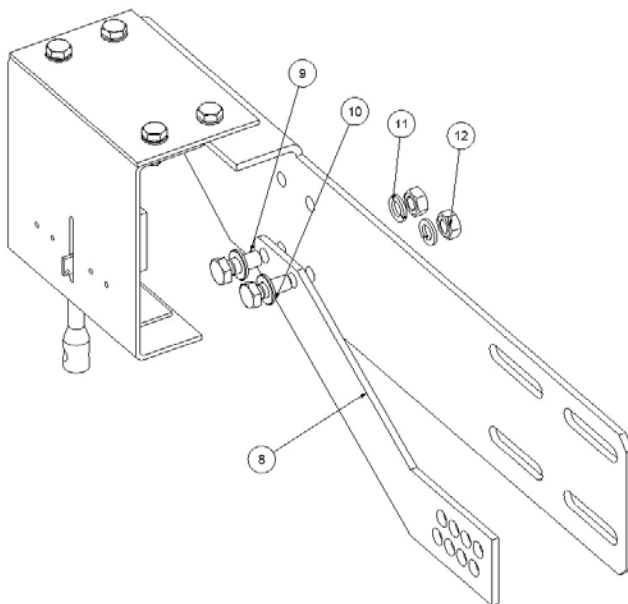
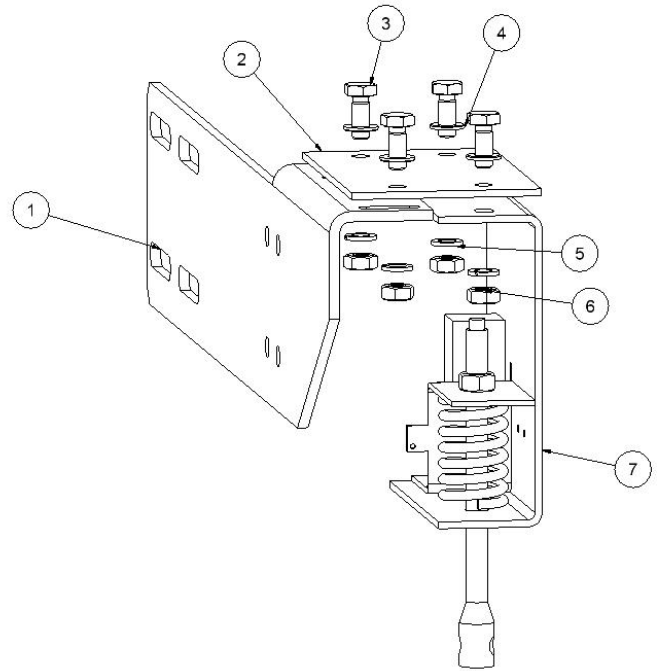
- Mounting of the long support

In the right picture it's shown the assembly of the long support **(1)**.

The prolongation plate **(2)** is joint to the long support by 2 screws DIN 933 M10x25 **(3)**, 2 washers DIN 125 M10 **(3)**, 2 grower washers M10 **(5)** and 2 nuts DIN 934 M10 **(6)**.

After that, the tension device of the STAR **(7)** has to be screwed to the prolongation plate with 2 screws , 2 washers, 2 grower washers and 2 Nuts of the same characteristic.

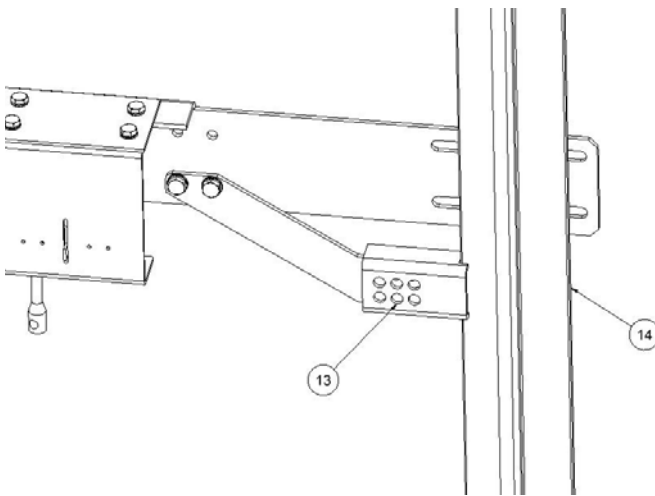
Don't screw them totally, since once the whole thing is assembled, the plays will let place the rope in the proper way.



The picture on the left shows the assembly of the brace of the long support **(8)** by 2 Screws DIN 933 M12x30 **(9)**, 2 Washers DIN 125 M12 **(10)**, 2 Grower washers M12 **(11)** and 2 Nuts DIN 934 M12 **(12)**.

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Once the assembly is ready, it has to be placed in the guide **(14)**. To do it, the system has to be assembled as it's shown in the pictures.



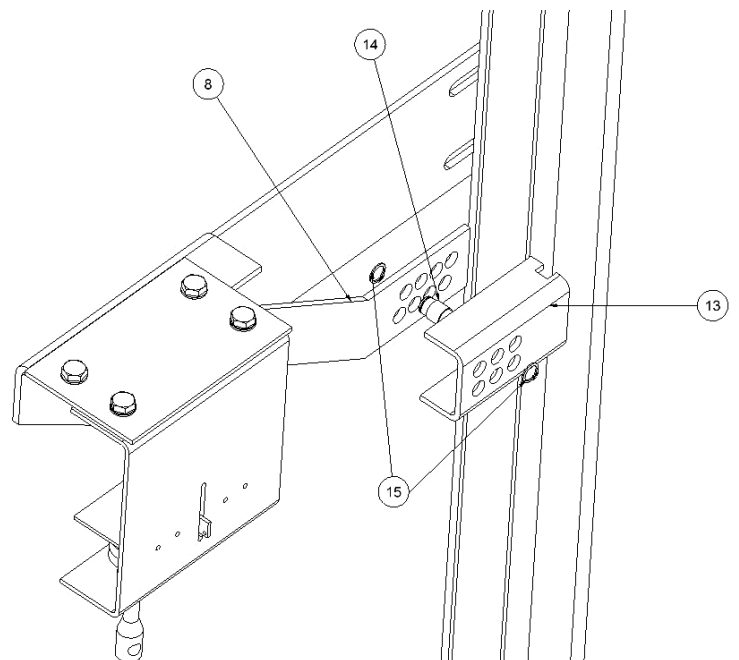
the brace sliding **(13)** is the part that avoids the whole assembly fall down, once the rope is installed. The neck of this part will have to lean in the edge of the guide.

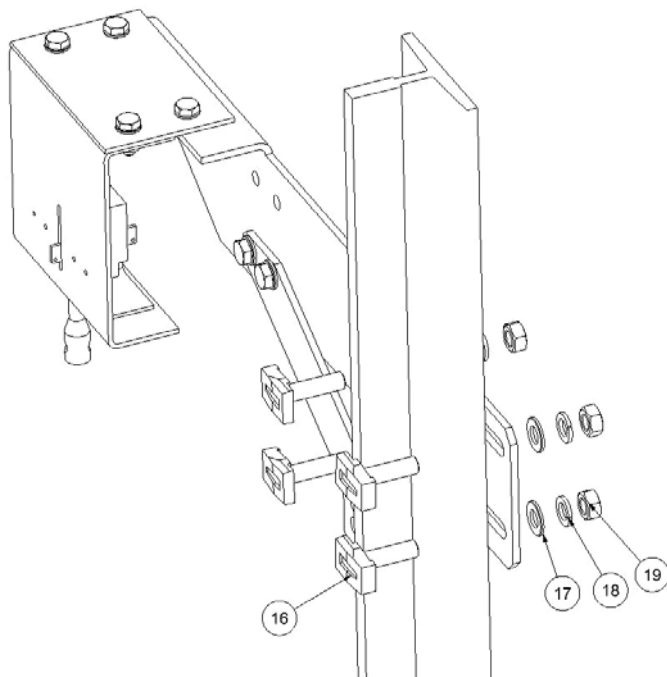
depending on the position of the whole, the brace sliding will be able to be assembled in different positions thanks to the different holes in the parts.

Once the hole is chosen, it's going to proceed to introduce the brace axle **(14)** as the picture below shows. The axle has two different thickness.

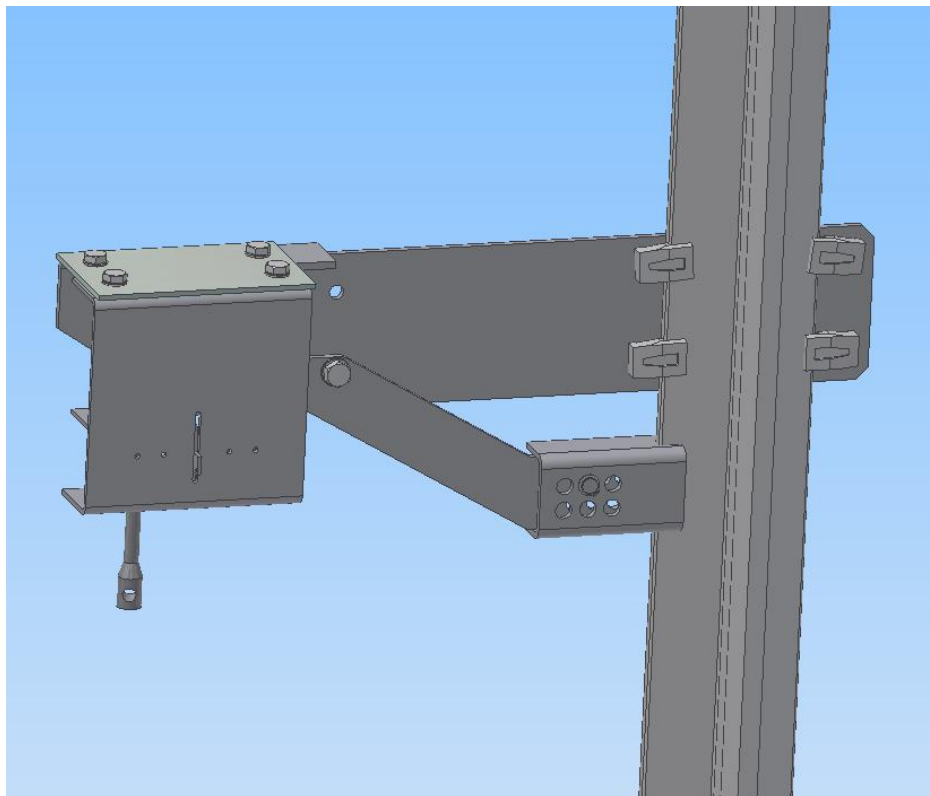
The longer, is inserted in the hole of the brace support **(8)** and the shorter, in the brace sliding **(13)**.

