

# *Ecotype*

## **COVERING SYSTEM FOR ROLL-OFF CONTAINERS AND TIPPER BODIES**

### *Installation Manual*



*English*

*- Translation of the original instructions in Italian language -*



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### **Rev. 05**

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This manual has been edited in accordance with the Machinery Directive 2006/42/CE.

## Covering with lowered cables

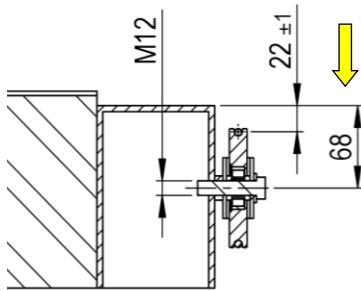
Dear Customer, all the Coverings model Sigillo®, MCA and Ecotype manufactured by Marcolin Covering s.r.l. can be purchased with "lowered cables".

The system is intended for lowering the cable run of the upper steel cable which pulls the covering system. The cable run is lowered by approx. 22 mm under the body upper edge compared to the standard cable run which is approx. 11 mm over the body upper edge.

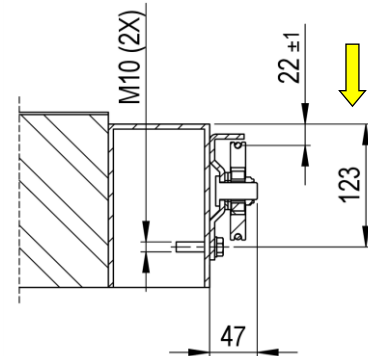
This option aims at fulfilling the requirements of our Customers and eliminating the breakage problems of the steel cable as a result of cable crushing during the normal loading operations.

If you purchase the covering with lowered cables, please follow the advices on the drawings while fitting the mechanical part on the front side and the tensioning plates or idler pulleys on the rear part.

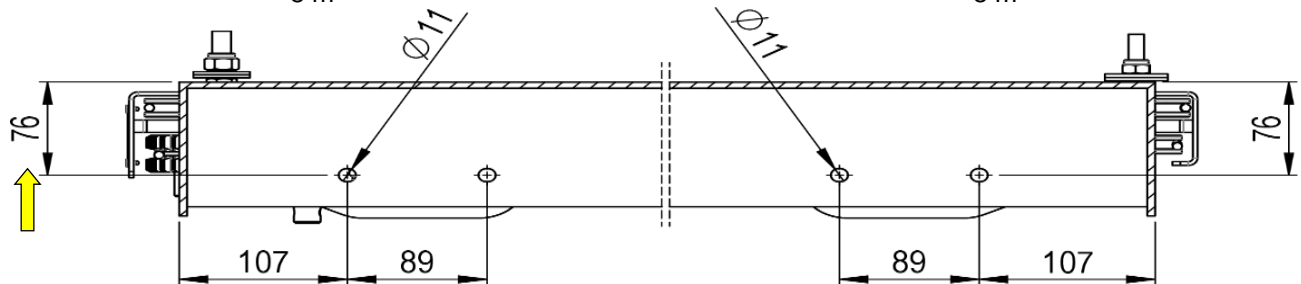
### Ecotype covering fitting with lowered cables:



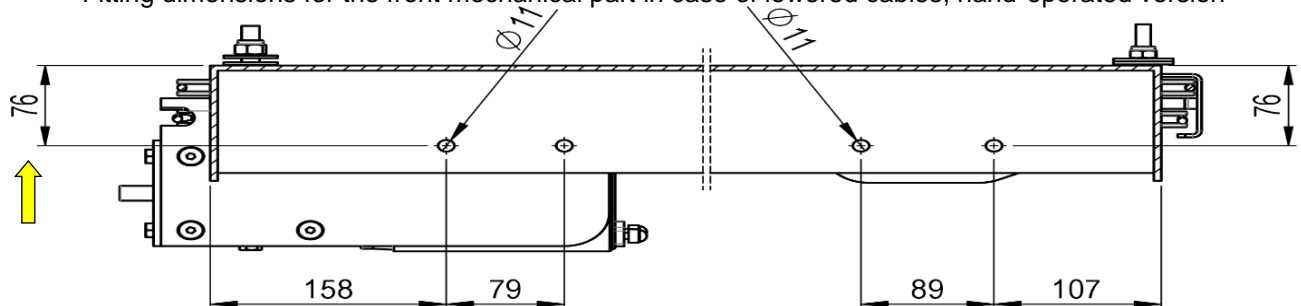
Fitting dimensions for the front mechanical part in case of lowered cables - hand-operated version for body < 8 m



Fitting dimensions for the front mechanical part in case of lowered cables - hand-operated version for body > 8 m



Fitting dimensions for the front mechanical part in case of lowered cables, hand-operated version



Fitting dimensions for the front mechanical part in case of lowered cables, electrical version

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# Chapter 1 INTRODUCTION

## 1.1 Introduction

Load securing, for example of aggregates, during the freight transport on road is required by law.

Marcolin Covering s.r.l. has developed the Ecotype Covering System, which fulfils the legal obligation and satisfies practical and functional needs of its user.

This manual provides all the necessary instructions for a safe application and for keeping fully functional the Ecotype Covering System through the planned periodic maintenance.

Thank you for having chosen the Ecotype Covering System of Marcolin Covering s.r.l.!

## 1.2 Important information if purchasing the “lowered cable system”

The Ecotype Covering is also available with “lowered cables”.

The system is intended for lowering the cable run of the upper steel cable which pulls the covering system. The cable run is lowered by approx. 22 mm under the body upper edge compared to the standard cable run which is approx. 11 mm over the body upper edge.

This option aims at fulfilling the requirements of our Customers and eliminating the breakage problems of the steel cable as a result of cable crushing during the normal loading operations.

In case of installation of the “lowered cable” covering system **all the height indications** mentioned in this installation manual regarding the positioning of the machinery on the front side and the tension plates or guide pulleys on the rear side **have to be increased by 33 mm**.

**i** See details in paragraphs 3.1.2 and 3.3.3 .

## 1.3 Commitments of the machinery deliverer to the end-user

As dealer of Marcolin Covering s.r.l. your company finalizes the sale, the installation, the delivery of the covering system to the end-user and the customer service.

The handing over procedure of the machine to the end-user is an important happening both for the dealer and for the user. For this reason it is relevant that the selling operation is carried out with understanding and collaboration.

Following operations are mandatory for the machine deliverer:

- Carrying out the teaching and training course with final examination (in oral or written form at yours own discretion) to pass by the machine operator.  
**i** The teaching and training course can be considered as passed when the machine operator has successfully answered your questions and has personally performed several operating cycles on the machine.
- Issuing the own EC Declaration of Conformity.
- Handing over the own EC Declaration of Conformity to the end-user (not the one issued by Marcolin Covering s.r.l. because it doesn't cover any civil and criminal liability arising from the installation and the start-up work of the machine).
- Handing over the user manual and any other documentation received by Marcolin Covering s.r.l. together with the covering system to the end-user.

### 1.3.1 The teaching and training course for the end-user must include the following items:

**The end-user has to be informed about the great importance of the following operations:**

- recognizing the own machine;
- knowing well the piece parts the machine is made of and their specific function and application.

**The end-user has to receive an appropriate information about following items:**

- machine's risk and danger areas;
- actions which are absolutely forbidden;
- the permitted proper handling and the prohibited misuse of the machine;
- components regarding the operational security.

**The end-user has to receive proper instructions about the following activities:**

- turning on and off the control switches;
- the machine workings by processing some operating cycles;
- the processing of the maintenance actions permitted by the manufacturer in safety conditions (fuse replacing);
- the processing of the ordinary maintenance of the machine;

- that it is mandatory to process EVERY YEAR at least one extraordinary maintenance at the manufacturer's workshops or at workshops authorised by the manufacturer;
- that the end-user must keep the maintenance check register updated.

**It has to be repeated several times that:**

- all the instructions given during the training course can be looked up in the user manual that has to be entirely read and learnt by the end-user before using the machine for the first time.
- that in case of selling of the machine the end-user is obliged to:
  - **carry out a teaching course to the new machine owner;**
  - **hand over this installation manual and the EC Declaration of Conformity to the new machine owner.**

**It is mandatory to obtain from the receiver the signed declaration "ASSUMPTION OF LIABILITY BY ACCEPTANCE OF THE MACHINE"** to find under chapter 1.8.9 of the operating manual, to make a copy of it and to send it to Marcolin Covering s.r.l. as acknowledgement of acceptance and beginning of the term of guarantee.

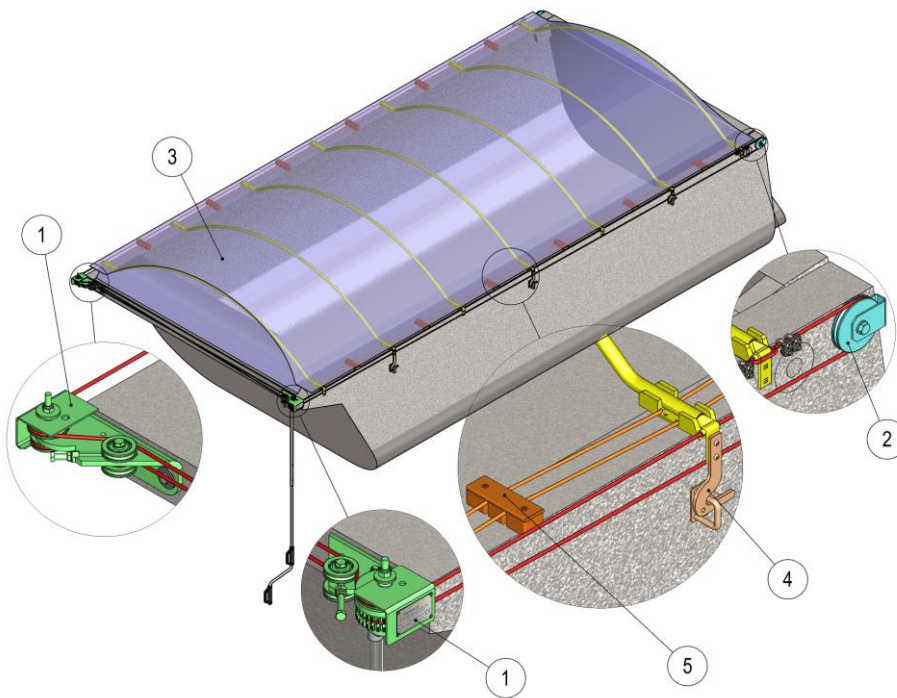


## Chapter 2 THE ECOTYPE COVERING SYSTEM

### 2.1 Covering system components

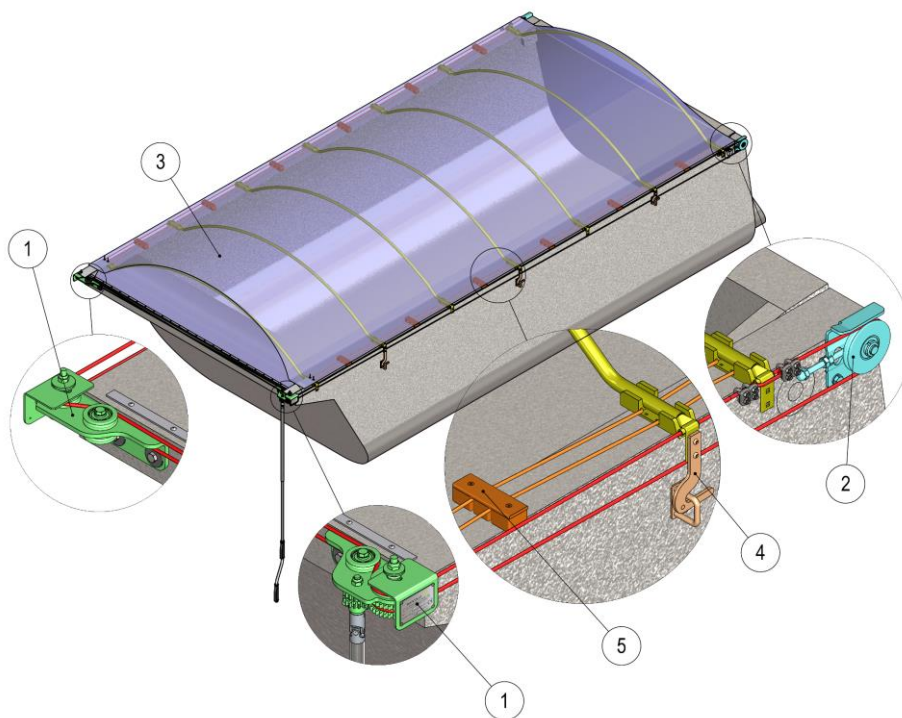
- i** THE INSTALLER IS OBLIGED TO KNOW THE CONTENT OF THE MANUAL HANDED OVER TO THE OPERATOR TOGETHER WITH EACH COVERING SYSTEM AND TO OBSERVE COMPLETELY PROHIBITIONS, REGULATIONS AND ADVICES.

Before installing the covering system it is essential to know well its characteristics and the various elements the system is made of. The figure below shows the main parts of the covering system.



#### **HAND-OPERATED VERSION < 8 m**

1. Front covering drive system, with cable tensioning and operating rod.
2. Pulley and bracket for the return of the cable at the rear.
3. Tarpaulin of variable size according to tipper body length.
4. Covering fastening system (depending on the model, it could be supplied with a hermetic closure with elastic strings).
5. Folding and lifting system of the tarpaulin.



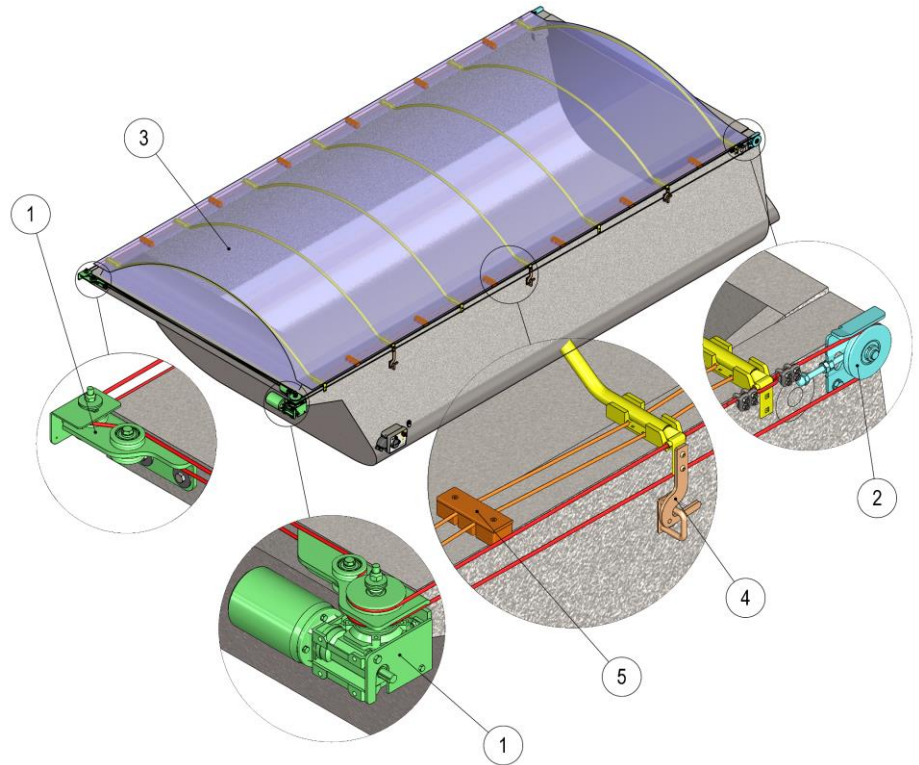
#### **HAND-OPERATED VERSION > 8 m**

1. Front covering drive system, with operating rod.
2. Rear cable tensioning system.
3. Tarpaulin of variable size according to tipper body length.
4. Covering fastening system (depending on the model, it could be supplied with a hermetic closure with elastic strings).
5. Folding and lifting system of the tarpaulin.