In order to avoid the release, 2 security rings DIN 471 $\varnothing=14$ **(15)** will be assembled..





Once all the whole is ready, it has to be screwed to the guide. To do it, use 4 flanges **(16)** with other 4 washes and nuts of the same characteristics.



Long Support assembled

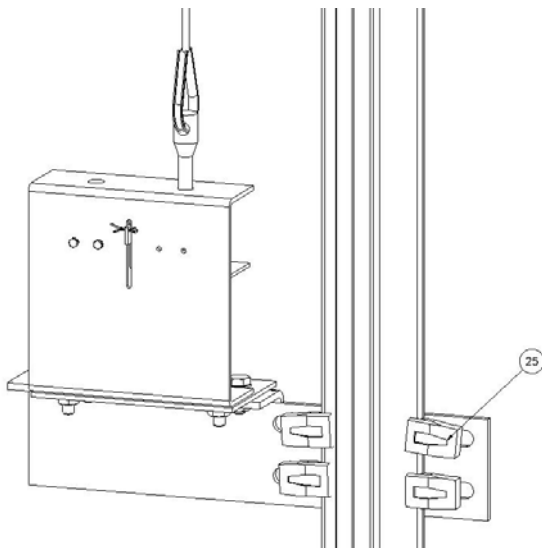
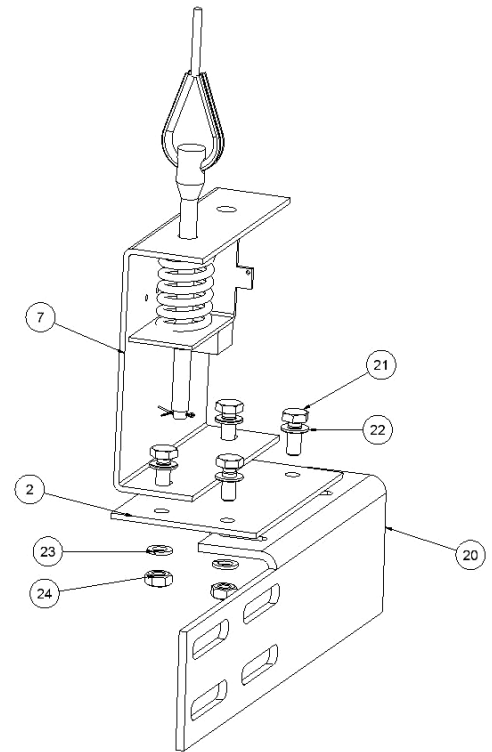
- Short support assembly

In order to assemble the short support, follow the sketch of the picture.

Assemble the prolongation plate (2) in the short support (20), by 2 screws DIN 933 M10x25 (21), 2 washers DIN 125 M10 (22), 2 grower washers M10 (23) and 2 nuts DIN 934 M10 (24).

After that, the tension device Star (7) will be placed in the position shown in the figure, using screws, washers and nuts of the same characteristics.

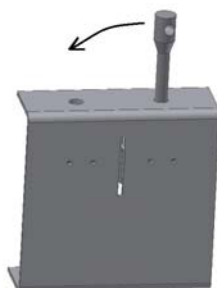
Don't screw them totally, since once the whole thing is assembled, the plays will let place the rope in the proper way.



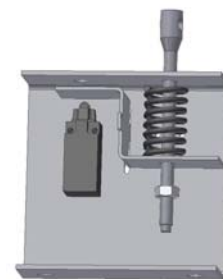
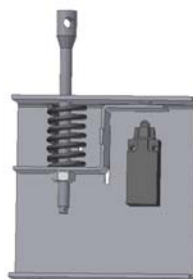
Once all the whole is ready, it has to be screwed to the guide. To do it, use 4 flanges (25) with other 4 washes and nuts of the same characteristics.

Finally, once the rope is installed and it's aligned with the grooves of the pulleys, proceed to screw all joints of the whole assembly to fix the supports and plates.

Note: The tension device Star, is supplied as it's shown in the picture, however the tension device is designed to be able to be assembled it symmetrical. So, if there is a problem with space or something that couldn't turn back the tensor devices, It exists the possibility to dismount the parts and assemble them in the contrary holes. This way, there is a one more possibility to install the rope.



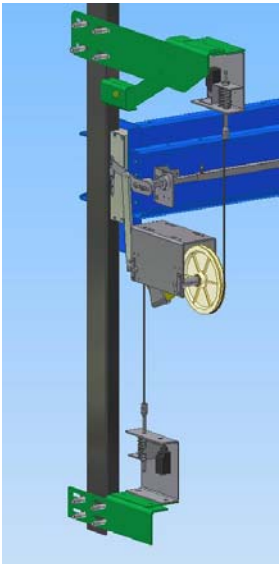
As supplied



Changed Device tensor - 9 -

The assembly of the symmetrical tension device is very simple:

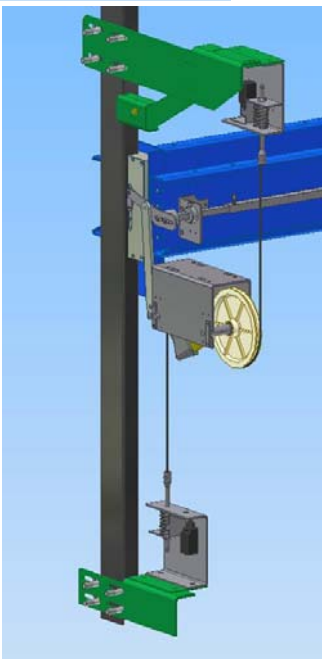
- a) Remove the safety lock and the nut from the rod
- b) Remove the rod and the spring.
- c) Remove the safety lock from the S shaped part
- d) Unscrew the electric contact
- e) Assemble all parts in the symmetrical holes in inverse order.



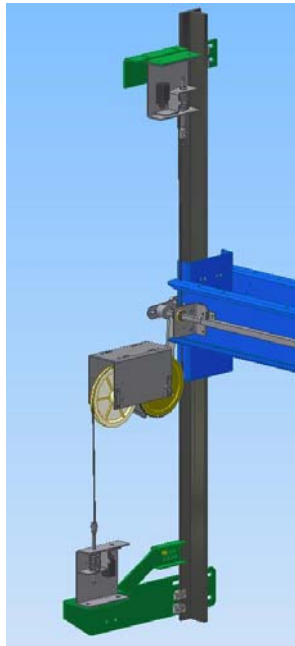
The picture on the left side, shows how would be the result of the whole assemble of the fittings tension devices Star.

However, the concept of assembly is the same for several positions and hands of the overspeed governor STAR.

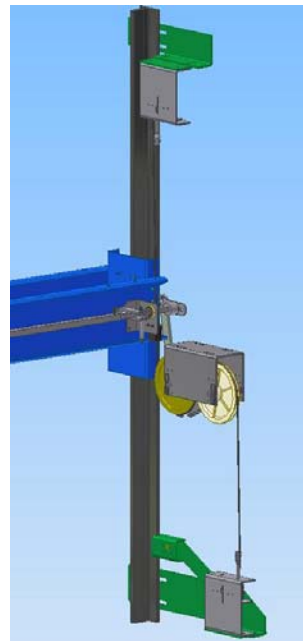
Next, it's shown a list of possibilities of assembly of the fittings.



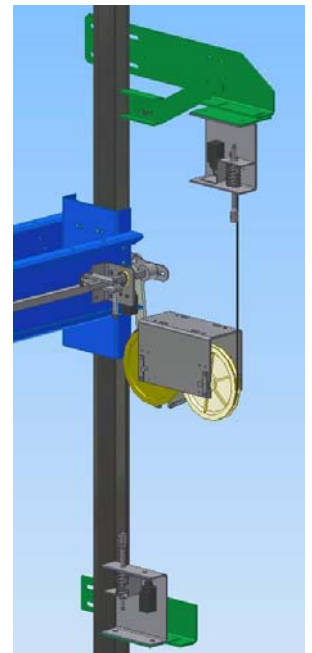
Option 1



Option 2



Option 3



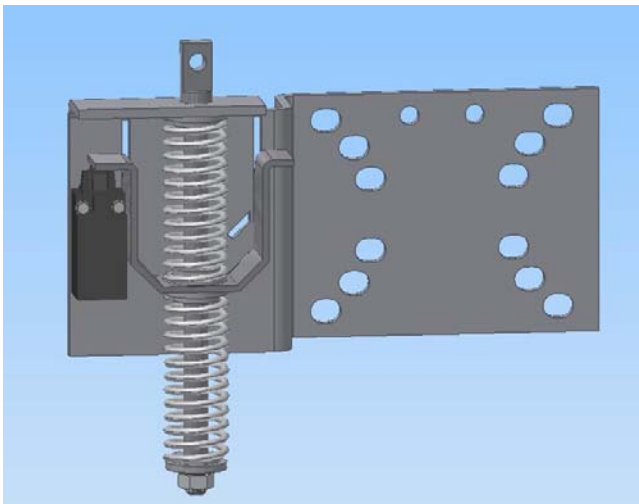
Option 4

All this options come with a prolongation plate in order to the rope can be better aligned, however it can be dispensable. It depends on the position of the Star axially.

2.2 TENSION DEVICES ORION STAR GUIDE

These tension devices are characterized fundamentally by:

- A greater detensing margin
- Easier way of tensing process

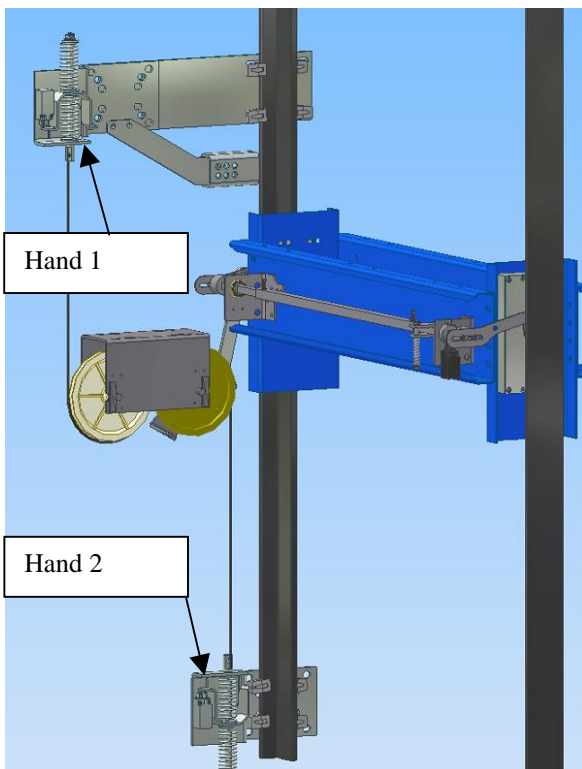


These kind of devices are advisable for great height installations, since due to the pretty long rope, it exists more detensing.

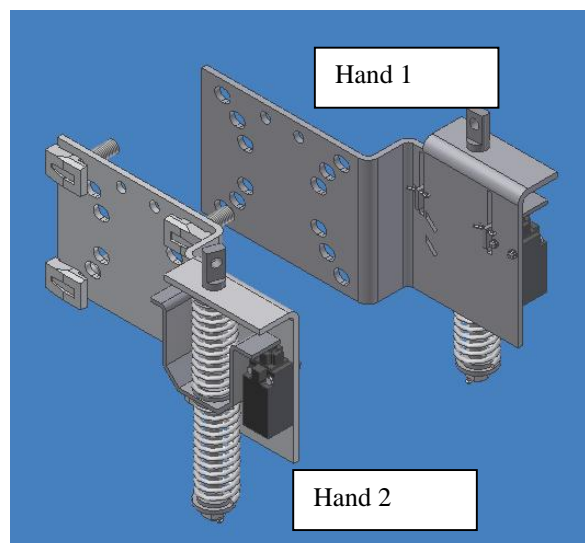
With this system, as well as bigger detensing margin, the process of tensing consists simply in applying some hits in the bottom tension device.

Next the details of this assembly are described.

In the drawing below, the whole of the devices and the overspeed governor are shown:



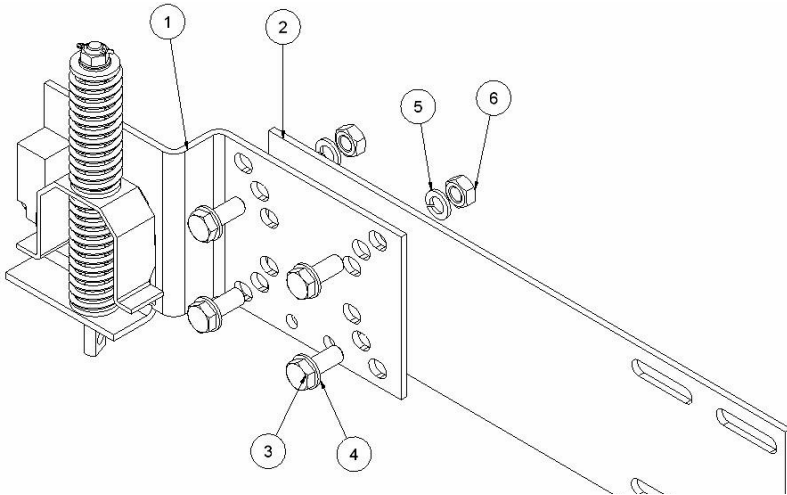
There are 2 hands for the assembly of the tension devices. It depends of the overspeed governor position.



In the packing sending both hands of the tension devices will be supplied, since regardless of the position of the Star, the bottom tension device is different from the top tension device (this is assembled upside down) as hand concerns.

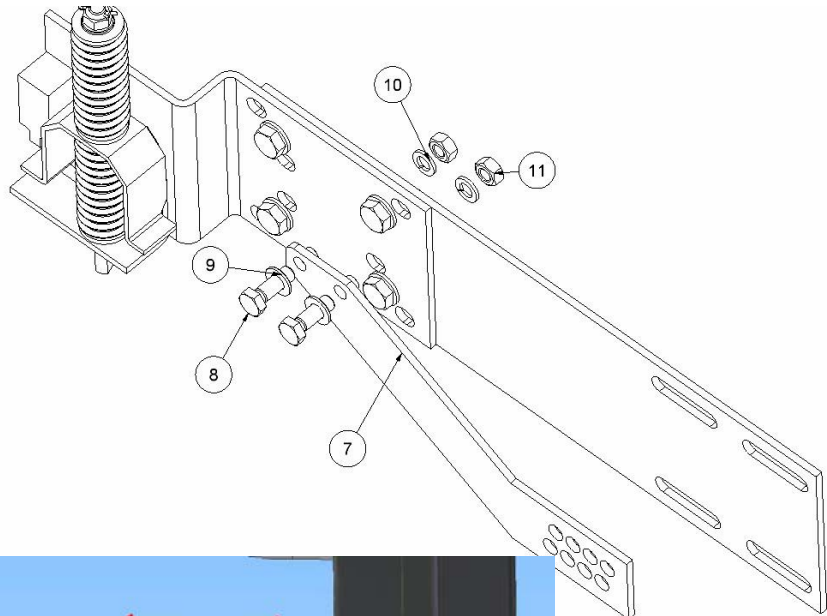
The upper support (or long), consists of a tension device (hand 1 or hand 2) and a plate for anchoring onto the guide.

- Assembly of the long support.



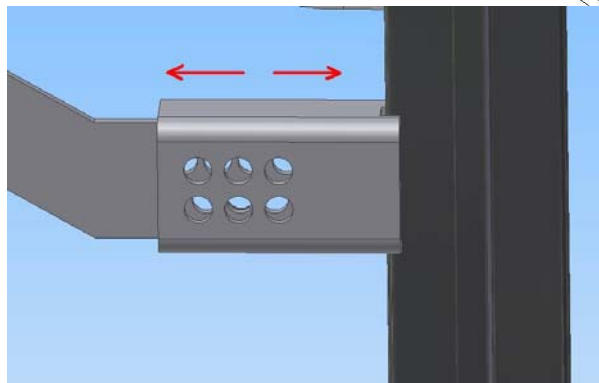
Assemble The tension device (1) in the anchoring plate of the upper tension device (2). Use 4 screws DIN 933 M14x35 (3), 4 plane washers DIN 125 M14 (4), 4 grower washers DIN 127 M14 (5) and 4 nuts DIN 934 M14 (6).

Next the support brace (7), is assembled by 2 screws DIN 933 M12x35 (8), 2 plane washers M12 (9), 2 grower washers DIN 127 (10) and 2 nuts DIN 934 M12 (11).



the brace sliding (12) is the part that avoids the whole assembly fall down, once the rope is installed. The neck of this part will have to lean in the edge of the guide.

depending on the position of the whole, the brace sliding will be able to be assembled in different positions thanks to the different holes in the parts.

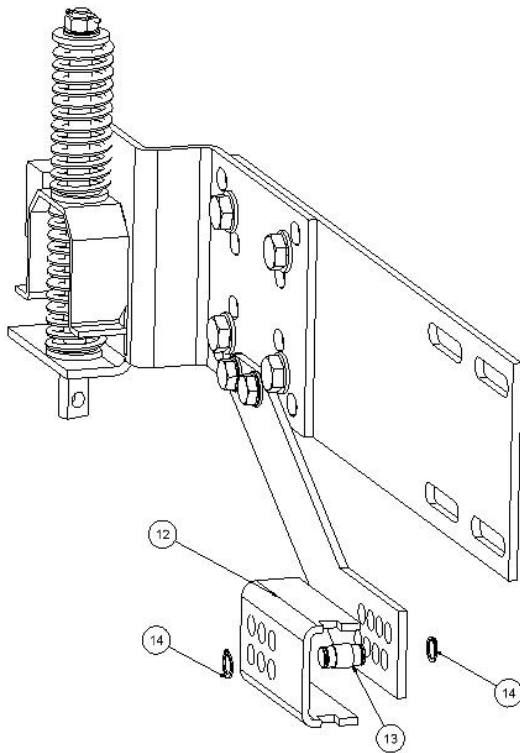


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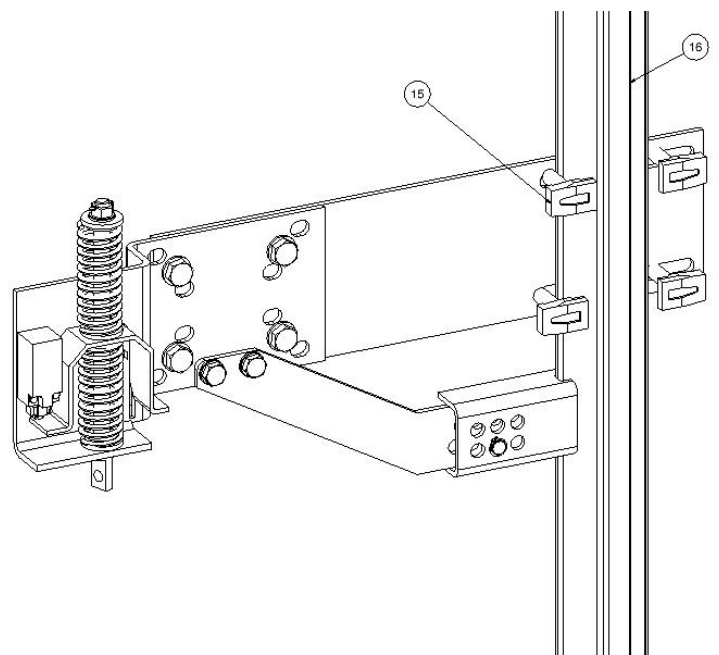
Once the hole is chosen, it's going to proceed to introduce the brace axle (14) as the picture below shows. The axle has two different thickness.

The longer, is inserted in the hole of the brace support (8) and the shorter, in the brace sliding (13).

In order to avoid the release, 2 security rings DIN 471 $\varnothing=14$ (15) will be assembled.

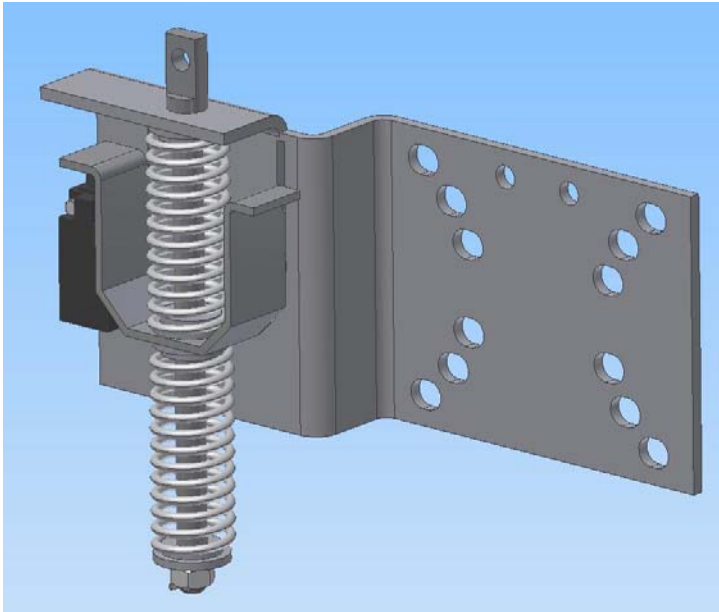


In the picture below, it's shown the assembly of the whole onto the guide (16) using flanges M14 (15).