### **ELECTRICAL VERSION**

1. Front covering drive system.
2. Rear cable tensioning system.
3. Tarpaulin of variable size according to tipper body length.
4. Covering fastening system (depending on the model, it could be supplied with a hermetic closure with elastic strings).
5. Folding and lifting system of the tarpaulin



## 2.2 Interventions and machine modifications



### WARNING!

#### IT IS ABSOLUTELY FORBIDDEN TO MODIFY THE MACHINE!

Whoever modifies the machine becomes its manufacturer and assumes all civil and criminal liabilities provided for by law in force.

Whoever modifies the machine assumes the obligation to issue:

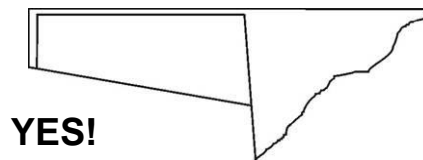
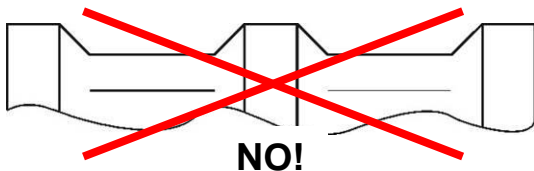
- a new CE marking,
- new installation and user manual for the end-user,
- an own EC Declaration of Conformity.

**i** The replacement of whatever is usually called spare part is not considered as a modification.

## 2.3 Tipper body construction features for a good installation

Before installing the covering system check following items:

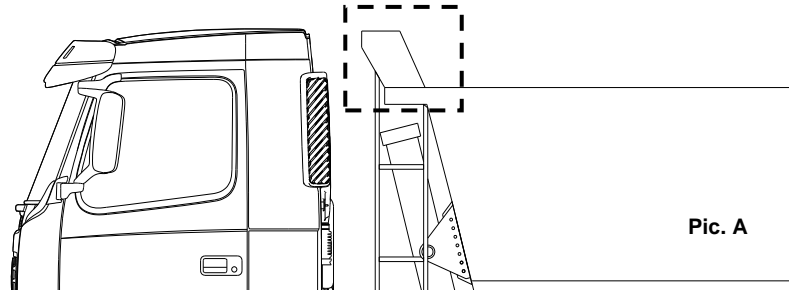
- The linearity of all the upper edge of the tipper body.
- The accuracy of flatness between the installation area of the covering (protrusion on the front side of the tipper body, usually called cab guard) and the remaining part of the tipper body along which the covering should slide.



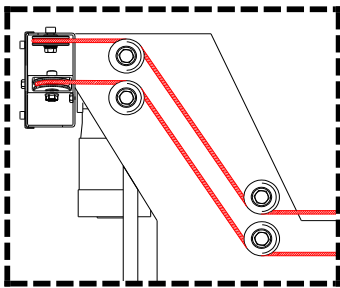
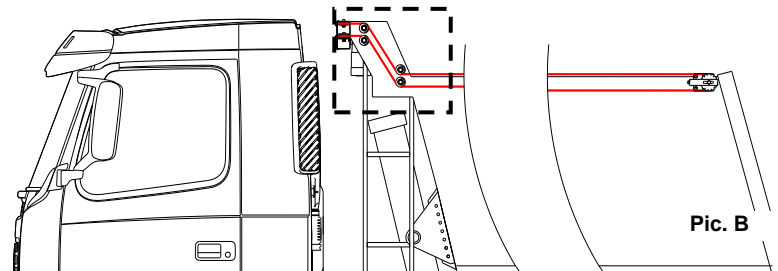
- The integrity of the upper edge of the tipper body.
- The absence of any projecting element all along the upper edge.
- The absence of any sharp edge.

## 2.4 Installation of the optional idler pulley system

If linearity between the cabin guard and the top edge of the sides is not possible (**pic. A**) you can proceed as follows:



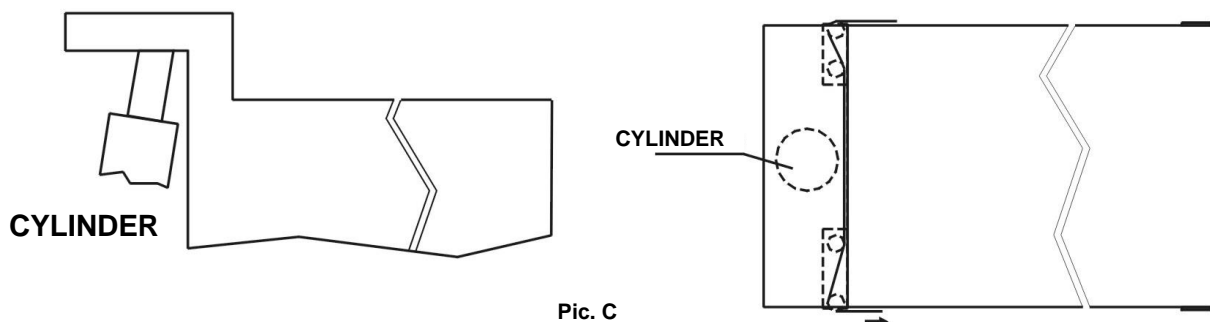
- ❶ Request to Marcolin Covering s.r.l. an optional idler pulley system (**pic. B**).



The optional idler system allows to deflect the steel cable from the top edge of the cab guard to the top edge level of the side walls in order to obtain a linear sliding movement of the covering.

Obviously, in this case, the covering occupies a part of the tipper body and the tarpaulin must be fastened over the cab guard.

- ❷ Another solution is fastening the front boxes at the level of the side edge and, to prevent the front steel cables from hitting the cylinder or spare tyre bracket, creating deflections with pulleys (**pic. C**), so that the steel cable passes very close to the frontal sideboard.



## Chapter 3 THE ECOTYPE COVERING SYSTEM INSTALLATION



### IMPORTANT!

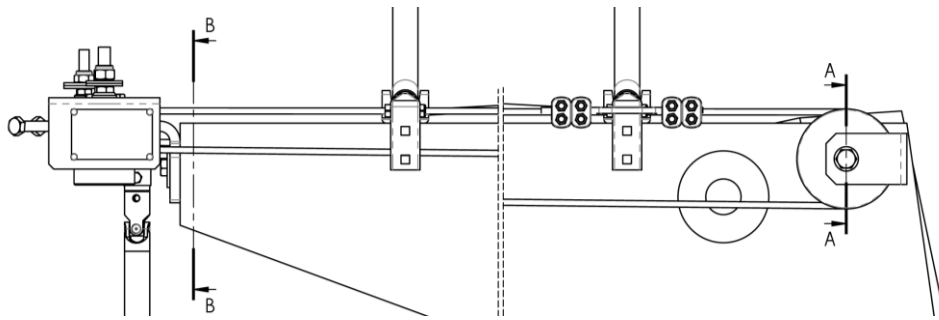
Before starting the installation process, check the covering model at your disposal and examine carefully any particular case that can occur.

### 3.1 Fitting the rear pulleys - Hand-operated version for body < 8 m

#### 3.1.1 Fitting the rear pulleys in case of "STANDARD CABLE SYSTEM"

The installation of the rear pulleys requires a special attention in order to avoid to create any obstacle for mobile elements (i.e. tailgate with lateral opening system).

The best installation position for the plate is the one as close as possible to the rear edge, but at a sufficient distance for avoiding to be an obstacle for hinges.



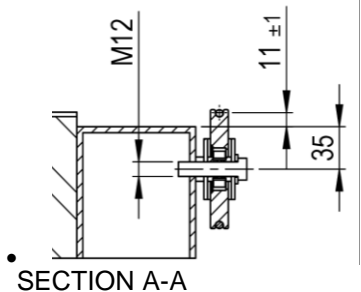
### WARNING!



A wrong positioning of the pulleys could cause damages for the covering or for the tipper body.

If in doubt, carry out mobility trials of the rear mobile elements to avoid unpleasant surprises.

- For a proper working of the covering system the axis of the lower fastening hole of the pulley has to be positioned at a distance of 35 mm from the upper edge of the tipper body.
- Drill a M12 threaded hole on the lateral board wall, aligning it with the pulley hole.
- Fasten the pulley and U-bolt with the hexagon head screw M12x60 supplied with the system.



#### Note:

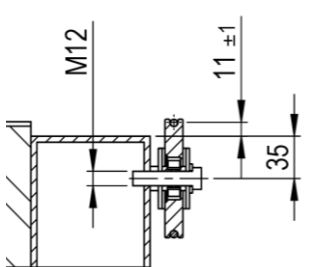
During its working life the structure is subject to vibrations and stress; therefore, it is recommended to apply a medium or strong threadlocker Loctite® liquid.

- Repeat now the pulley fastening operation on the opposite board wall.

#### Note:

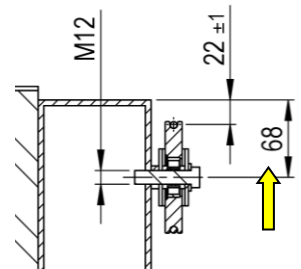
The proper fitting of the rear pulleys is of primary importance since it is binding for the positioning of all the subsequent element.

#### 3.1.2 Fitting the rear pulleys in case of "LOWERED CABLE SYSTEM"



For installing the LOWERED CABLE covering system the height indication of 35 mm given for installing the standard cable covering system has to be increased by 33 mm.

The installing height **for lowered cable system becomes 68 mm** →

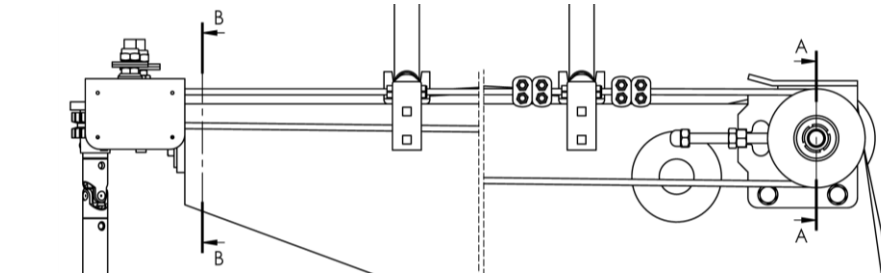


## 3.2 Installing the tensioning plates - Hand-operated version for body > 8 m and electrical version

### 3.2.1 Installation of the rear tensioning plates with the "NORMAL CABLE" option

When installing the rear tensioning plate, pay special attention not to impede the movement of other moveable parts (e.g.. swing doors).

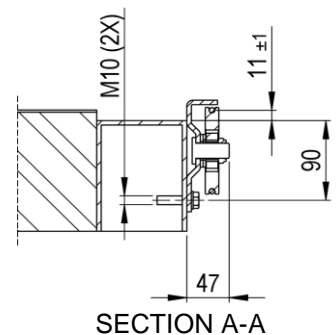
The most appropriate location of the plate is as close as possible to the rear edge, but, at the same time, at such a distance as not to hinder the movement of hinges and similar.



#### WARNING!

Incorrect placement could cause damage to the covering itself or to the body.  
If in doubt, it is advisable to try out the movement of the rear moving parts to avoid unpleasant surprises.

1. For the correct operation of the covering, ensure that the axis of the lower plate fixing holes is located at a distance of 90 mm from the upper edge of the body.
2. Proceed with two M10 threaded holes on the side wall, in correspondence with the holes on the plate.
3. Secure the plate using the bevelled head screws M10x40 provided with the kit, ensuring that the tensioning screw is facing the front of the vehicle.

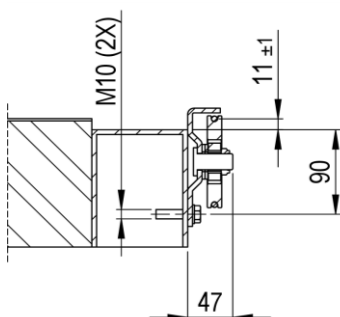


**Note:** During its lifetime, the structure will be subject to vibrations and stresses. It is therefore recommended to use a medium or high strength thread locking fluid.

4. Mount the plate on the opposite side using the same procedure.

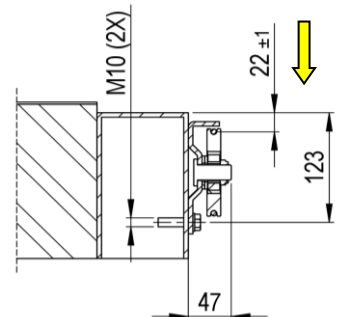
**Note:** The correct installation of the rear plates is essential because it affects the placement of all other components.

### 3.2.2 Installation of the rear tensioning plates with the "LOWERED CABLE" option



When mounting the cover with the LOWERED CABLE option, you need to add 33 mm to the distance (90 mm) required by the normal cable option.

The installation distance for the **lowered cable option is 123 mm** →



### 3.3 Driving system installation

The covering driving system must be placed on the front side of the tipper body next to the cab guard.

The driving system is available either hand-operated or motor-operated; in any case the installation process is similar.

#### 3.3.1 Versatility of the covering system

In order to meet the various market requirements our covering system has been designed and manufactured for being installed with the driving unit either on the right or on the left side of the cab guard.

The procedure is the same for both assembly configurations, only the positioning of the driving system requires a special attention.

---

**Note:** Normally, installing the covering system, the positioning of the driving system should be on the left side (in relation to the driving direction) of the cab guard, as it is proved that in this position the driving unit is easy accessible for the driver when he gets out of the vehicle, and this especially in case of hand-operated covering system.

---

In this manual, reference will be made to standard assembly of the covering system, which is on the left of the cab guard.

For installing on the opposite side, carry out the mirror-imaged activities on the opposite side.

#### 3.3.2 Working and preparation of the cab guard with "STANDARD CABLES"

The type of work which has to be done on the cab guard is the same for both versions available for the covering system (manual or motorised version).