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Once the long support is assembled, the bottom tension device (of contrary hand) must be placed as follows.

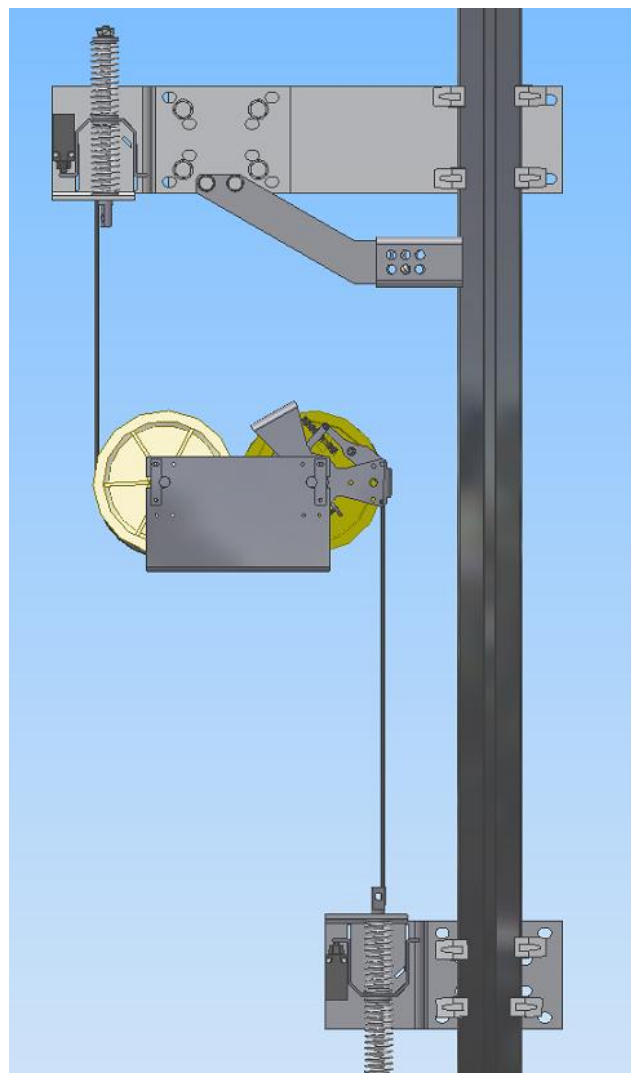


As it appears in the picture on the left, the tension device, has several holes in order to adapt it to different kinds of guide.

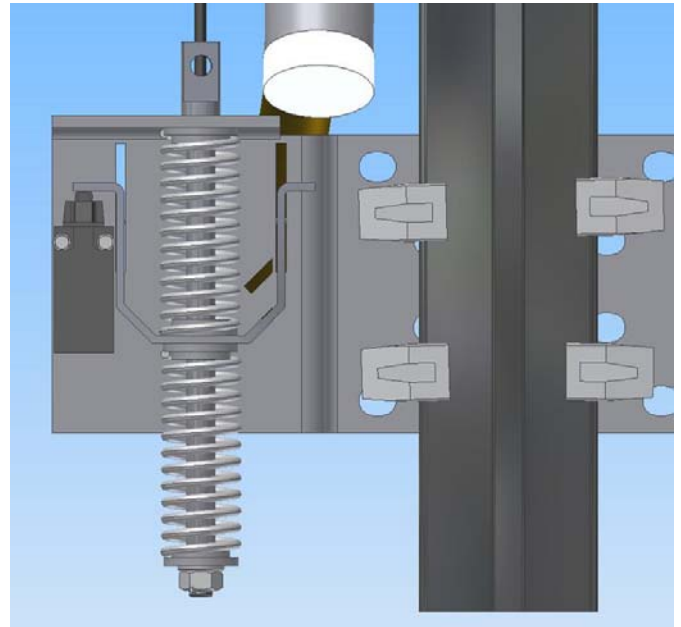
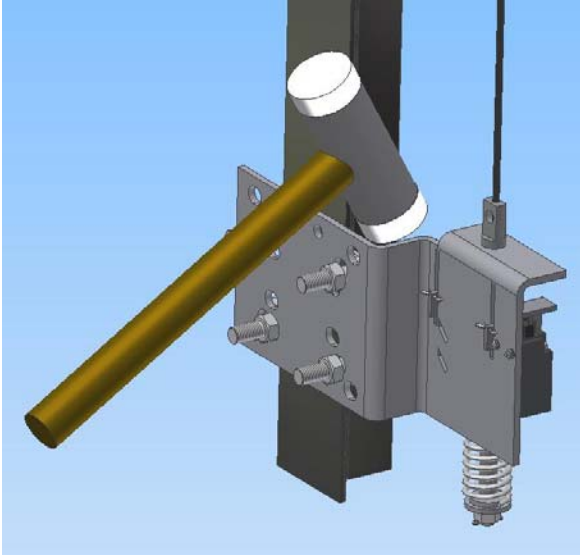
The main guides T70, T90, T125 correspond with the whole of holes in the plate, however for guides such as T82, T85, etc... the tension device is also valid.

Let's suppose we use a guide T90. The sketch of the tension devices / overspeed governor installation would be as it's shown on the right: The rope is tied in both tension devices with thimbles and wire ropes clips. Before screw the wire rope clips, you have to tense the rope manually.

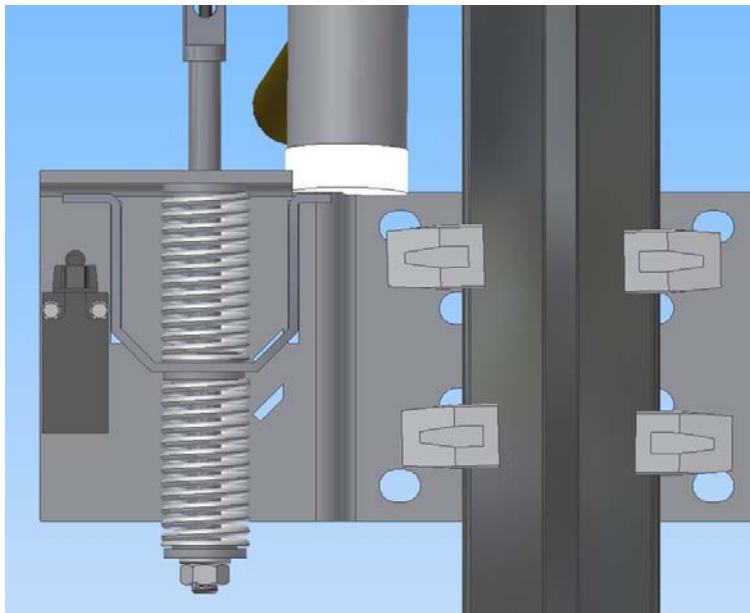
In order to apply to the rope the needed tension, proceed as it follows: Screw the flanges to the guide and the tension device. Don't screw totally, since next you must hit down the support in order to tense the rope.



As you can see in the pictures, use a mallet and hit the bottom tension device until the plate fits in the upper slot.