#### WARNING!

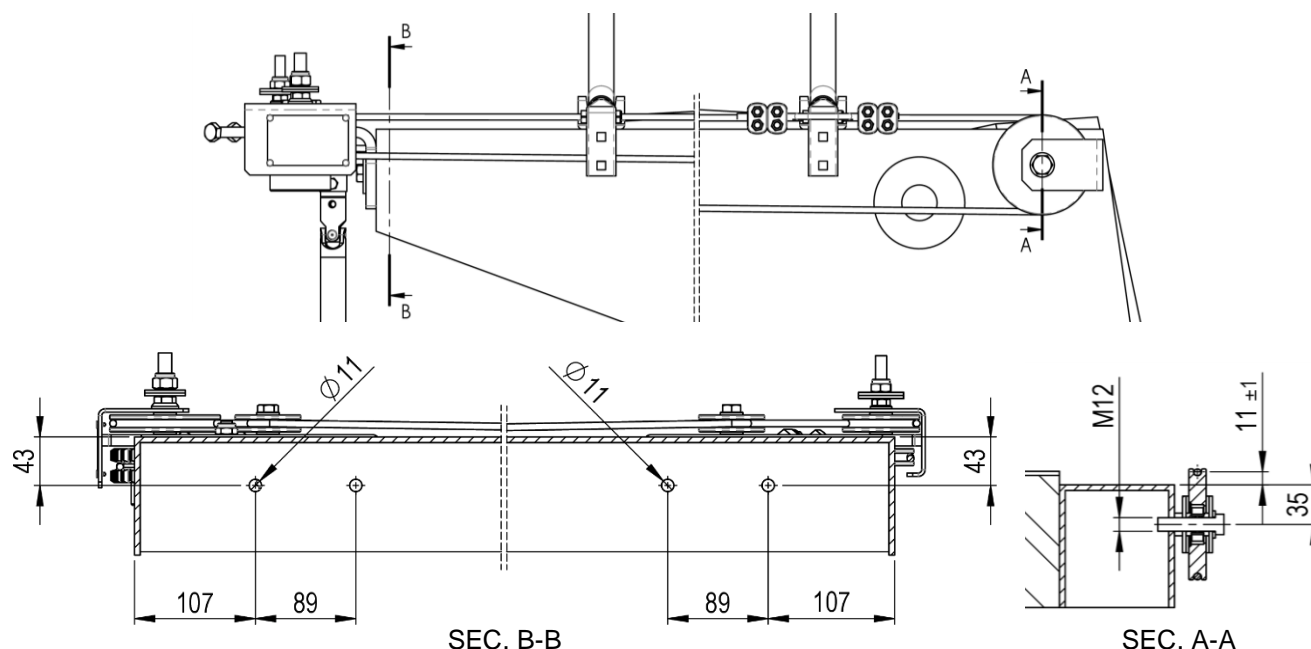
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First, check the taper of the body, and specifically **that the front side of the body is aligned with the edge of the side wall.**

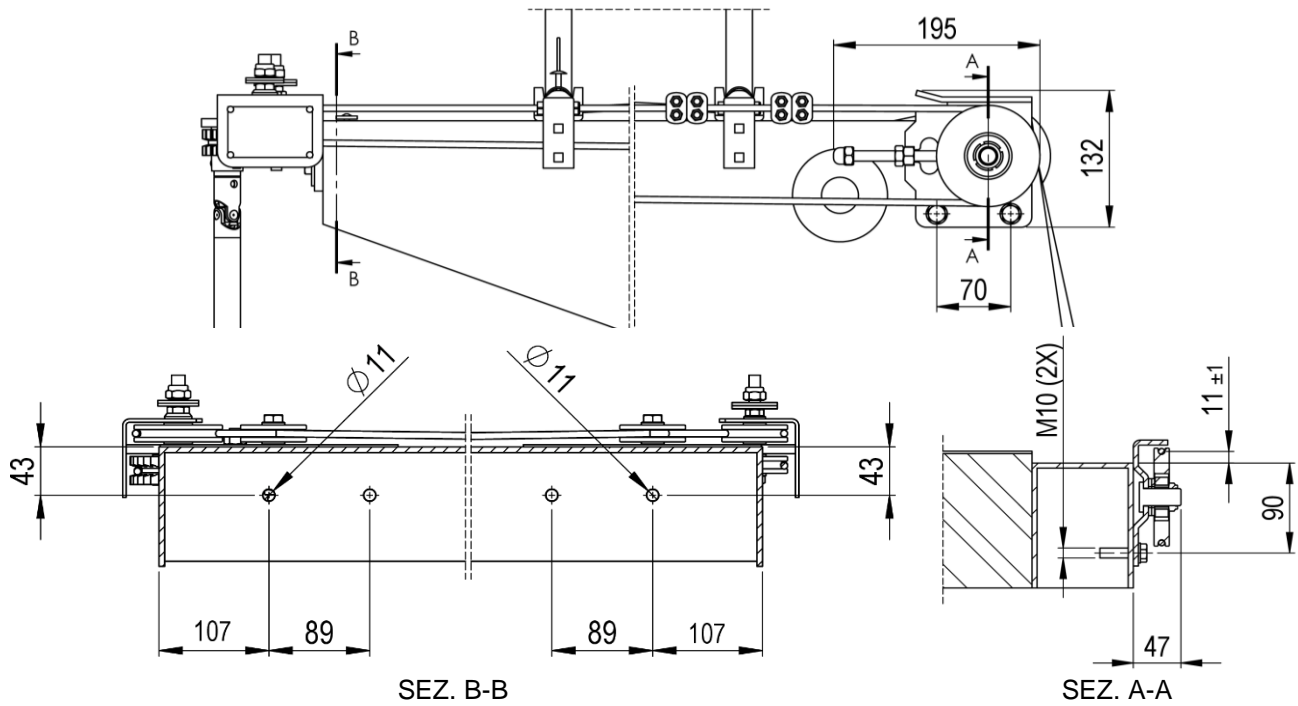
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After determining the positioning of the left and right supports, it is possible to intervene on the body for the installation of the cover.

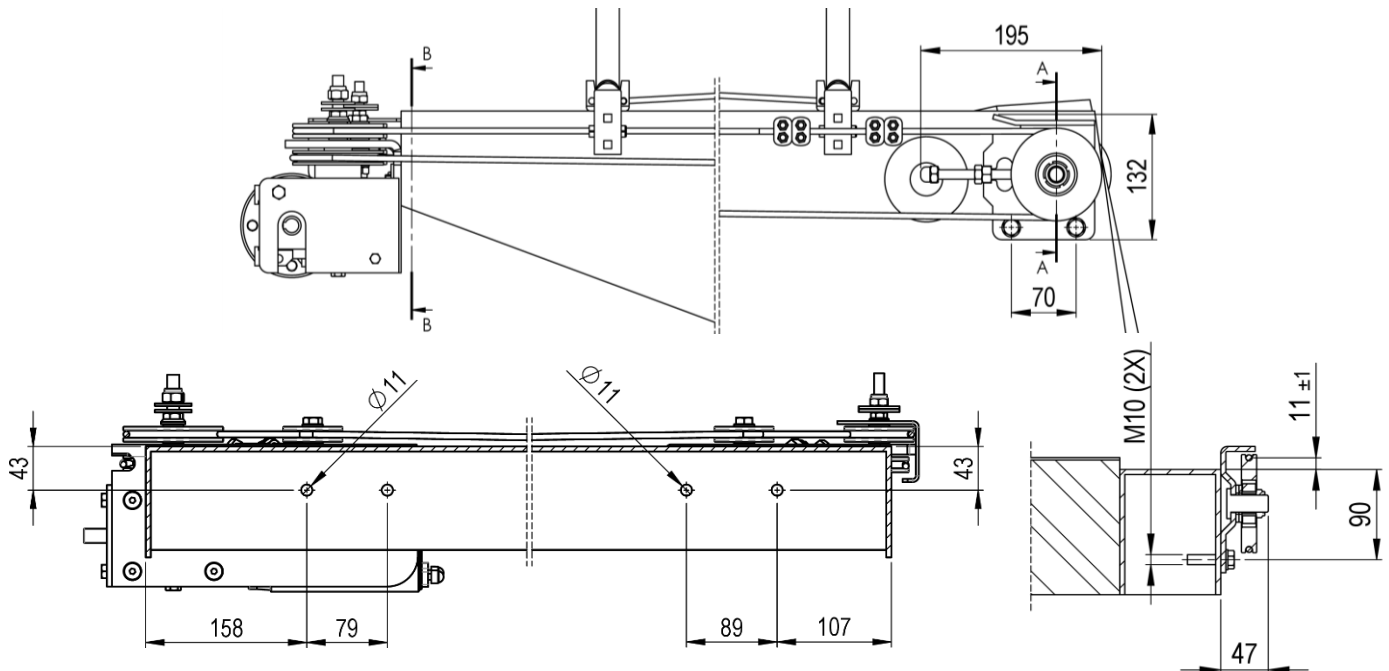
#### HAND-OPERATED VERSION for tipper body length < 8 m:



**HAND OPERATED VERSION for tipper body length > 8 m:**



**ELECTRIC VERSION:**



- Drill holes (Ø 11) of the fastening seats according to the dimensions shown in the figure above.
- Fasten the supports with the screws and check that the distance between the two rear pulleys which will cycle through the ropes, lines up front.

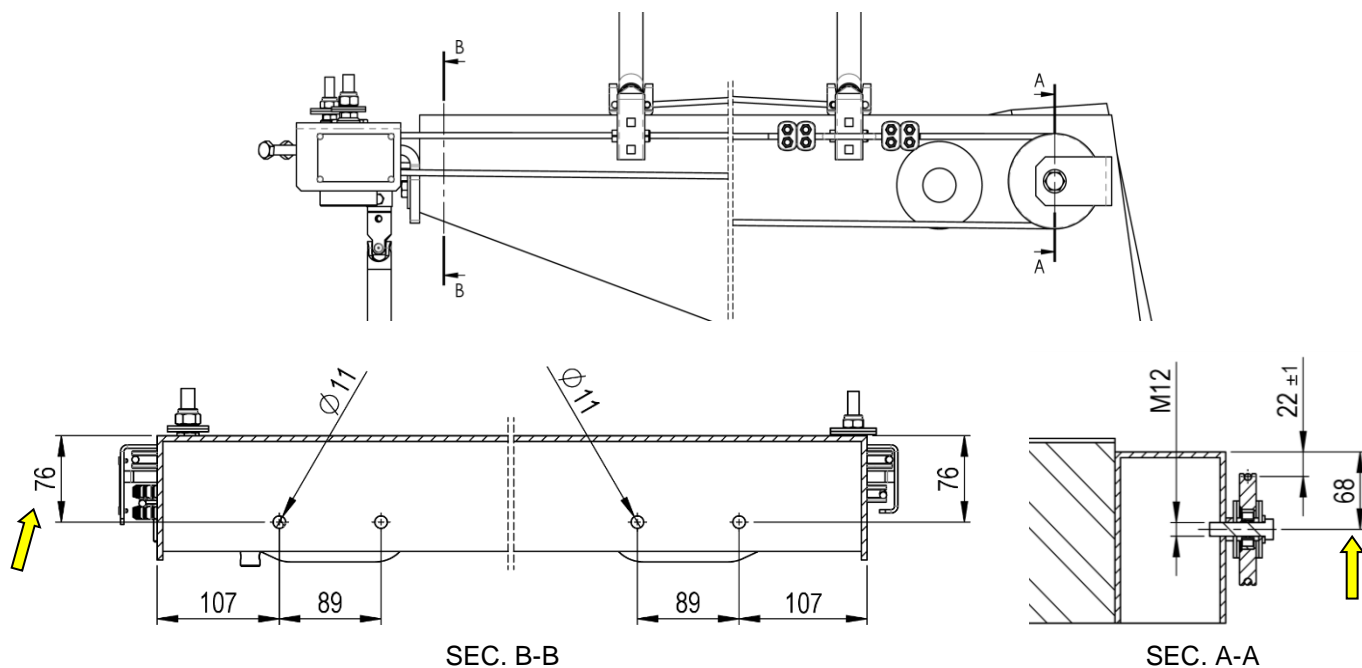
At this point, everything is ready for housing the various components, as indicated subsequently.



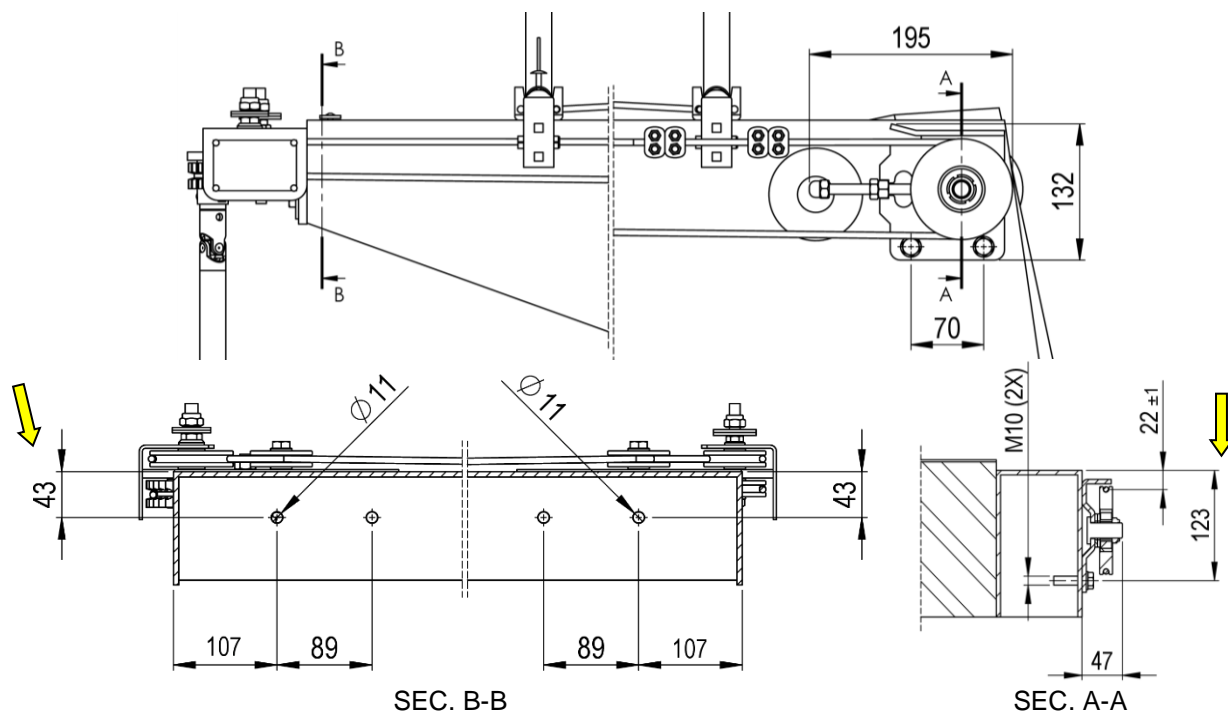
### 3.3.3 Working and preparation of the cab guard with “LOWERED CABLES”

Add 33 mm. to the positioning height (from 43 mm to 76 mm).