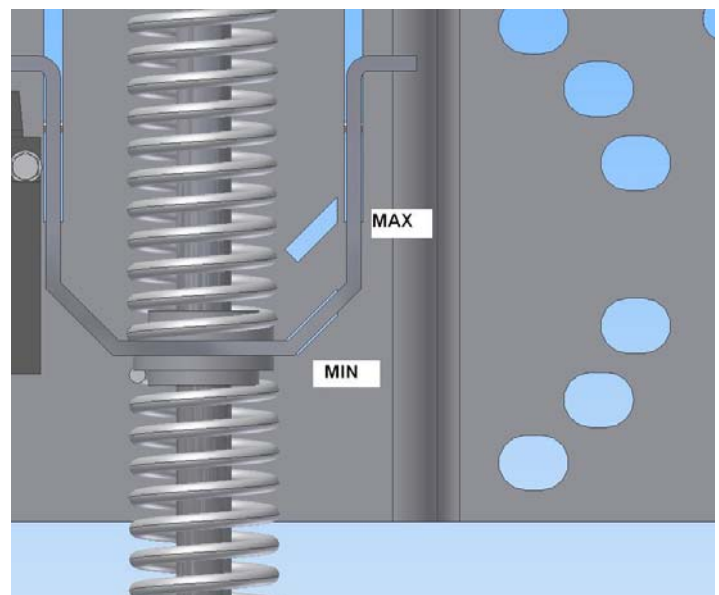


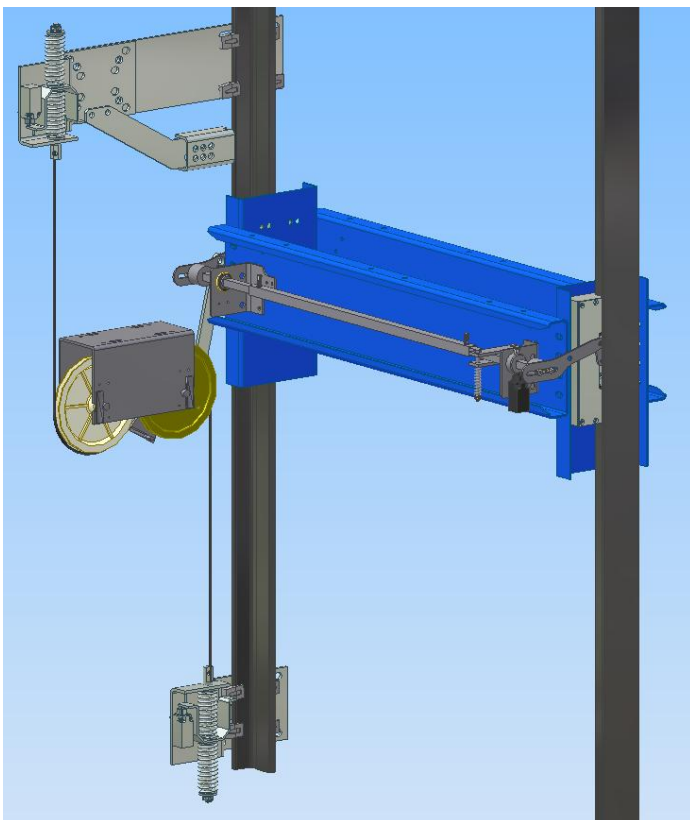
Minimum Position



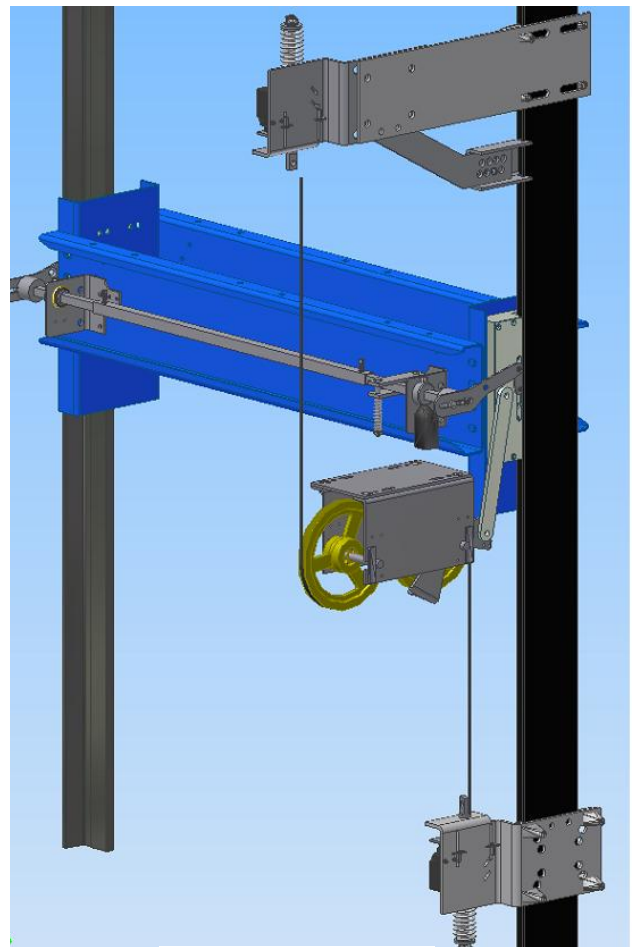
Maximum Position

On the right picture the two reference slots are marked as Min and Max.
The bottom slot means the minimum tension, (This way is how it's supplied)
The upper slot marks the maximum tension.
This is the mark where it gets when hitting the tension device with a mallet.





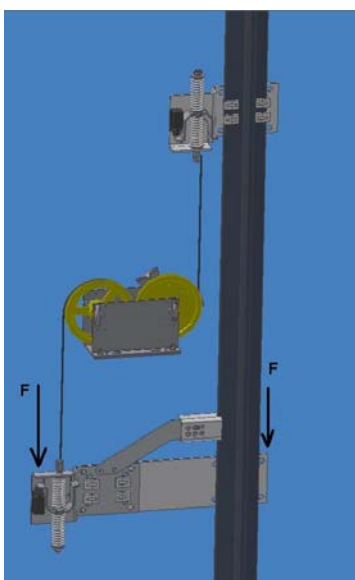
Position 1



Position 2

The tension devices are valid for these assembly conditions.

Note: When the overspeed governor is installed perpendicular to the guide, it's not possible to use the tension devices since the rope in the upper side, is too far from the guide.



If the customer wants to assemble the long support in the bottom side, and the short one upside, the process of tensing is more complicated. However it's possible if a Force is applied in the furthest part and while doing it, apply some hits in the part of the support near the guide, so that the rope gets the needed tension.

It's possible that 2 persons are needed for this assembly.

2.3 TENSION DEVICE STAR WITH WEIGHT

2.3.1 ANCHORED TO THE GUIDE

Another option for installations of great height is to tense the rope without spring.

The device tension without spring, consists in tensing one end of the rope with a weight, if it would be a tension pulley.

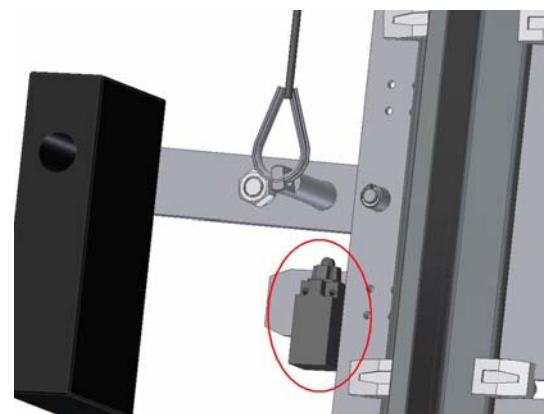
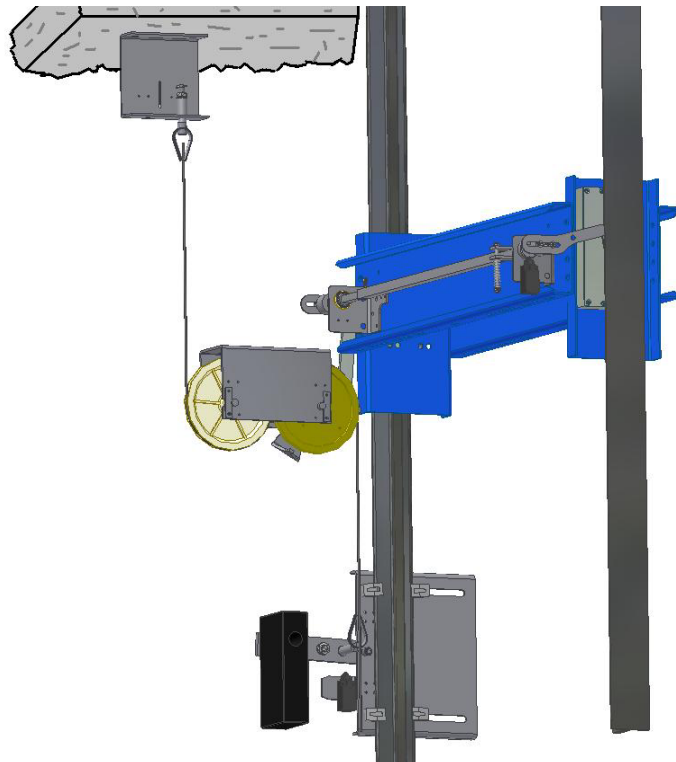
Next a sketch of the whole is shown:

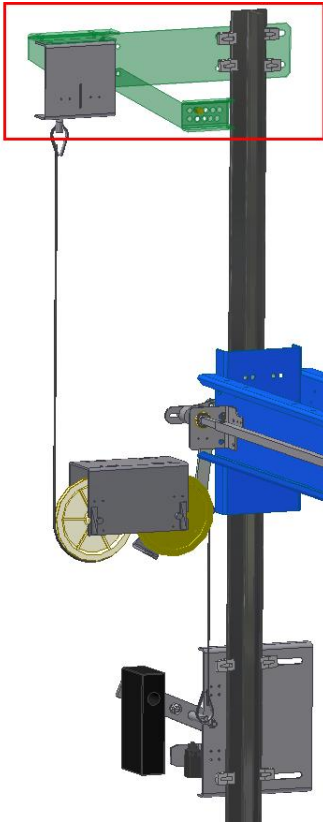
As it's shown in the picture on the right, the rope is tightened with a weight in the bottom side and the upper end of the rope is tied to a support anchored on the roof.

In the bottom side there is a shaft with a hole where the rope with a thimble must be inserted.

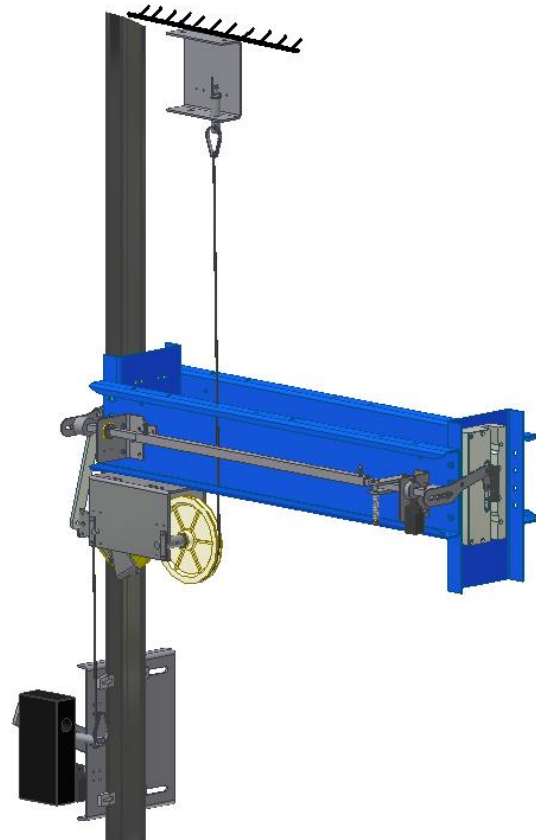
This device tension has an electric switch in the bottom side.

With this device, it's possible to let a greater detensing margin, since the electrical switch will work when the supporting bar go down and finally touches the button of the switch. So, you can let more detensing margin by raising the bar.





As mentioned before, the upper support is anchored under the roof, however there is a possibility to use a fitting guide for that support. See the picture on the left. In the orders, it must be specified that beside the tension device without spring, the fitting guide is also required.



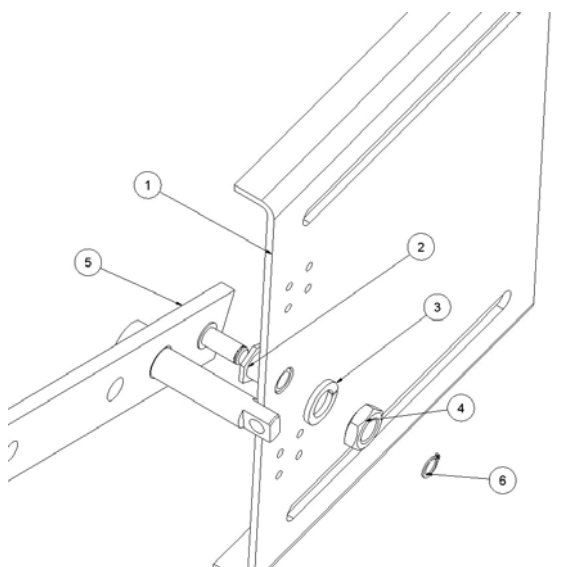
This way of tensioning , allow to place the overspeed governor STAR in perpendicular position. As it can be seen in the picture, the upper support is anchored under the roof and the bottom device is valid for this layout.

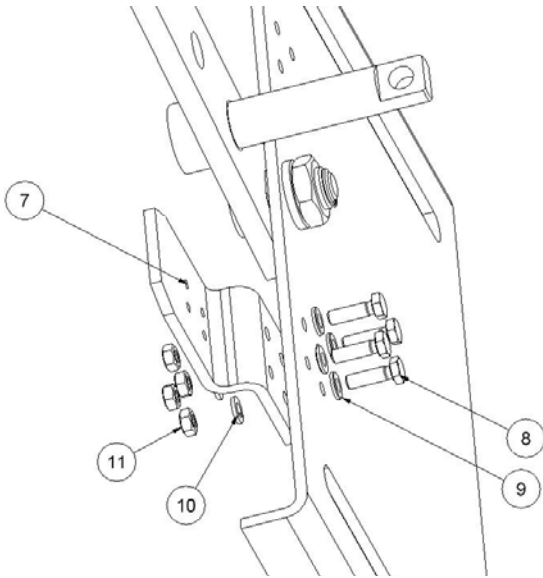
- Assembly of the bottom tension device

The assembly of the tension device must be as follows:

The hexagonal tip **(2)** will be inserted in the hitch guide **(1)** then insert a grower washer DIN 127 M18 **(3)** and a nut M18 DIN 936 **(4)**.

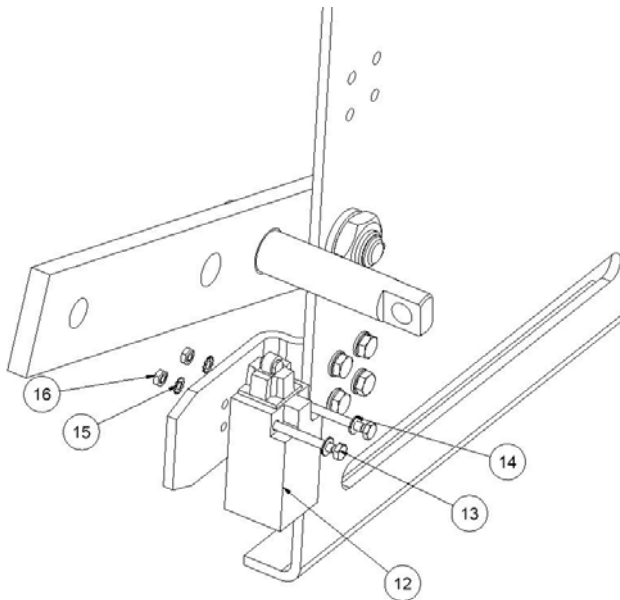
After that, the small shaft of the bar **(5)** must be inside the hexagonal tip. In order to avoid the release use a security ring DIN 471 $\varnothing=12$





Next, the contact support **(7)** has to be assembled in the hitch guide. As shown in the picture on the left, use 4 screws DIN 933 M6x20 **(8)**, 4 washers DIN 125 M6 **(9)**, 4 grower washers DIN 127 M6 **(10)** and 4 nuts DIN 934 M6 **(11)**.

Note: The contact support can be assembled upside or downside. It depends on the position of the tension pulley regard to the guide.

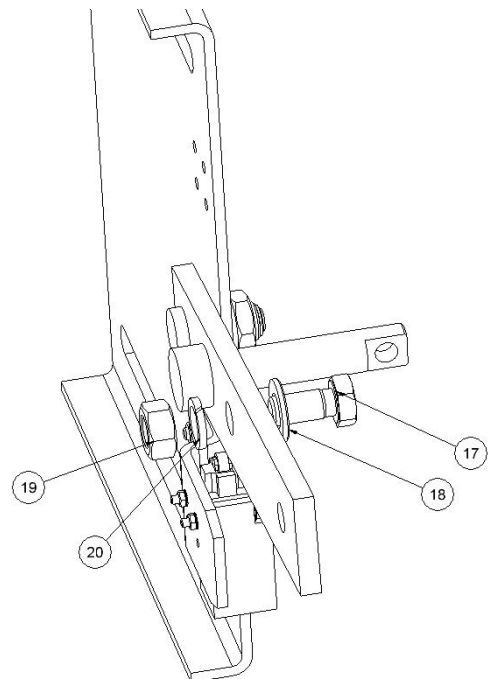


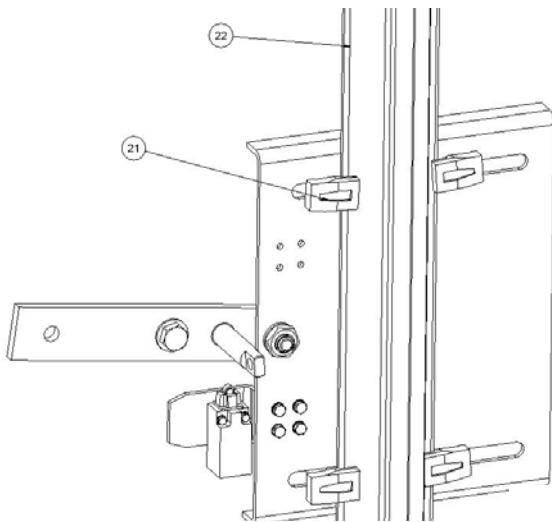
In order to assemble the electric switch **(12)** take 2 screws DIN 933 M4x35 **(13)**, 2 washers DIN 125 M4 **(14)**, 2 toothed washers M4 DIN 6798 **(15)** and 2 nuts DIN 934 **(16)**.

See the picture and notice that the switch will be screwed in the upper holes of the contact support.

After that, insert the screw that play as top in the contact support so that the electrical switch can't be damaged.

Use a screw DIN 933 M16x30 **(17)**, one washer DIN 125 M16 **(18)**, one grower washer DIN 127 M16 **(20)** and one nut M16 DIN 934 **(19)**.

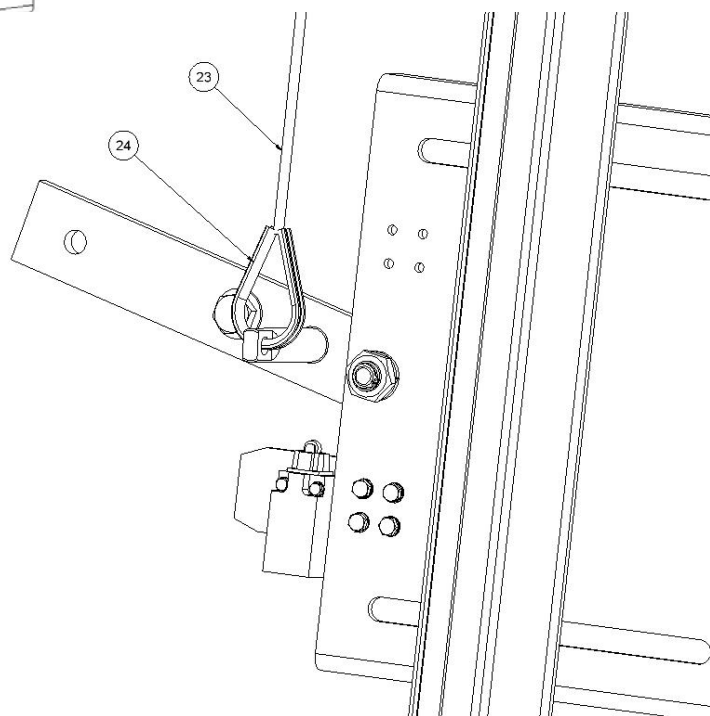




The whole will be joint to the guide (22) with flanges M14 (21).
Don't screw them totally.

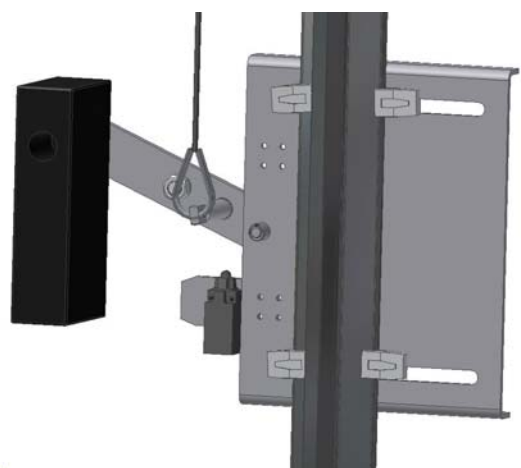
The next step will be to tie the rope (23) in the shaft of the device as seen in the picture.

Use also a thimble (24), in order to not damage the rope



Once the rope is tied, it's important to place the bar in an upper position, so that when the weight is assembled, the bar doesn't go down very much.

The more the bar is higher up, the bigger is the detensing margin.



2.3.2 ANCHORED ON THE FLOOR

For customers installing the governor in the middle of their sling (far from the guide), It's possible to use this next tensing device.

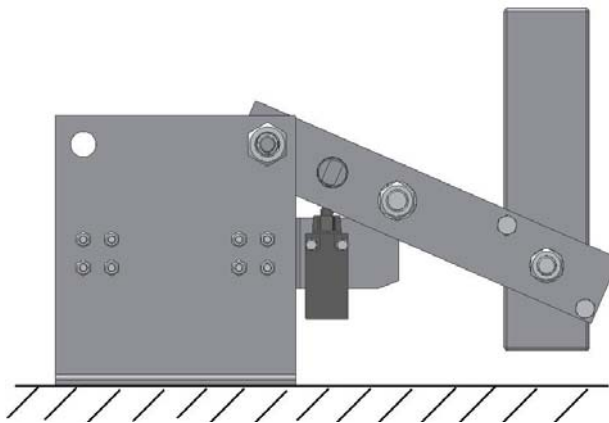
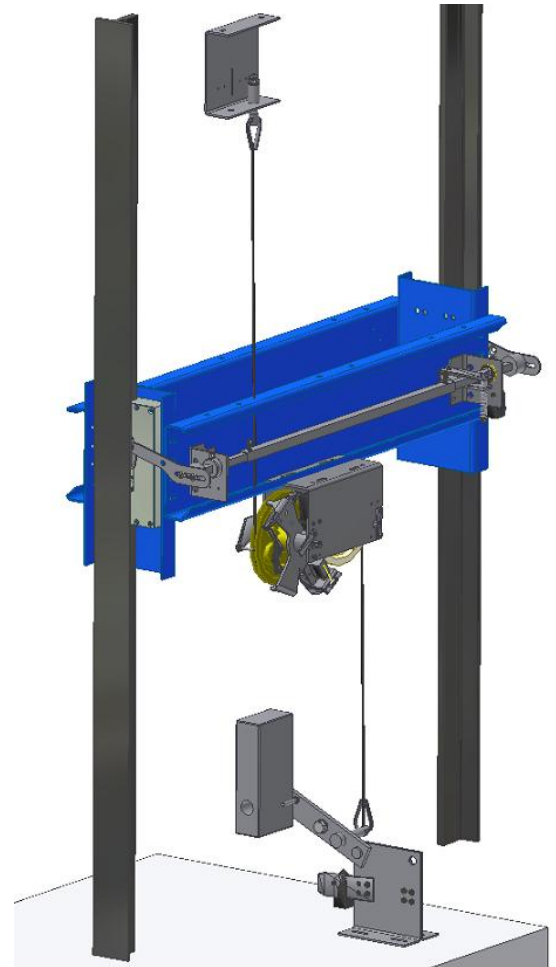
It consists in the same system mentioned before, with the main characteristic of being able to be anchored on the floor.