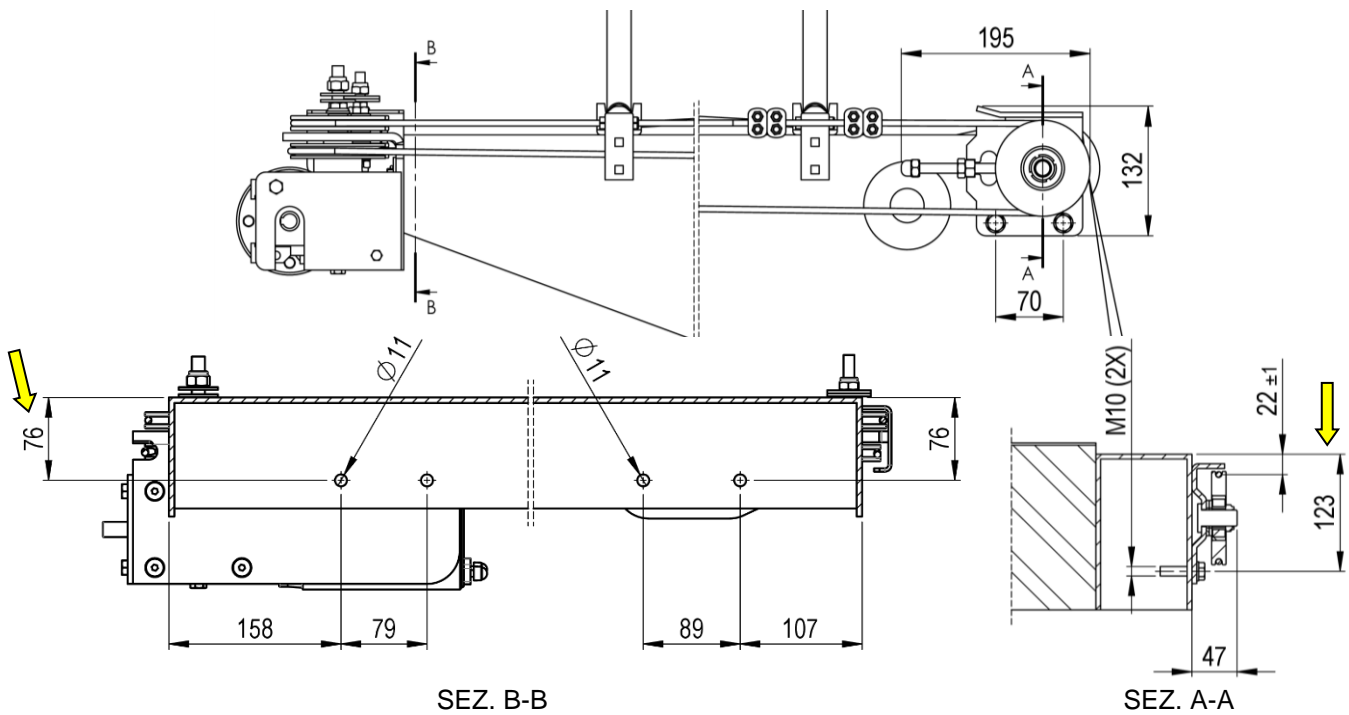
#### HAND OPERATED VERSION for tipper body length < 8 m:



#### HAND OPERATED VERSION for tipper body length > 8 m:



### ELECTRIC VERSION:



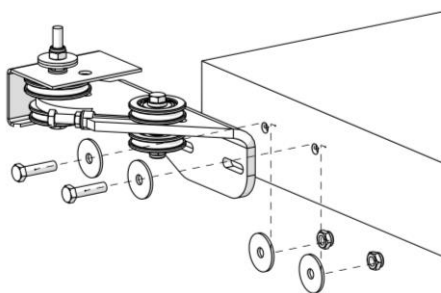
### 3.3.4 Supports fitting

Firstly, install the LH control support, which must be positioned on the left part (with respect to the direction of travel):

- Position the left support as shown in the figure, according to the previously prepared holes.
- Fasten the support with the two screws and self-locking nuts supplied with the system.

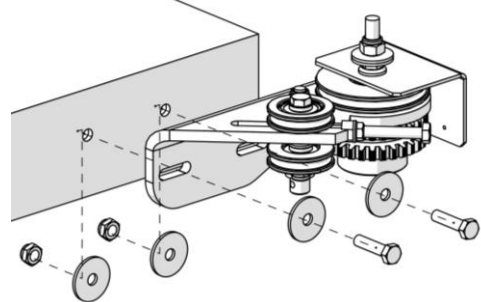
Then fasten the right support.

- Position the support as shown in the figure according to the previously prepared holes.
- Fasten the support with the two screws and self-locking nuts supplied with the system.

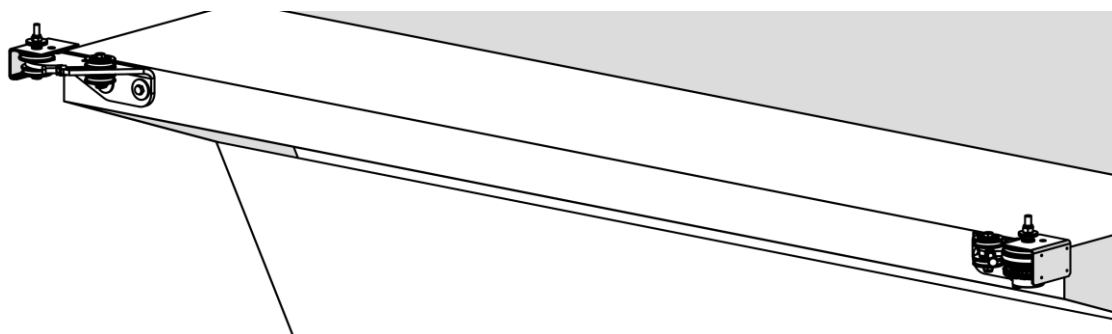


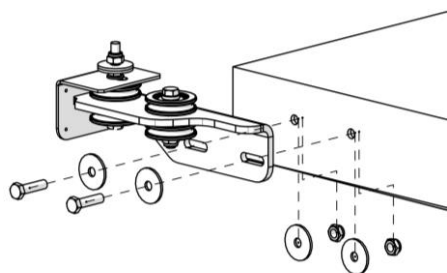
**RH Support**

**HAND OPERATED  
VERSION for tipper body  
length < 8 m**

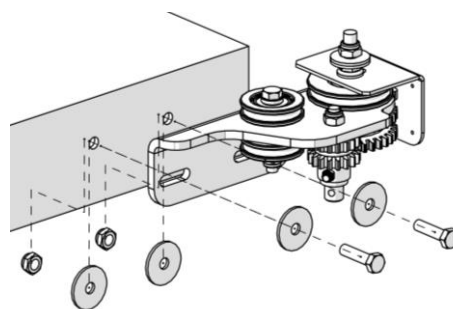


**LH Control Support**



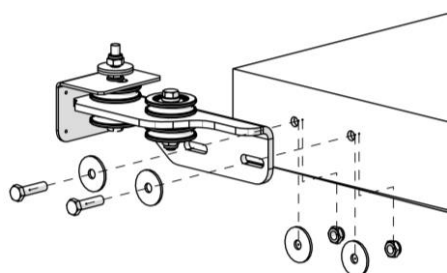
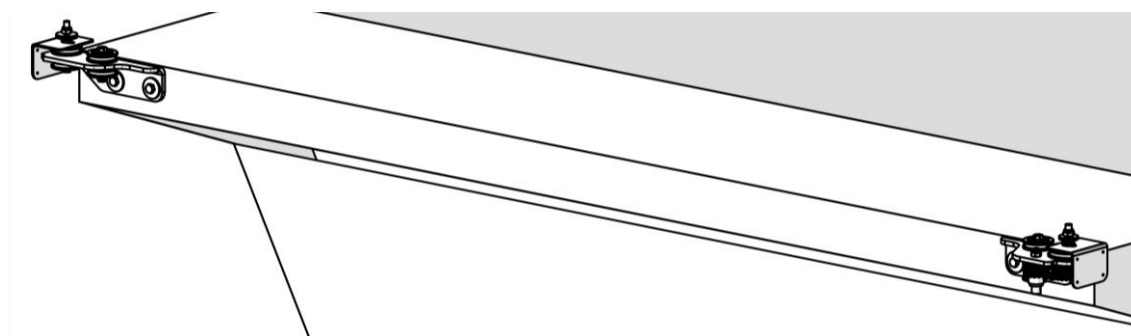


**HAND OPERATED VERSION**  
for tipper body length > 8 m

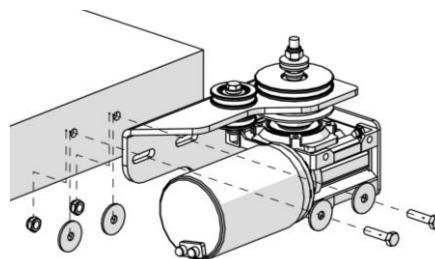


**RH Support**

**LH Control Support**

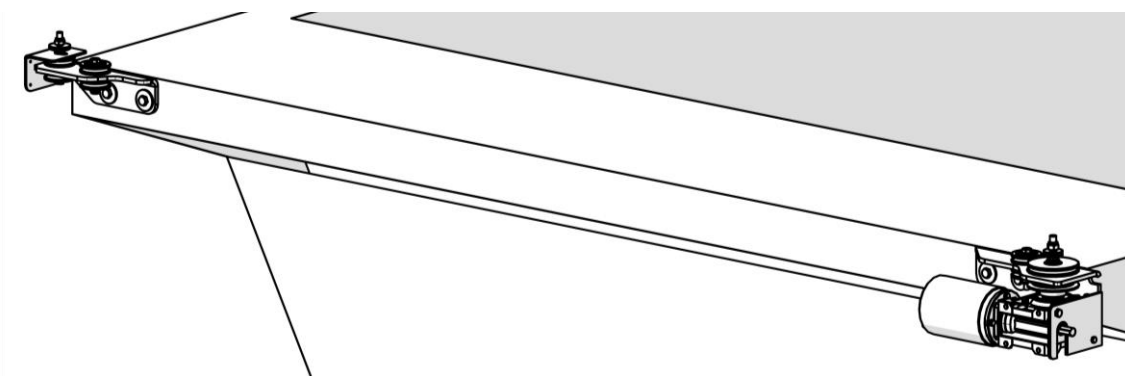


**ELECTRIC VERSION**



**RH Support**

**LH Control Support**



### 3.4 Installation of the steel cable

The covering systems of Marcolin Covering s.r.l. are supplied already preassembled. Therefore, after having placed the covering on the tipper body, it is only necessary to pull out one by one the iron rods that keeps together the bows and to pull the steel cable through the holes of the bow supports.

The main component that makes possible the proper covering functioning is the steel cable.



#### CAUTION!

During the installing activities of the steel cable the use of suitable protective gloves is mandatory in order to avoid any injury to hands due to a possible fraying of the steel cable mesh.



#### PAY ATTENTION!

This activity is one of the most important for the proper workings of the tarpaulin.

The better the alignment, the easier the handling of the tarpaulin, in case of hand-operated version, and the lesser the motor effort in case of electrically-operated version.

Before proceeding with the steel cable installation, it is necessary to carry out some operations.

Positioning of the covering:

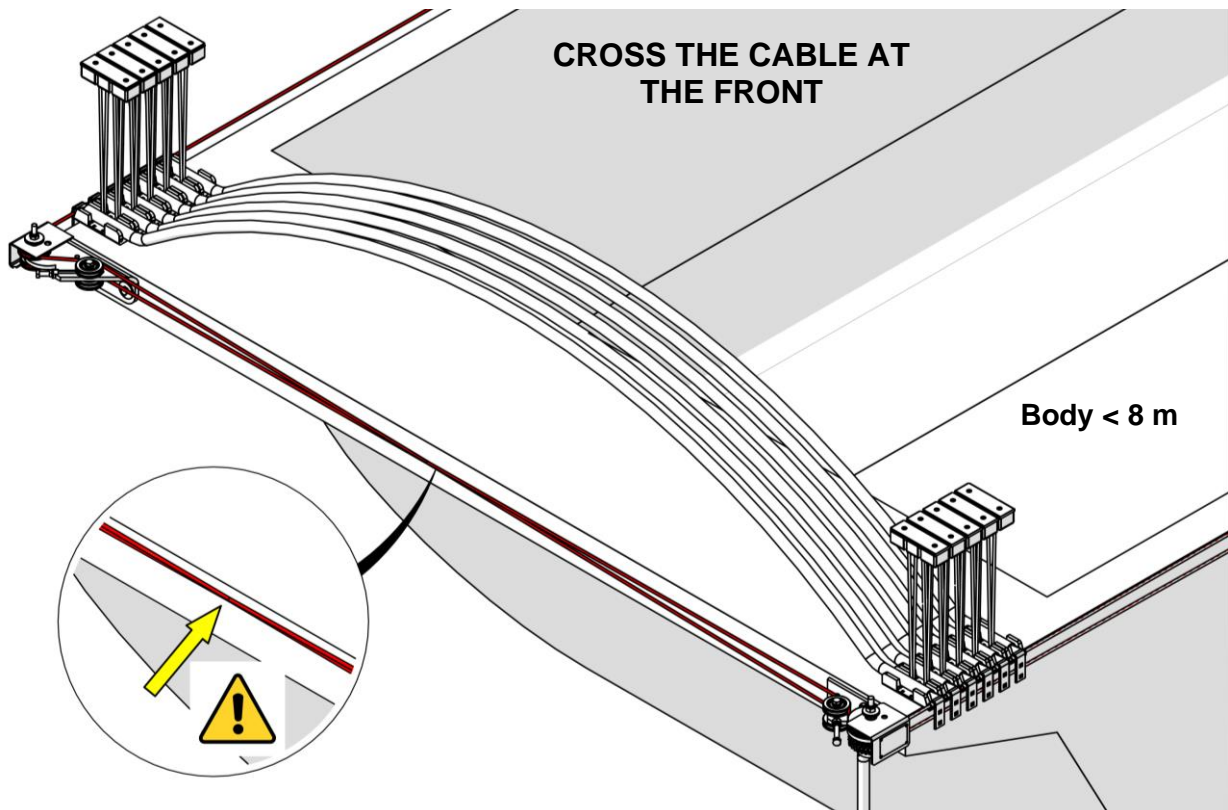
- Remove any packing;
- Ensure the correct orientation of the tarpaulin (front – rear).
- Position the first pulling bow exactly perpendicular to the edges of the tipper body.