As it's shown in the picture on the right, the governor is far from the guide, so the Tension device with weight anchored to the guide, won't be possible to use.

The tensioning bottom part, would be anchored directly on the floor and the top side, under the roof.

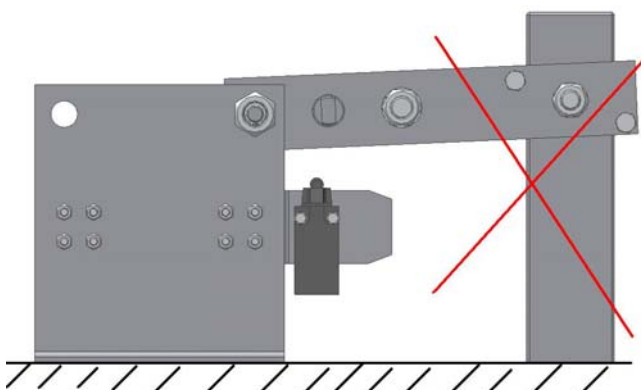
An important thing that has to be taken into account, is the placing of the weight of the device.

Below, in the pictures, it's shown how it has to be assembled.



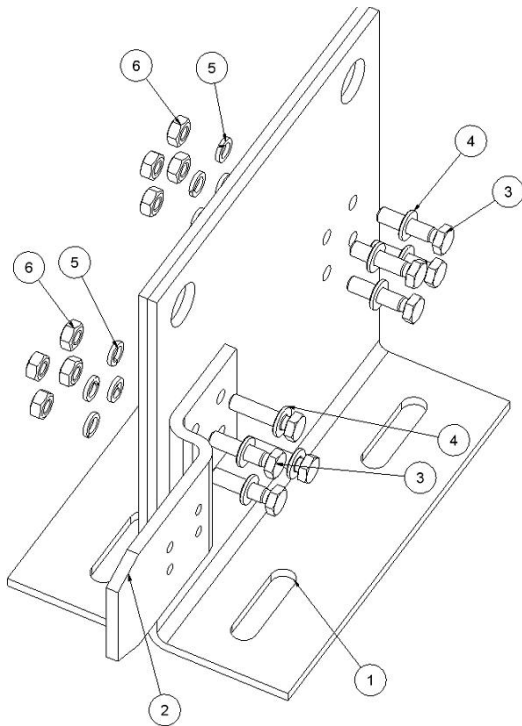
In the picture on the left, the weight is assembled so that if the rope loose tension, the system detects this.

Otherwise, this picture shows a wrong assembly of the weight. If it's assembled this way, the weight will touch on the floor and the detension won't be able to be detected by the device.



In the orders, the customer will specify if the device will be assembled on the guide or on the floor

In order to assemble the system, follow the next instructions:

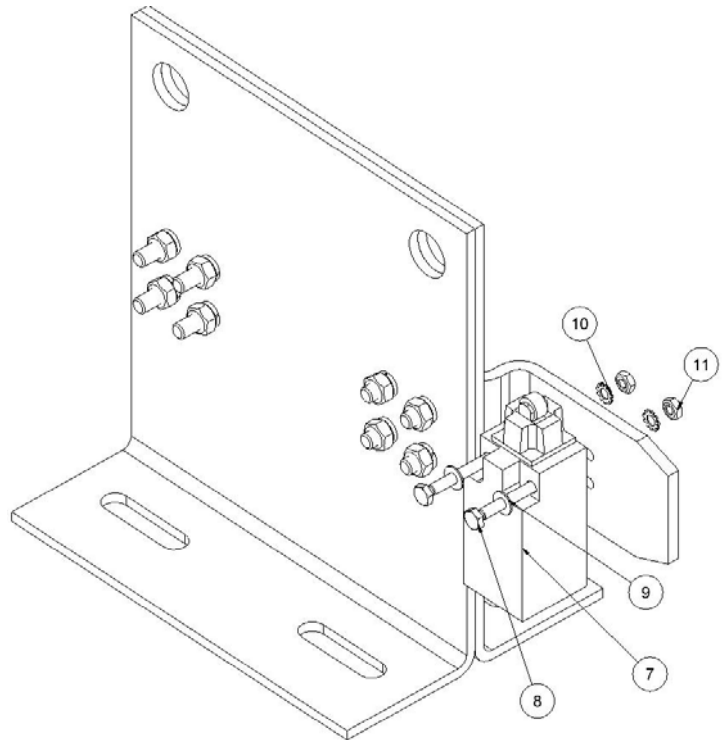


Start with joining the 2 Anchoring floor tensors **(1)**, with screws DIN 933 M6x25 **(3)**, plane washers DIN 125 M6 **(4)**, grower washers DIN 127 M6 **(5)** and nuts DIN 934 M6 **(6)**.

Also we must join the contact support **(2)**, as it's shown in the picture. Use screws and nuts of the same characteristics.

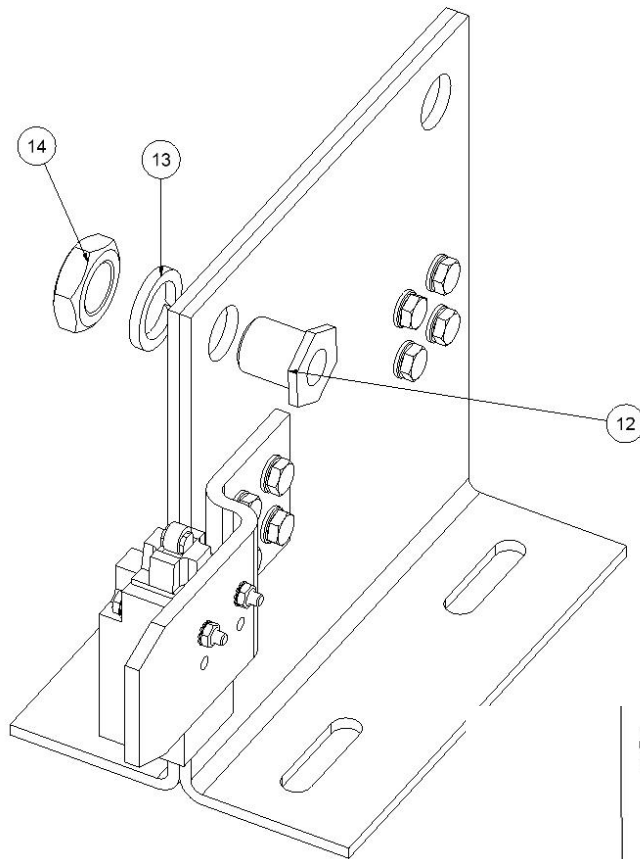
After that, we will assemble the electrical contact **(7)** in the contact support **(2)**. Use 2 screws DIN 933 M4 x 35 **(8)**, 2 plane washers DIN 125 M4 **(9)**, 2 toothed washers DIN 6798 M4 **(10)** and 2 nuts DIN 934 M4 **(11)**.

The support has 2 top holes and 2 bottom holes. The electric contact will be assembled in the upper ones.



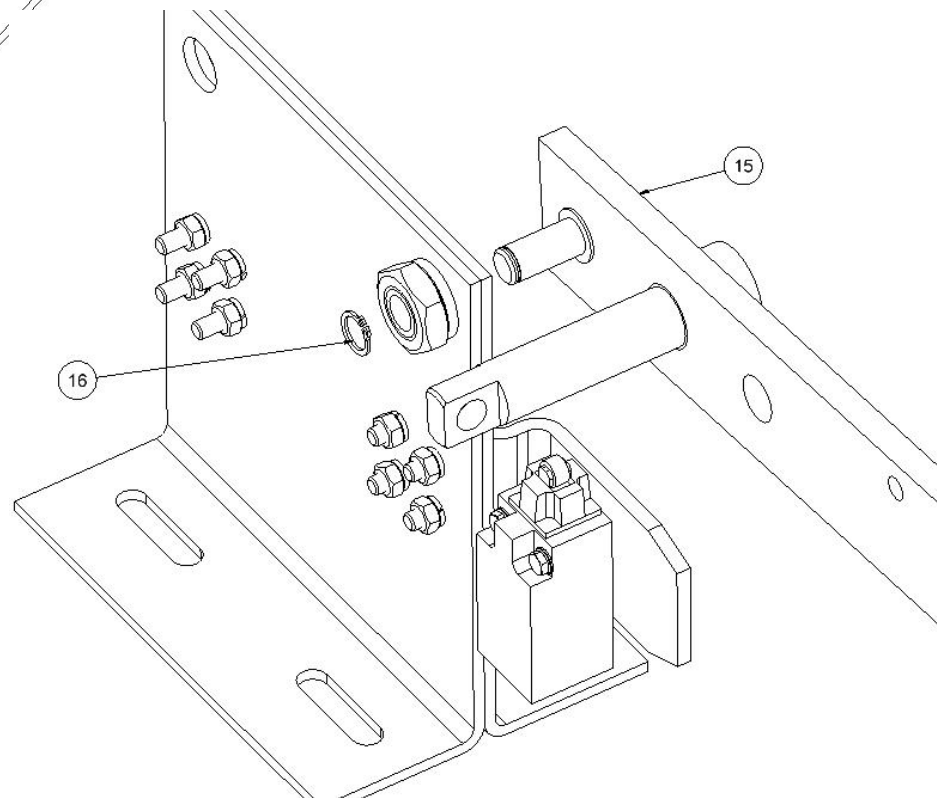
As the system is symmetrical, the contact can be assembled in the opposite side. This way, the contact must be assembled also in the upper holes.

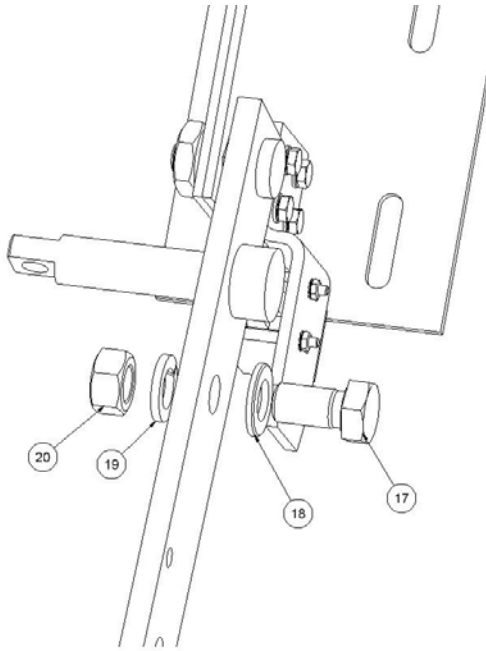
In addition, take into account that the piece explained next, would be assembled in the opposite side if the electric contact is mounted on the opposite side.



The hexagonal tip **(12)** is inserted in the hole that shows the picture. In order to fix it, use a grower washer DIN 127 M18 **(13)** and a nut DIN 936 M18 **(14)**.

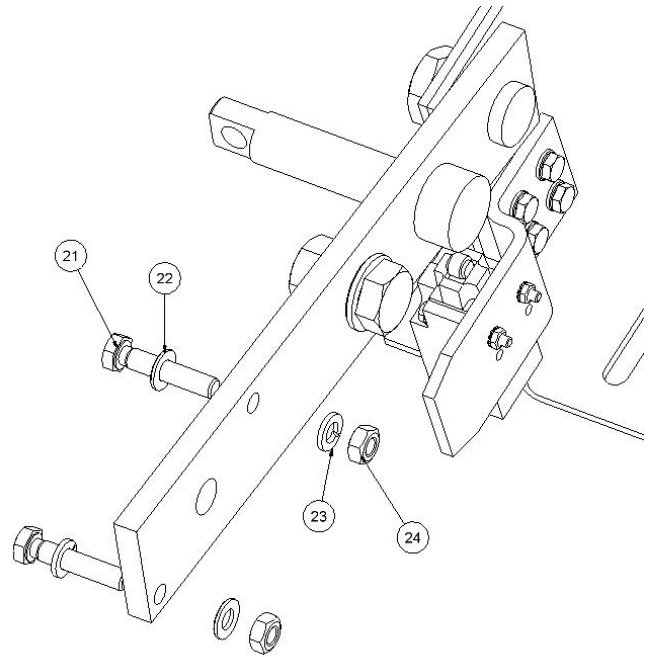
In the right picture shows the assembly of the bar **(15)** in the hexagonal tip of the support. In order to avoid its release, insert a security ring DIN 471 $\varnothing=12$ **(16)**



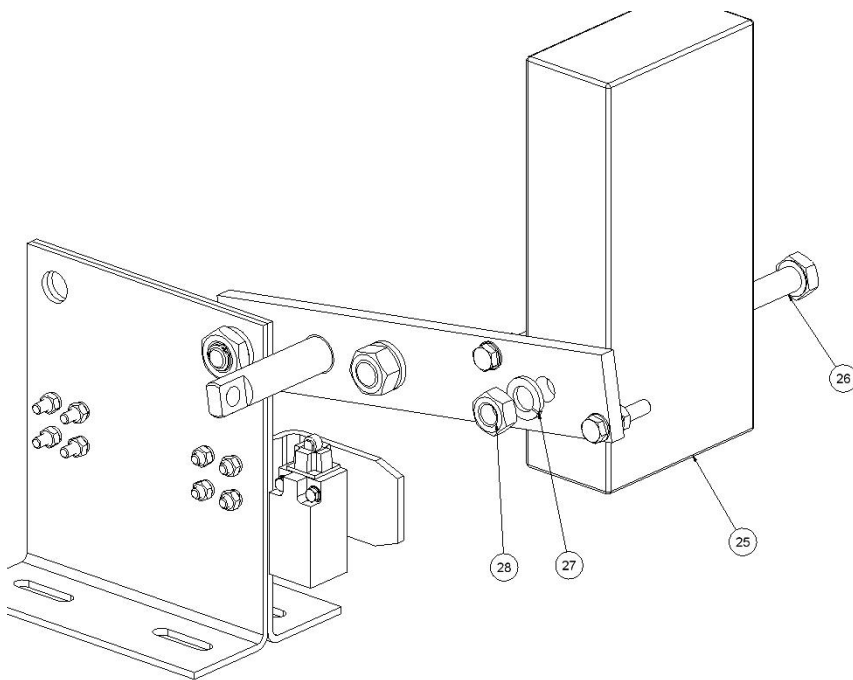


Insert a screw DIN 933 M16x30 **(17)** and a washer DIN 125 M16 **(18)**, in the hole shown in the picture, fix it with a grower washer DIN 127 M16 **(19)** and a nut DIN 934 M16 **(20)**.

This screw is the top that avoid the damage of the electric contact.



Next, 2 screws DIN 933 M8x60 **(21)** must be inserted, with 2 washers DIN 125 M8 **(22)** to fix them, 2 grower washers DIN 127 **(23)** and 2 nuts DIN 934 M8 **(24)**.



The weight **(25)**, will be assembled with a screw DIN 931 M14x70 **(26)**, a washer DIN 127 grower M14 **(27)** and a nut DIN 934 **(28)**.

The screw must be strongly tightened in order to ensure the vertical position of the weight.

Note: It's important to place the weight upwards, since as mentioned before otherwise the weight assembled wrong would make an inappropriate working,

3 SELECTION OF TENSION DEVICES.

The overspeed governor STAR travels with the car, the ways of installing it in the car, are multiple: Above, below, on the left, on the right...

Generally, it's installed near the guide, since the overspeed governor must be connected directly to the safety gears and the driving bar, however there's a possibility to assemble it far from the guide using the proper lever that ensure the correct working of the safety gears.

For this last case, the conventional tension devices (by screwing springs) of the Star are perfect, since they are anchored on the floor and under the roof.

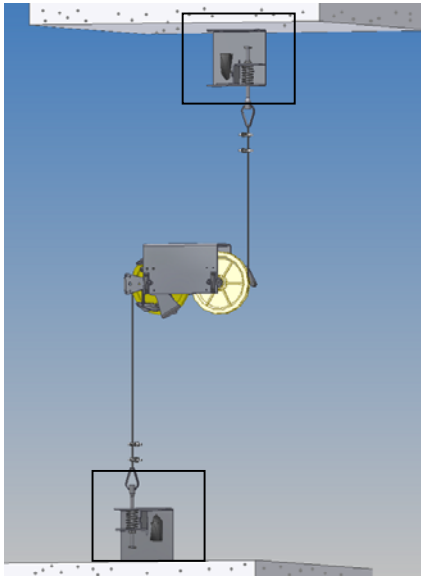
For those customers who install the overspeed governor near the guide, they have the possibility to use several tension devices described on this manual, How to choose which one is the most appropriate?

1. *Tension Device Fitting Guide:* It's interesting for customers who are not going to drill holes in the floor or the roof and they have the overspeed governor near the guide.
2. *Tension Device Orion Star Guide:* For installations with a great height, where there are problems with the detensing of the rope or / and for customers who want to tense the rope in a easier way.
3. *Tension Device Star without spring:* Valid for installations with a greater height and there are problems with the detensing of the rope.
The customer has to have enough space for placing the bottom tension device, since the rope is tightened with a weight.

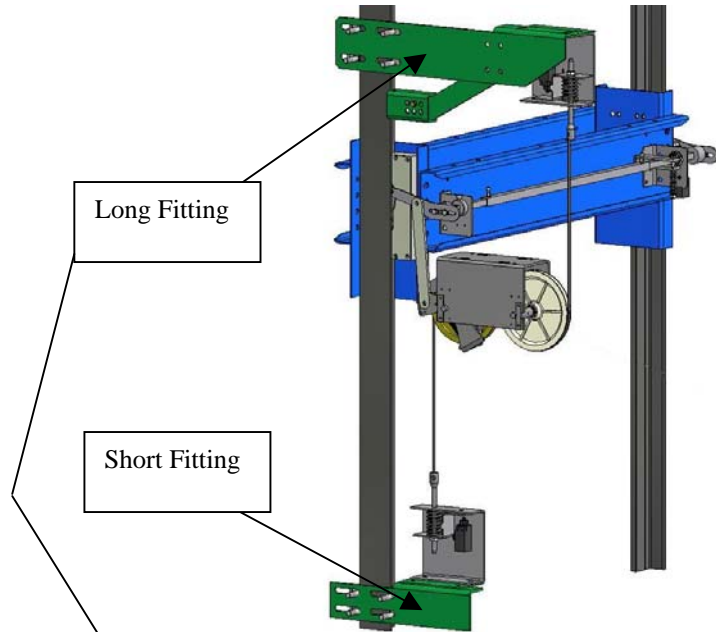
In the orders of the overspeed governor STAR, it has to be specified the kind of tension devices required for the customers.

If there is no specification of any tension devices in the order, Dynatech will supply the conventional tension device with spring.

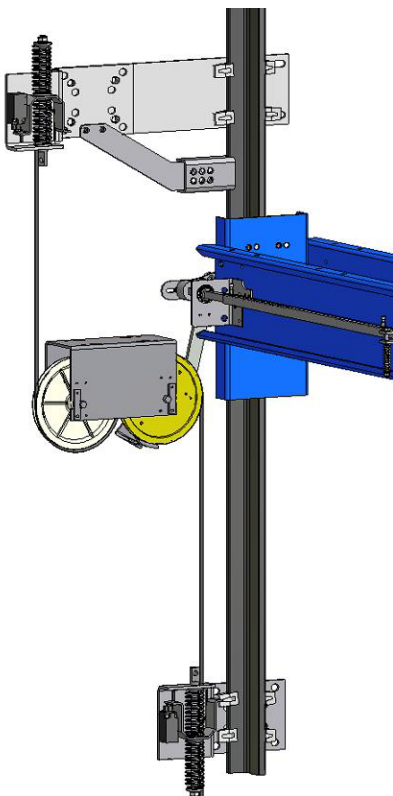
CONVENTIONAL TENSION DEVICES
(Supplied by default)



FITTINGS TO THE GUIDE



STAR ORION TENSION DEVICES
(Tightened by hitting the bottom tensor)



TENSION DEVICE WITH WEIGHT