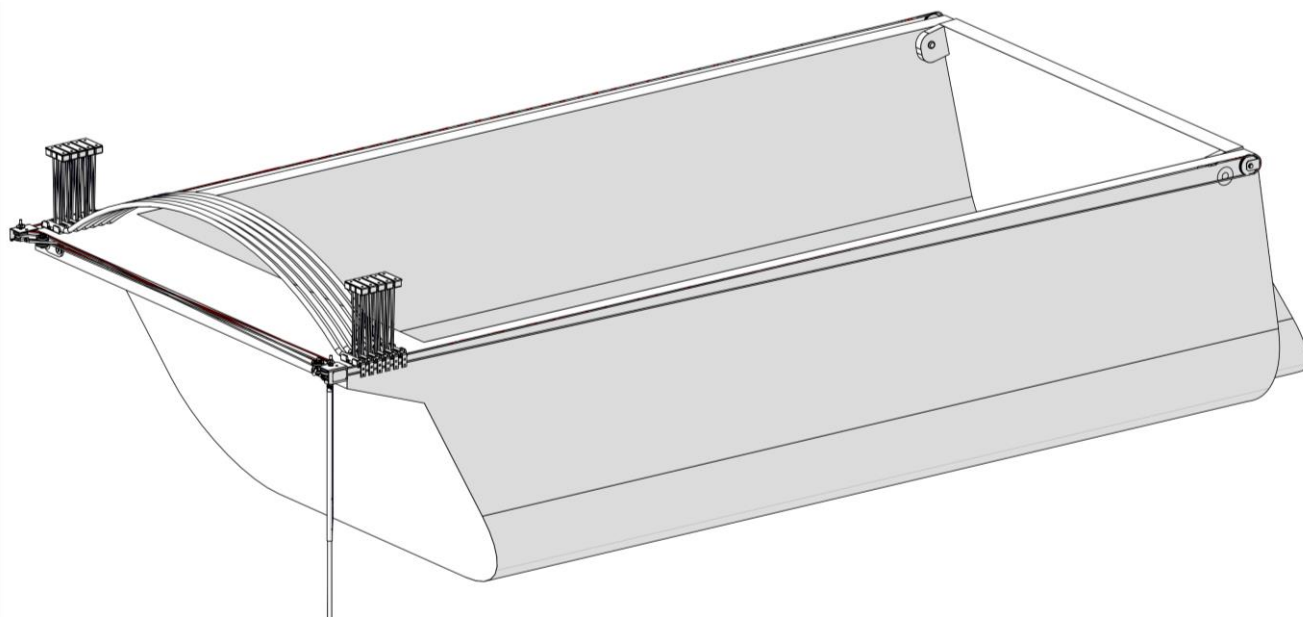
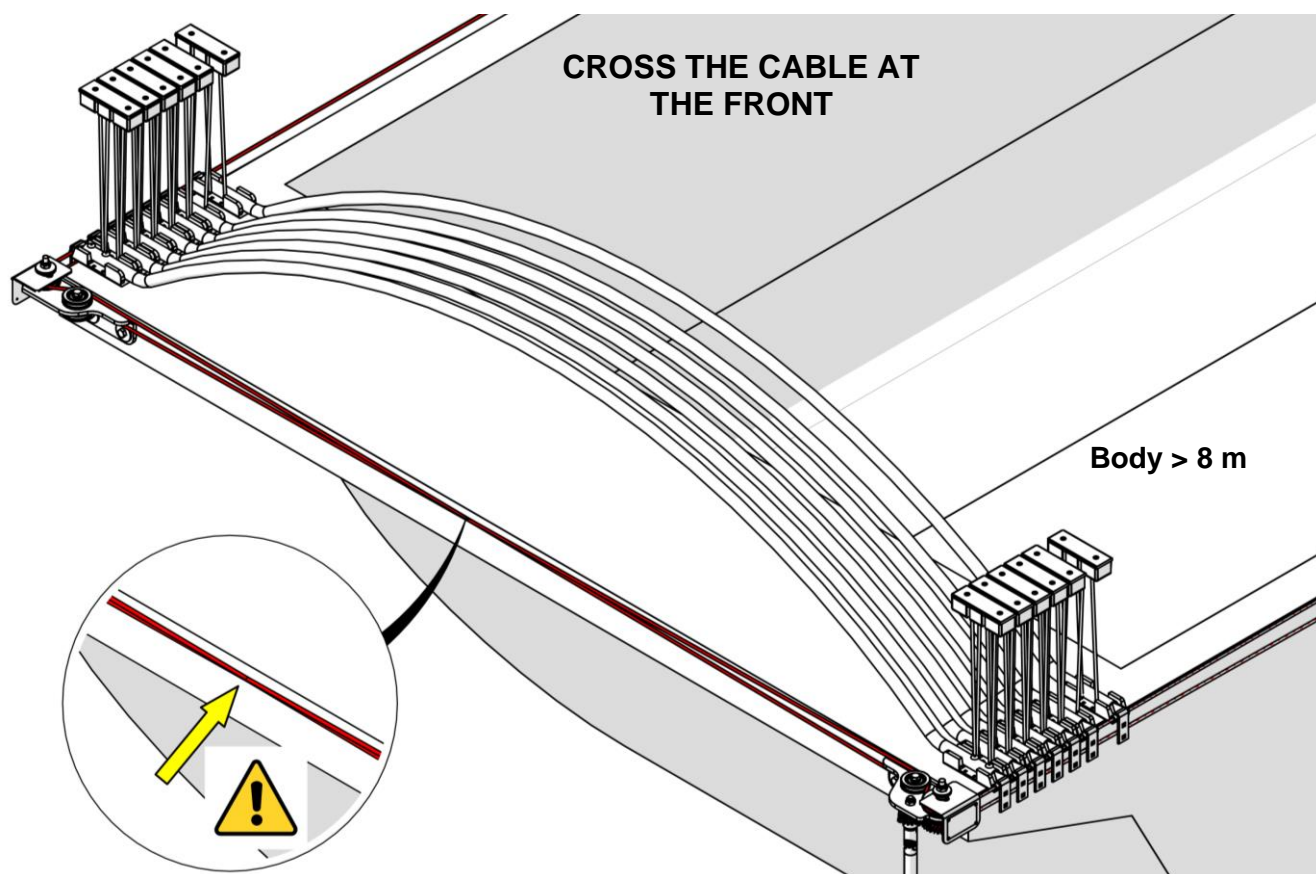
**Note:** Pay close attention while fixing the pulling bow, because a misalignment could compromise the covering workings.

#### 3.4.1 Run of the steel cable

Scrupulously follow the instructions below for positioning the steel cable.

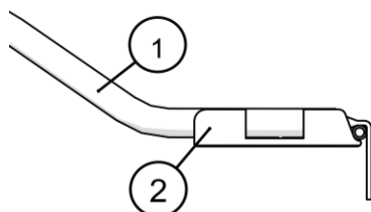
For convenience insert the whole length of the steel cable, between the various elements, operating as shown in the following figures.





**Note:** The position of the cable is the same, both for the manual and motorised versions.

**Note:** In the absence of our directive specifications, the cable must be passed through the outermost hole.

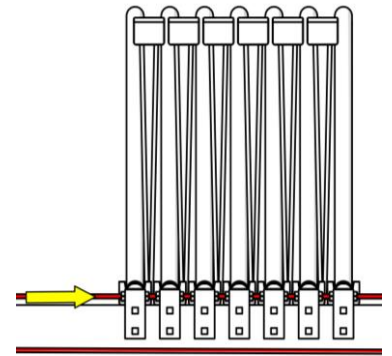


The bows holding up the tarpaulin have on their ends suitable bow supports for an easy sliding of the covering along the upper edge of the tipper body. These supports have at their outside a hole through which the steel cable runs.

- 1) **BOW**
- 2) **BOW SUPPORT WITH SLIDING PART**

Using the head of the upper cable, proceed as follows:

- Insert the steel cable onto all the bows through the hole on the bow support;
- Last of all, insert the head of the cable into the hole of the first pulling bow;
- Make sure that there is at least 100-150 mm left of the back end of the cable for further fastening and possible corrections.




---

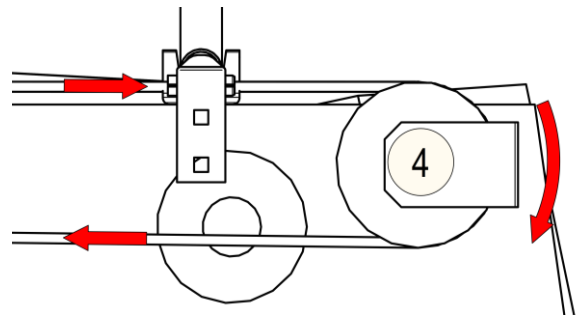
**Note:** Ensure that the bow keeps as perpendicular as possible to the board walls for avoiding any subsequent adjustment service.

---

Now proceed with positioning the lower end of the steel cable:

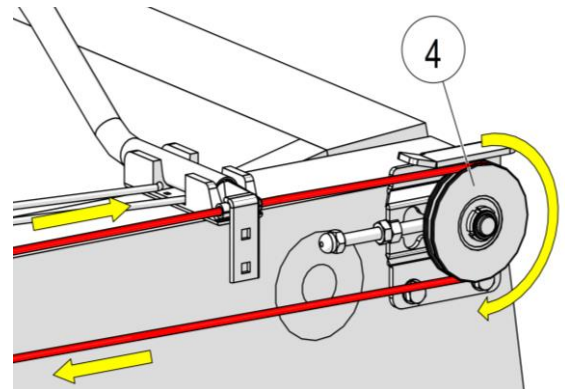
**HAND OPERATED VERSION for tipper body length < 8 m**

1. Pull the lower end onto the rear part of the body.
2. Wrap the steel cable on the rear idler pulley (4).
3. Bring the end of the cable back to the pulling bow support.



**HAND OPERATED VERSION for tipper body length > 8 m**

4. Pull the lower end onto the rear part of the body.
5. Wrap the steel cable on the rear idler pulley or on the pulley of the rear tensioning plate (4).
6. Bring the end of the cable back to the pulling bow support.





### 3.4.2 Cable fastening

Now that the steel cable has been properly positioned on its path the cable fastening activities can be carried out.



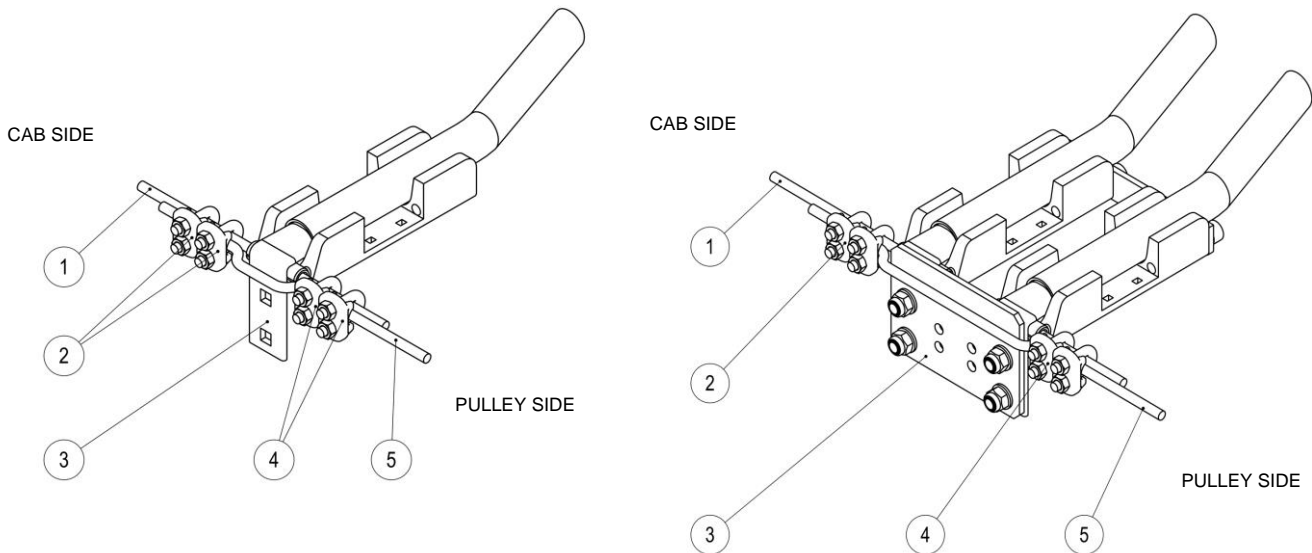
#### CAUTION!

During the installing activities of the steel cable the use of suitable protective gloves is mandatory in order to avoid any injury to hands due to a possible fraying of the steel cable mesh.

#### Note:

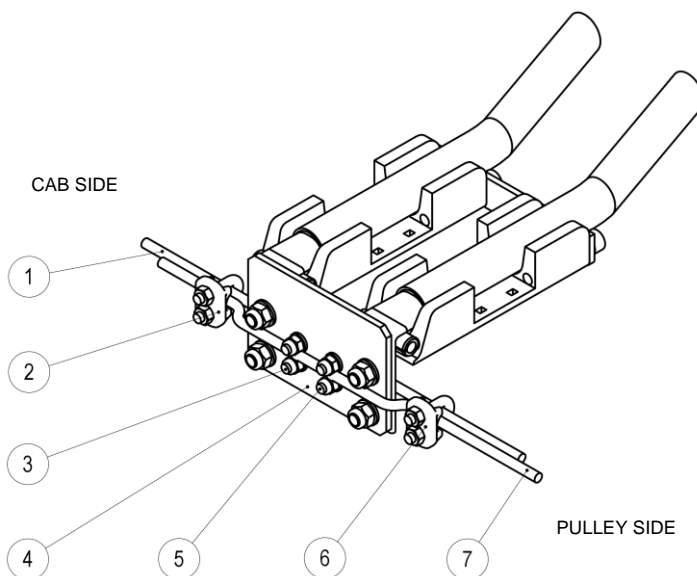
Before fastening the cable, check carefully whether the covering is provided with a single or double pulling bow.

#### COVERING WITH SINGLE OR DOUBLE PULLING BOW (STANDARD CABLE)



1. Take the cable which comes back from the rear part (pulley side) **(5)** and pass it at the outside of the pulling bow support **(3)**.
2. Tighten the steel cable by pulling it manually.
3. Fasten both ends of the cable **(1) & (5)** pulling them through the specific supplied clamps **(2) & (4)**.

#### COVERING WITH DOUBLE PULLING BOW (LOWERED CABLE)



1. Insert two clamps **(3)** and **(5)** in the inner side of the support plate of the double pulling bow **(4)**.
2. Take the end of the cable **(1)** which comes back from the vehicle cab side and fasten it with the clamps **(3)** and **(5)** passing it through the **inner** side of the support plate **(4)**.
3. Take the end of the cable which comes back from the rear side of the vehicle (pulley side) **(7)**, overlap the first one **(1)** passing it through the **outer** side of the support plate **(4)**.
4. Manually, pull the cable which comes back from the rear side of the vehicle (pulley side) **(7)** for tensioning it.
5. Fasten both cable ends with two clamps on the left **(2)** and right **(6)** side of the previously fastened ones..



**WARNING!**



**IT IS FORBIDDEN TO use different materials than those supplied with the covering system, in order to avoid invalidation of warranty.**

The cables must be secured by 4 galvanized steel clamps for Ø 6 cable, placed as shown in the figures above (i.e., 2 on each side).

**WARNING!**



An incorrect fastening of clamps, the lack of one or more clamps as well as a different fixing process from the described one can compromise the tarpaulin stability on the tipper body, causing its detachment with danger and damages to persons and objects.

**IT IS FORBIDDEN TO use different materials than those supplied with the covering system, in order to avoid invalidation of warranty.**

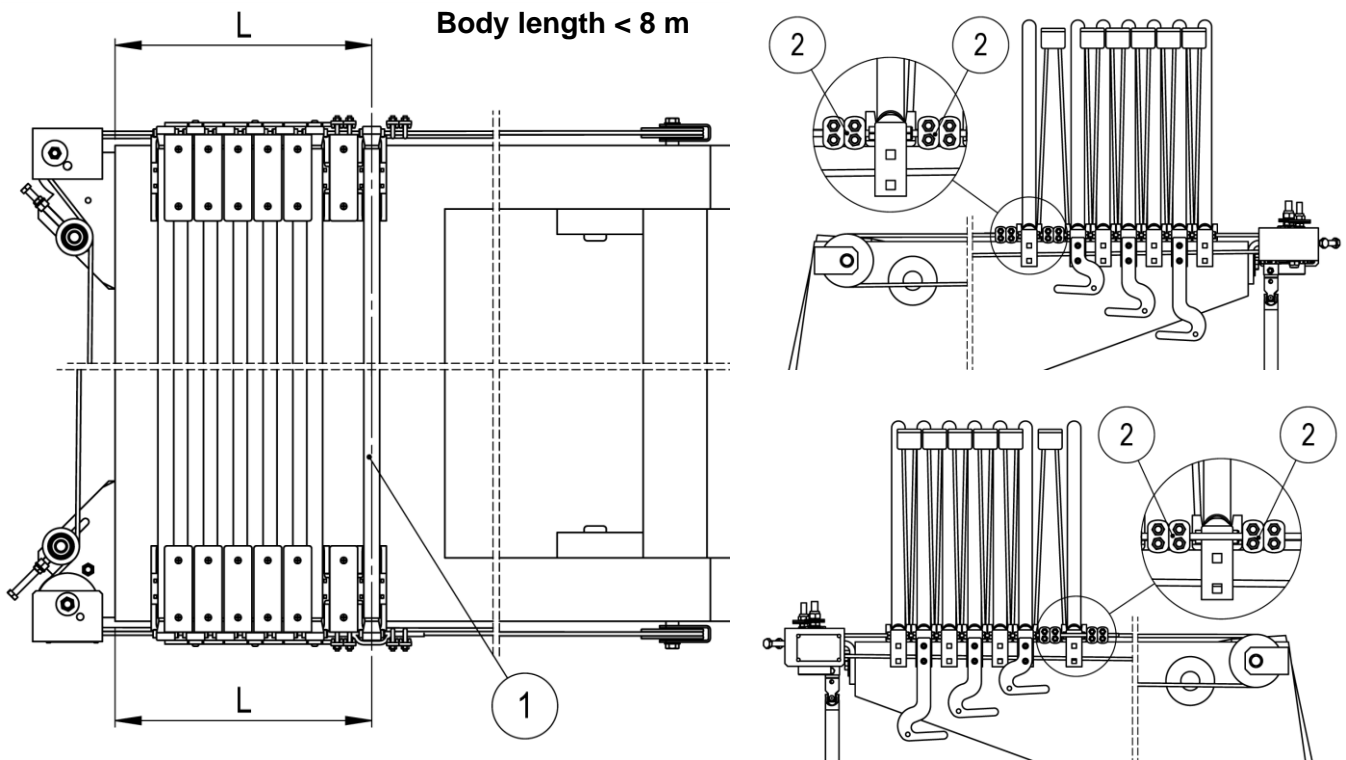
- After having fastened the steel cable cut the excess length off but leaving about 100-150 mm, that can be used for any necessary adjustments.

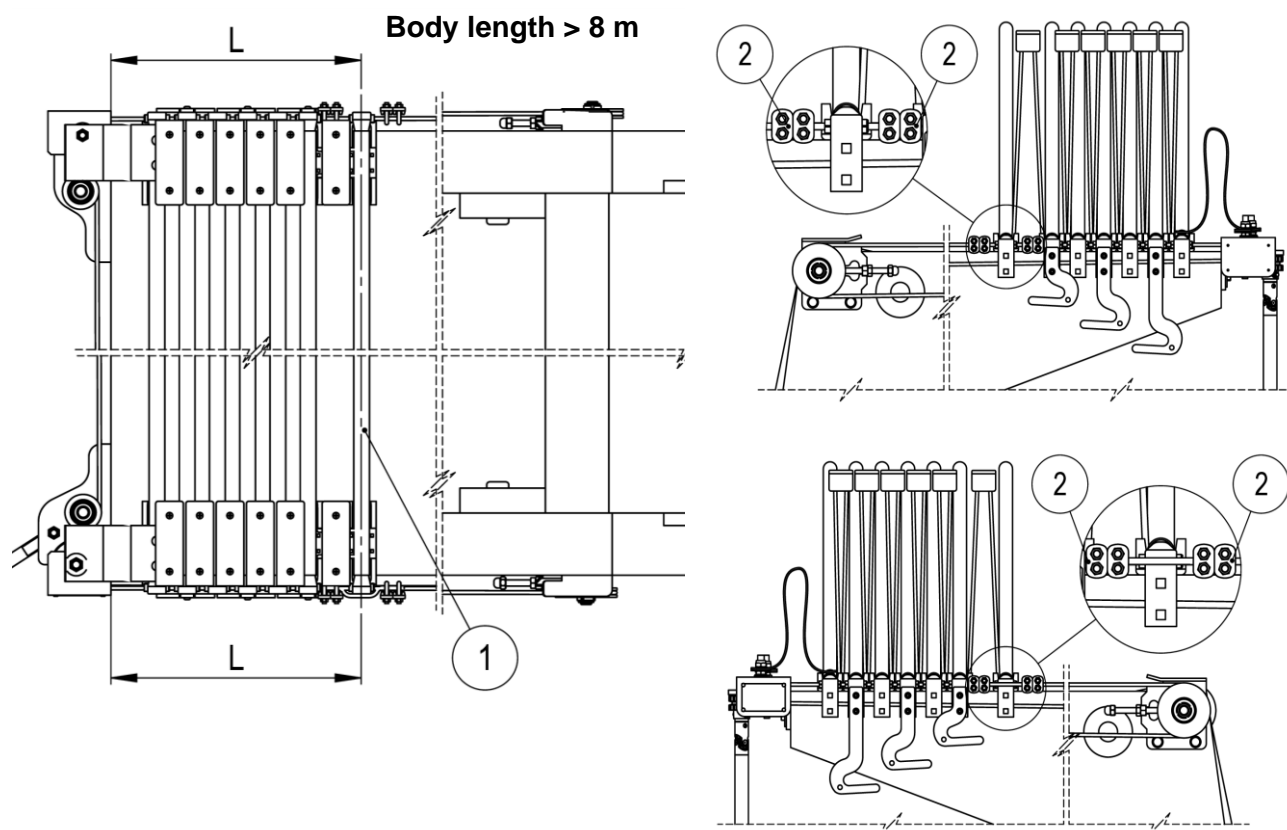
**Note:** Before cutting the cable, wrap the cut surface with insulating tape to prevent a possible fraying over time.

### 3.4.3 Clamping the pulling bow

At this point it is necessary to fasten the bow also on the opposite side by means of the clamps supplied, to allow pulling the covering.

- Make sure that the last bow **(1)** (the one near the rear part of the body) is straight (parallel with respect to the front panel).
- Measure the length **(L)** from the beginning of the body to the bow on which the clamps **(2)** have already been fastened.
- Bring the opposite side to the same measurement and fasten with two clamps as shown in the figure.
- Fasten the steel-wire rope to the foot of the pulling bow as described above.



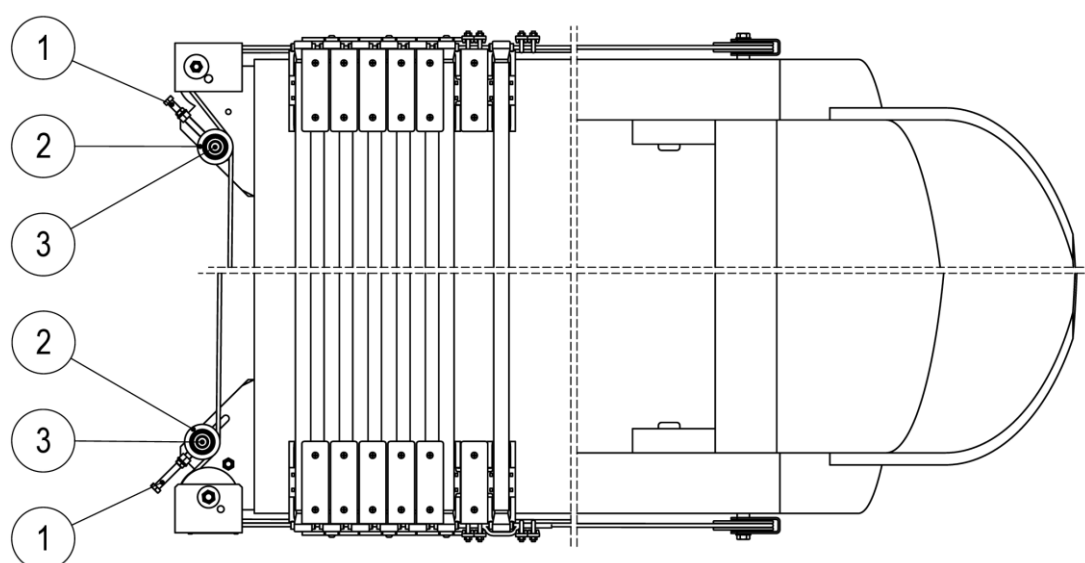


### 3.4.4 Steel cable tightening up

After positioning the steel cables, tighten them up by applying the process described for the rear drive pulleys in order to make possible the proper sliding of the covering.

#### **HAND OPERATED VERSION for tipper body length < 8 m**

To do this you need to act on two front supports. In fact, the anterior drive pulleys have been developed and manufactured in order to allow the operator to adjust the steel cable tension.



Operating alternately on the two drive pulleys proceed as follows:

- Use a 10 Nm torque wrench to tighten the screw placed on the front side (1) of the drive pulley. As a consequence, the drive pulleys (2) and the slide part move backwards, in this way tightening up the steel cable.

- Act alternatively on one support and on the other one, tightening up the cable in the same way on both sides.
- When the required tension is achieved, block the guide pulley tightening the central screw (3)



### WARNING!

During the installing activities of the steel cable the use of suitable protective gloves is mandatory in order to avoid any injury to hands due to a possible fraying of the steel cable mesh.

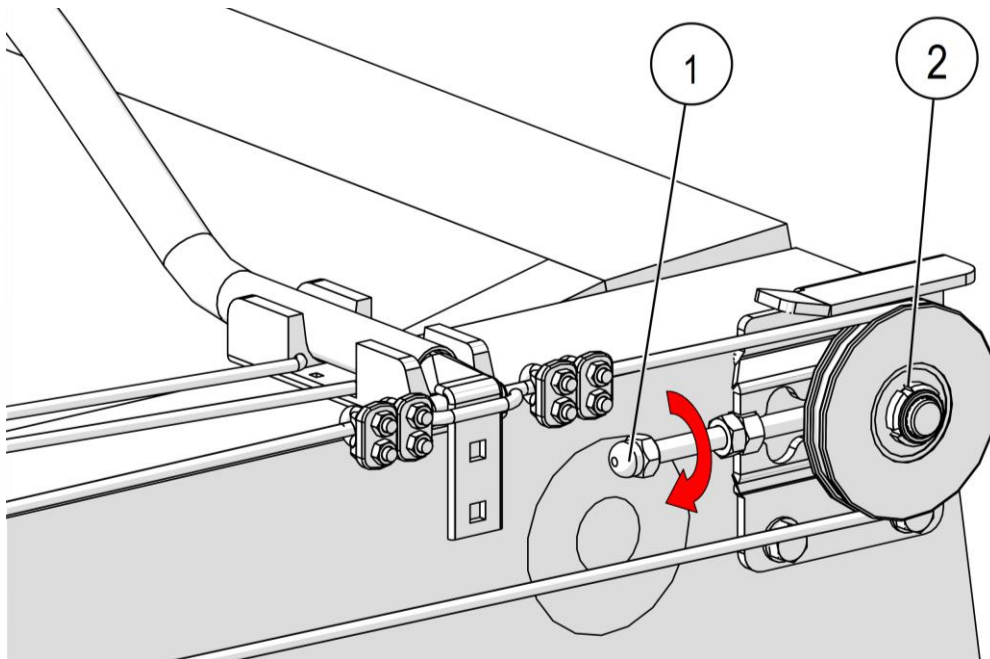


### IMPORTANT!

Once terminated this operation **make sure that the bow is perpendicular to the side board and at equal distance from the tailgate**. If not, operate consequently on the tensioning device of the steel cable or, if necessary, proceed to block it.

### HAND OPERATED VERSION for tipper body length > 8 m and ELECTRIC VERSION

To do this you need to act on two front supports. In fact, the anterior drive pulleys have been developed and manufactured in order to allow the operator to adjust the steel cable tension.



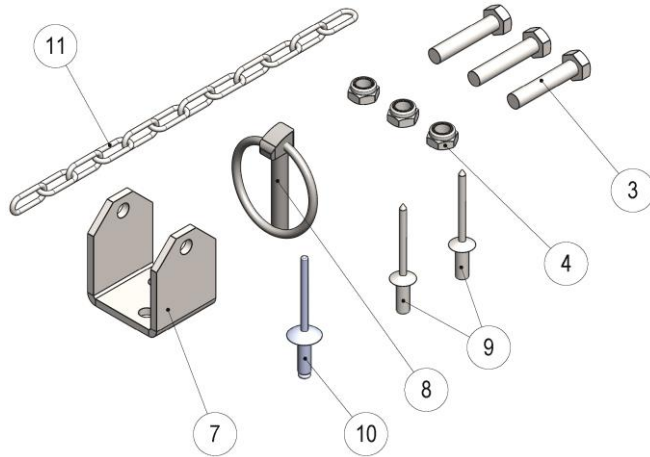
Operating alternately on the two rear tensioning plates proceed as follows:

- Use a 10 Nm torque wrench to tighten the screw placed on the front side (1) of the drive pulley. As a consequence, the drive pulleys move backwards, in this way tightening up the steel cable.
- When the required tension is achieved, block the guide pulley tightening the central screw (2)
- Act alternatively on one support and on the other one, tightening up the cable in the same way on both sides.

### 3.5 Fastening the operating rod (hand-operated covering system)

When installing the hand-operated covering system, after having installed the driving system, it is necessary to assemble and mount the operating rod.

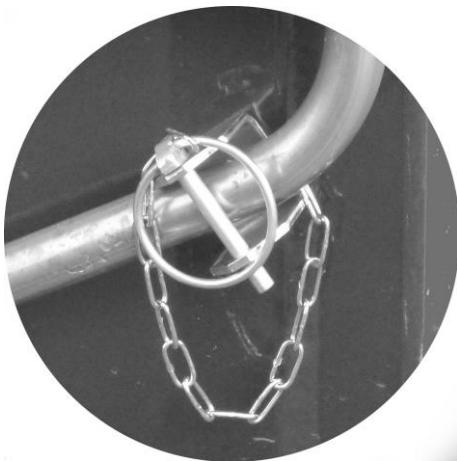
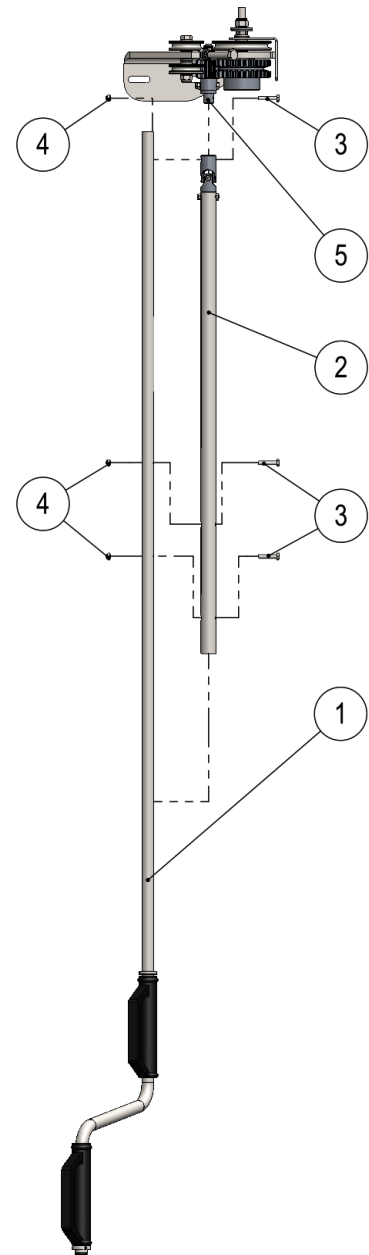
For fastening the operating rod use the following items:



- Insert the operating rod (1) into the extension piece (2) and drill 2 holes for fastening it at the desired height.
- Fasten the operating rod (1) on the extension piece (2) with the supplied screws (3) and self-locking nuts (4).

**Note:** During its working life the structure is subject to vibrations and stress; therefore, it is recommended to apply a threadlocker Loctite® liquid.

- Place and fasten the operating rod on the pivot (5) situated on the manual gear of the handling system, with the supplied screws (3) and self-locking nuts (4).



Fasten the holder for the rod:

1. Find a suitable location for the rod in order that it does not become an obstacle;
2. Drill the tipper body to fit the holder's holes;
3. Fasten the holder (7) with proper supplied rivets (9).
4. Fasten the safety chain (11) of the forelock (8) with proper supplied rivet (10).

### 3.6 Tarpaulin fastening

On the front part, the tarpaulin is longer than the body for a better customization to the different types of tipper body and, especially, to the possible presence of the cab guard.

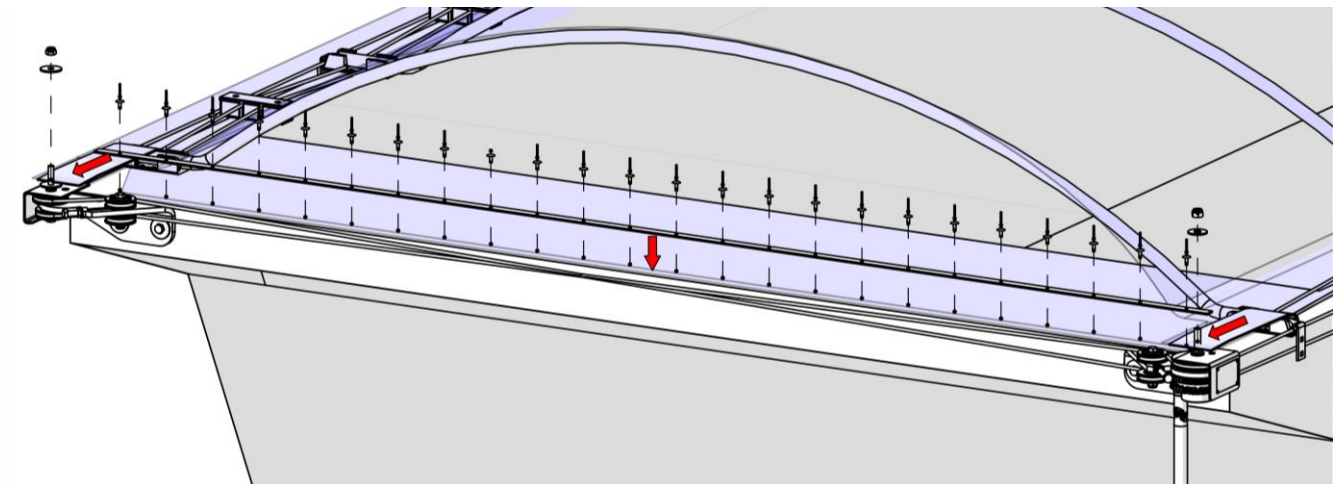
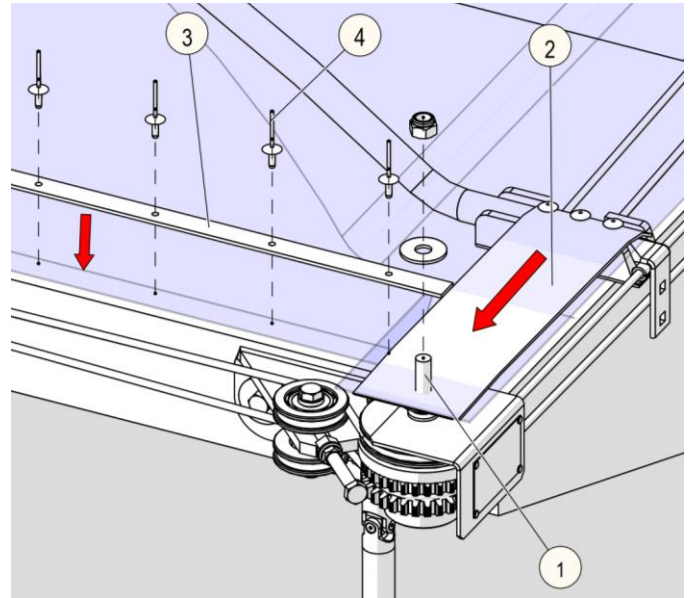
Before going on with the tarpaulin fastening, some operations have to be carried out in order to define the correct fastening measure of the tarpaulin.

**Note:** Pay special attention while fixing the tarpaulin in case of automatic rear closure. In such **circumstances refer to the process described in the specific paragraph 4.1.**

- Move the tarpaulin and cover the tipper body, stopping the pulling bow 70 mm before the rear pulley.

The tarpaulin has to be moved according to the installed driving system type (manually or electrically operated).

- Tighten and fasten the PE (2) band on the lateral fastening screws (1) of the front pulleys Ø 60.
- Tighten up the front part of the tarpaulin.
- Fasten the tarpaulin on the top of the gear housing, using the specific clamping plate (3) and rivets (4).
- Cut off the excess part of the tarpaulin.



### 3.7 Lateral hooking system for the covering

The covering system has been designed to satisfy the various operative requirements. For this reason two different types of lateral fastening of the tarpaulin have been developed:

- Standard closure with automatic “L” hooking.
- Hermetic closure with elastic strings.

#### 3.7.1 Standard closure with automatic hooking

With this lateral closure system, the L-hooks automatically fit into the respective U-clamp terminals fastened on the side of the tipper body.

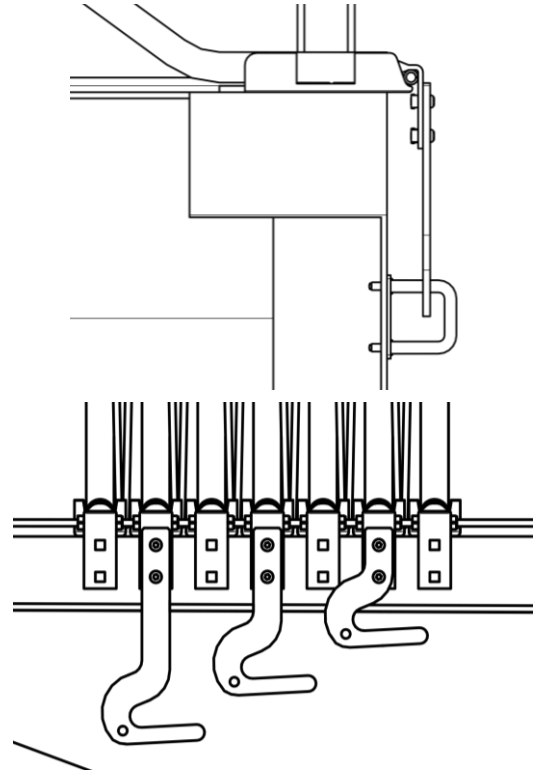
When the tipper body is covered the tarpaulin is automatically blocked and the vehicle is ready for moving on the road.

For installing, proceed as follows:

- Move the covering and cover the tipper body entirely.
- Define the fastening positions of the safety hooks.

For fastening the covering, 2 or 3 safety hooks supplied in different heights are planned to be evenly distributed along the side of the tipper body.

The number of safety hooks is in any case not binding as it can change according to the length of the tipper body or the customer's requirements.




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**Note:** The positioning of the safety hooks is essential for the proper working of the hooking system.

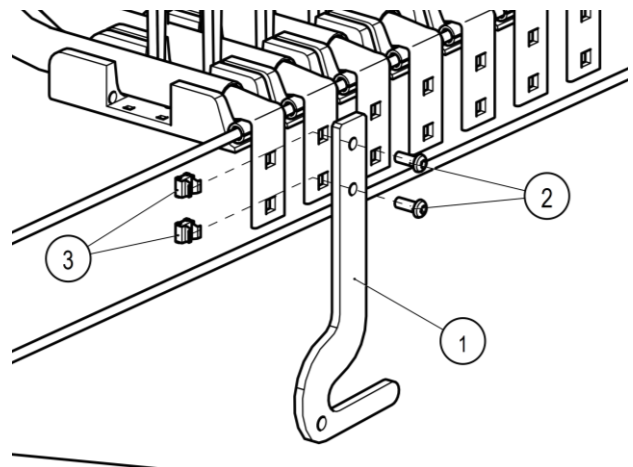
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- Lean the safety hook against the lateral side of the bow support (1).
- Fasten the safety hook with the supplied round-head screws (2) and cage nuts (3).

---

**Note:** Apply medium threadlocker Loxeal 54.03 for the supplied screws.

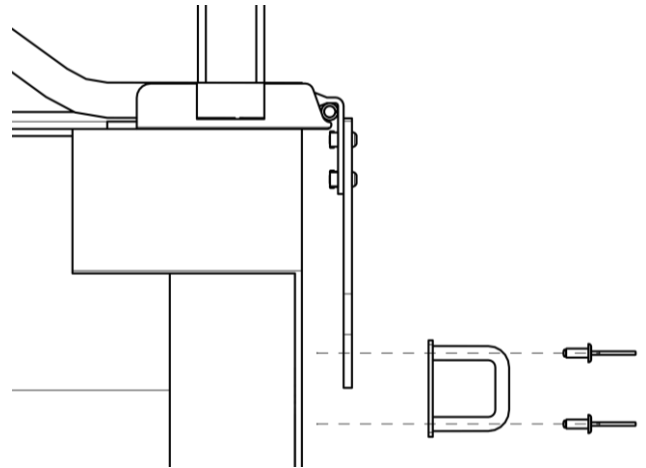
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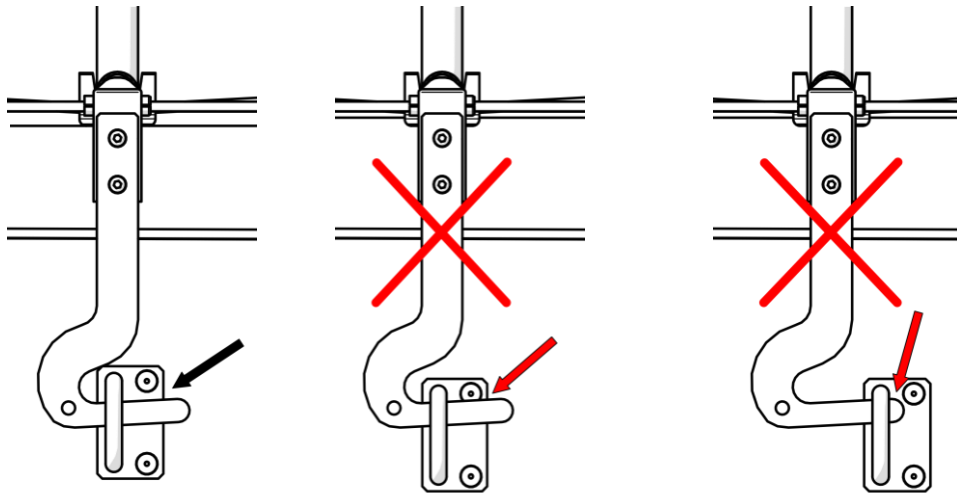


After having defined the safety hook height, it is possible to fasten the U-bolt on the tipper body as follows:

- Place the U-bolt centrally to the safety hook.;
- Drill the board wall of the tipper body and fasten the hooking with suitable supplied rivets.



**YES**



Now the positioning of the remaining safety hooks can be done.



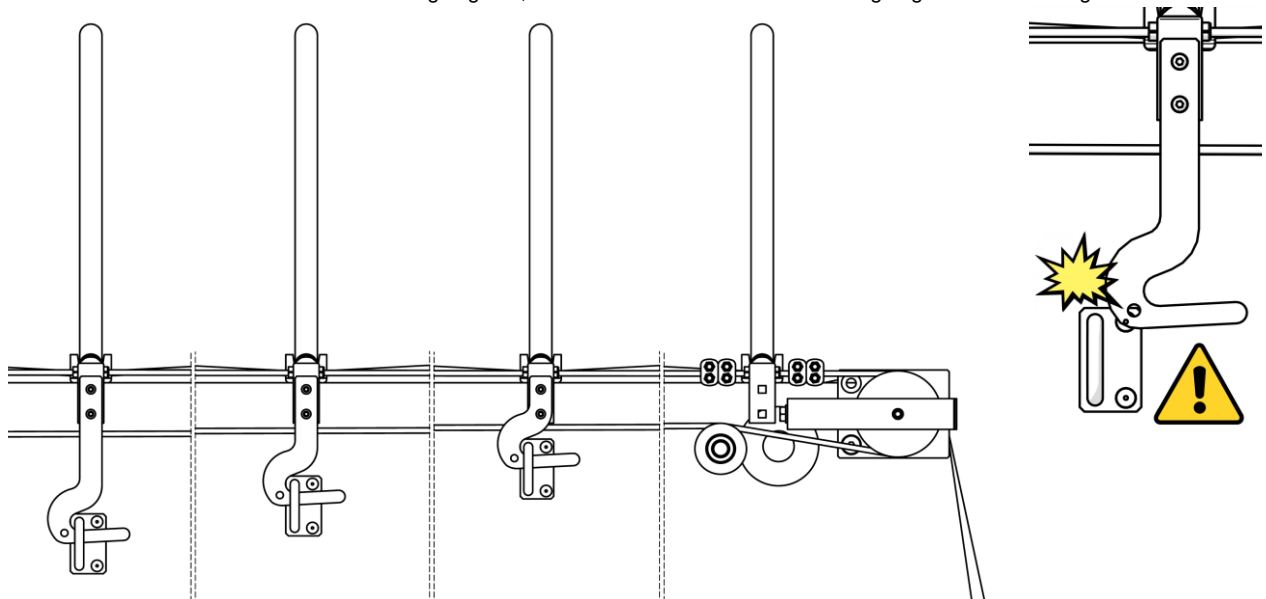
#### **WARNING!**

From now on the height positioning of the safety hook is the decisive factor for a proper working of the covering system.

- Proceed installing the remaining safety hooks as shown in the below figure

#### **Note:**

Before fastening the respective hooking, Check that while folding the tarpaulin the safety hook is fastened on a different level than the foregoing one, in order not to interfere with the foregoing fastened hooking.





---

**Note:** If obstacles interfere with the hookings, shift the hook upwards on the upper hole and repeat the above described fastening operations.

---

- In the absence of any obstacles while moving the tarpaulin, fasten the U-clamp of the respective hook.
- Proceed with fastening the subsequent hooks.



---

**WARNING!**

We recommend taking care of each U-clamp terminal positioning in order to avoid operating troubles while handling the covering system.

---

### 3.7.2 Hermetic closure with elastic strings

With this lateral closure system, the tarpaulin comes down a few centimetres from the upper edge of the tipper body and then it is tightened by appropriate elastic strings with hooks.

The tarpaulin borders are equipped with fastening ropes with elastic strings, with plastic or iron hooks.

For fastening the hooks proceed as follows:

- Move out the tarpaulin and cover entirely the tipper body.
- Fasten the specific hooks using the supplied rivets on the hooking points in the bottom part of the tipper body.



- Make sure that the fastening height of the hooks permits a proper tightening of the elastic strings.



---

**INSTRUCTION!**

During the training course REPEAT often to the operator that HE HAS NOT TO MOVE THE VEHICLE while the elastic strings are still loose.

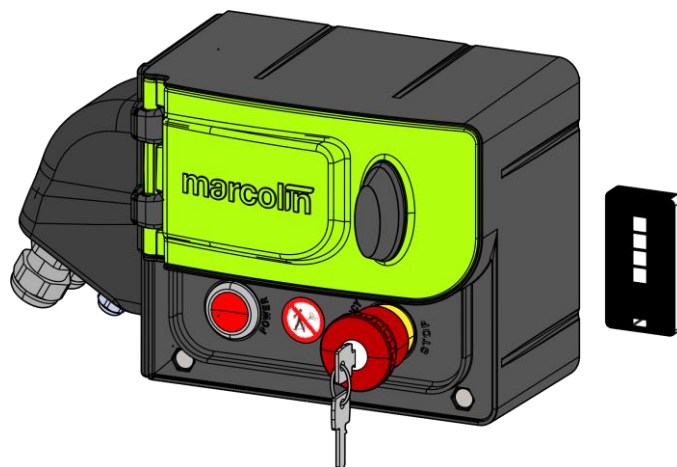
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### 3.8 Electrical wiring for Ecotype Covering System

The application of the motorised covering system requires the installation of an elementary wiring, suitable for supplying electricity and the proper functioning of the covering.

The system equipment includes, apart from the above-described motor, following material:

1. Control Box → see paragraph 3.8.1
2. Radio remote control "TX MARCOLIN"
3. Set of electrical contacts
4. Electrical wiring



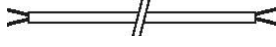



identification plate: inside the door →

The electrical system also includes the connection cables for the various components.

Each supplied cable has been prepared and adapted for a specific application. Therefore, each one is marked with a special initial.

The table below shows characteristics, application and identification marking of the several connection cables.

Length	Cable End 1	Reference Colour	Cable End 2	Application
4.50 m	Open ended for cutting to length to connect to battery	 <b>A</b>	80 A female plug	Connection from the tractor battery to the semi-trailer connection zone
2.50 m	80 A male plug	 <b>B</b>	Open ended for cutting to length to connect to Control Box (1- 2)	Connection from the semi-trailer connection zone to the Control Box power supply
2.50 m	Connection to Control Box terminals (3 - 4)	 <b>C</b>	Open ended for cutting to length to connect to contact plate	Connection from Control Box (motor output) to contact plate
4.50 m	Connection to contact plate terminals	 <b>D</b>	Open ended for cutting to length, for connection to the motor	Connection from contact plate to motor

#### WARNING!



**Prior to establish the electrical connections "disconnect the battery".**

The wiring system must be performed by qualified personnel in strict accordance with the instructions described in this manual and the wiring diagram shown in paragraph 6.1.

#### Note:

If use of different cables than those supplied should be necessary, consult previously the manufacturer.

### 3.8.1 Control Box models description

The following table summarizes the various types of Control Boxes (X), where (X) stands for R 24, RH 24, RHV 24, depending on the model.

PRODUCT FAMILY	DESCRIPTION	DIFFERENCES FROM THE STANDARD
<b>CONTROL BOX R 24 V</b>	Standard model. In this version the mode of operation includes a latching control selector and a radio remote control ("TX MARCOLIN"), to withdraw (" <b>UNCOVERED</b> ") and extend (" <b>COVERED</b> ") the covering tarpaulin. It also includes an emergency mushroom-head pushbutton with safety key reset and an LED-lit button showing the presence of power and allowing the programming of the "TX MARCOLIN" radio remote control.	(None)
<b>CONTROL BOX RH 24 V</b>	This model includes all the features of the standard model. It also provides an option for the timed partial retraction of the tarp for bodies fitted with hydraulically-operated sides.	This version includes the timed partial retraction of the tarp.
<b>CONTROL BOX RHV 24 V</b>	This model includes all the features of the RH 24 V model. It also includes an auxiliary output for the control of the vibrator. The first two channels of the "TX MARCOLIN" radio remote control are used to control the motor (as in the Control Box R 24V), while the other two channels are used for additional controls (verifying the electromagnetic compatibility remains the responsibility of the manufacturer of the vehicle).	This version includes the timed partial retraction of the tarp. It also includes an auxiliary output for the control of the vibrator.

### 3.8.2 Installation of the electrical components

Hereafter the required operations for installing the electrical components:

- Using proper hooking elements, fasten the Control Box on the chassis of the tipper body.
- Fasten one of the two contact plates on the front part of the tipper body.
- Fasten the other contact plate on the chassis.



#### IMPORTANT!

The fastening of the contact plates has to be done making sure that, with the tipper body completely lowered, both contact plates meet properly.

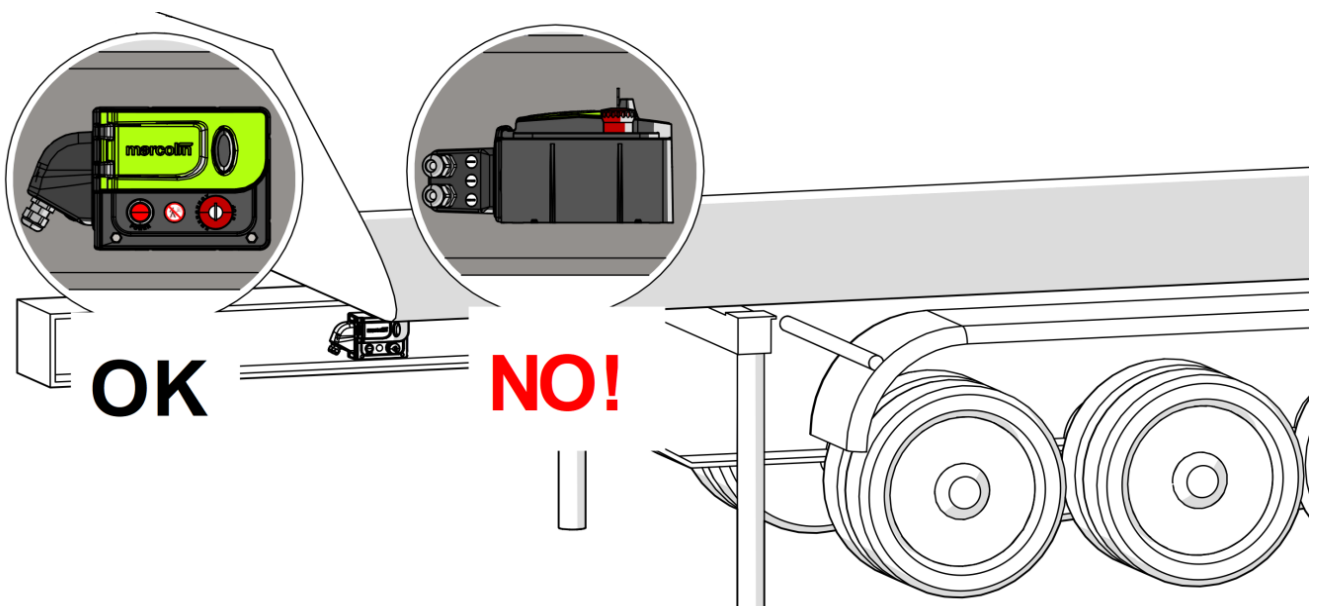


#### WARNING!

Make sure that the contacts connect properly to avoid any damage to the wiring system due to a possible short circuit

### EXAMPLE OF ASSEMBLY

The Control Box can be positioned anywhere on the tipper-trailer chassis, provided that it is fastened vertically (as shown in above figure).



#### IMPORTANT!

The Control Box has to be fastened vertically on the tipper trailer chassis (see figure) by means of the supplied connection cables.  
For battery connection insert a 70A fuse (not supplied) - see "wiring diagram" in paragraph 6.1.



#### WARNING!

**Do not power the Control Box with power supplies other than vehicle batteries** or with systems that have not been authorized by Marcolin Covering



Call us in case of any doubts or problems during installation.

#### Note:

Any installation made without authorisation by Marcolin Covering s.r.l. **can invalidate the warranty!**

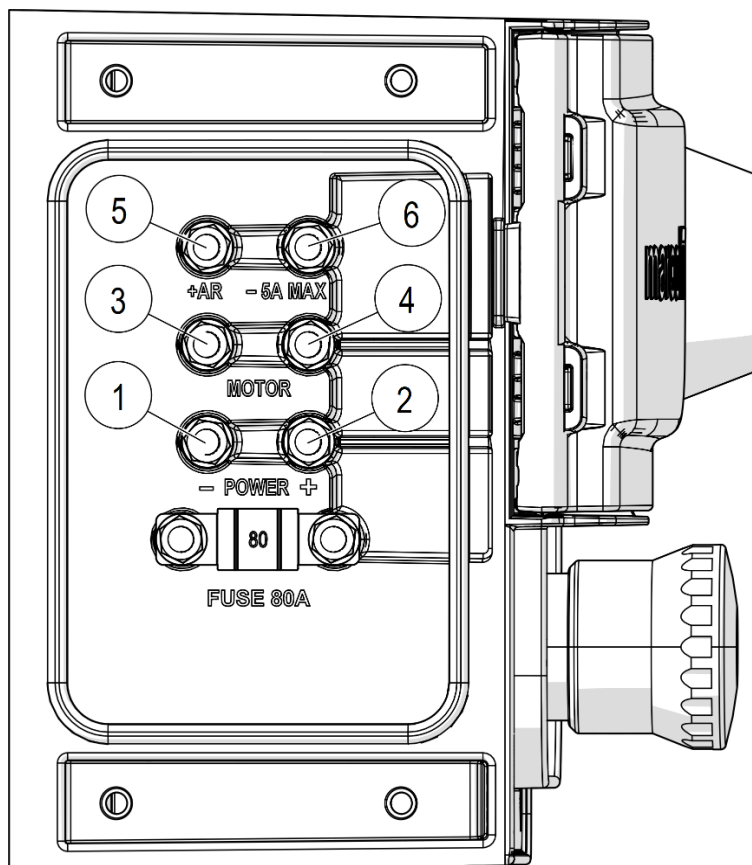
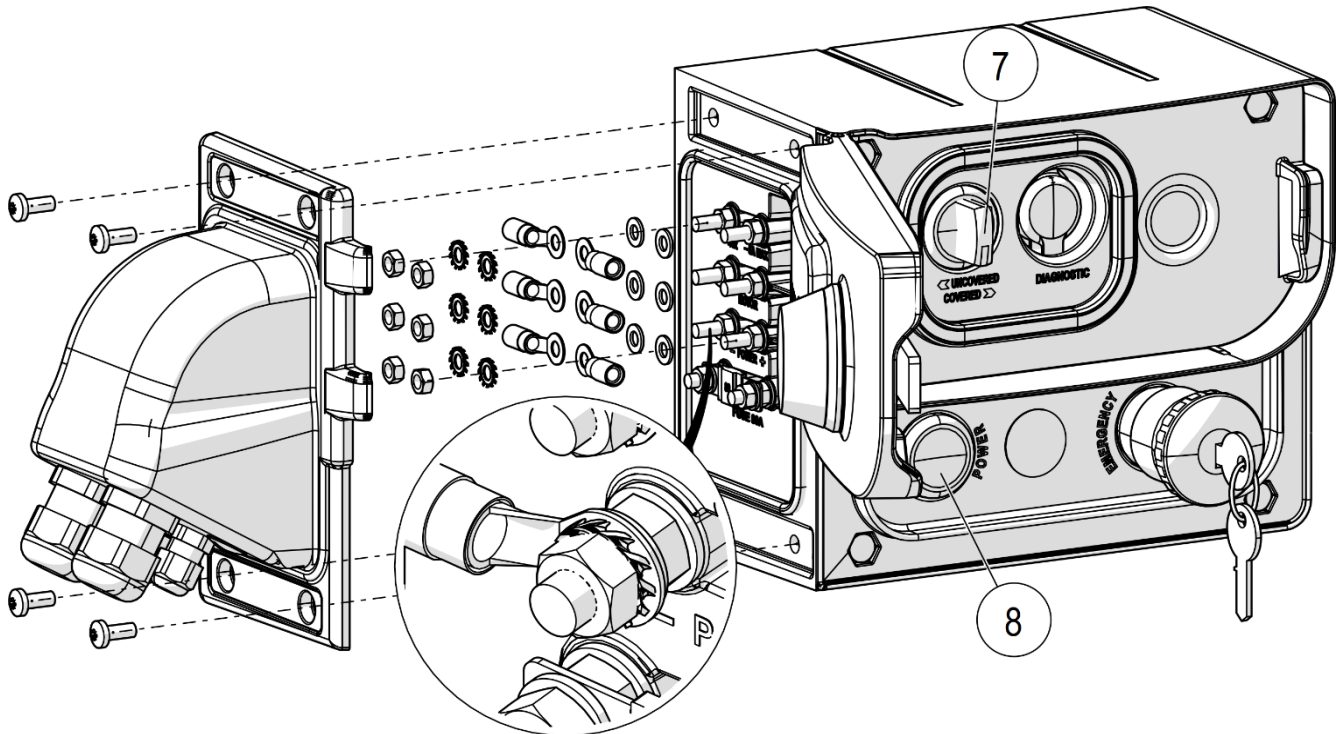
Once the main components are fastened, proceed with wiring the system.



### WARNING!

**The electrical system must be installed by qualified personnel!**

Disconnect the battery to remove voltage from the system before proceeding with the electrical connections.



Loc.	Description
1	<b>Power Supply – 24 V</b>
2	<b>Power Supply + 24 V</b>
3-4	<b>Connection to motor</b> Note: Verify the correct direction of rotation of the motor using the controls at loc. 7. If, when you turn the selector to "UNCOVERED", the tarp covers the body instead of uncovering it, reverse the polarity of the motor contacts.
5	<b>INPUT - Retraction board control</b>
6	<b>OUTPUT - Motorised vibrator control (MAX - 5 A)</b> <b>Warning: negative output!</b>
7	Latching control selector ( <b>UNCOVERED / COVERED</b> )
8	"TX MARCOLIN" radio remote control programming button

1. By use of the supplied cables connect the battery to the power supplying terminals (1-2) of the Control Box.

2. Connect a system safety fuse (70 A) (not supplied) to the positive pole of the power supply cable.
3. Then connect the Control Box output (3 - 4) to the stationary contact plate.
4. Connect the motor to the movable contact plate



**WARNING!**

**Pay special attention to ensure that the contacts of the motor are securely tightened.**  
Damages to the system may occur if the contacts were to come lose.

**Note:**

For a better understanding consult the wiring diagram shown in paragraph 6.1.



**WARNING!**

**When connecting do not reverse the polarity of the power supply!**

**Note:**

Make sure that cables are firmly fastened to the body in order that they would not form an obstacle or cause an entanglement risk.



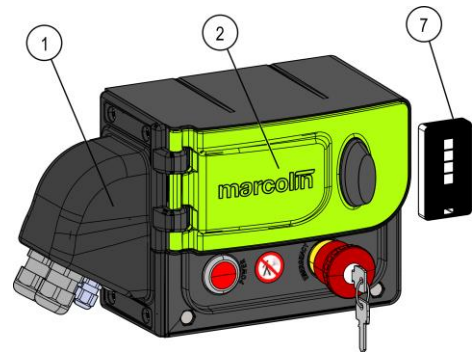
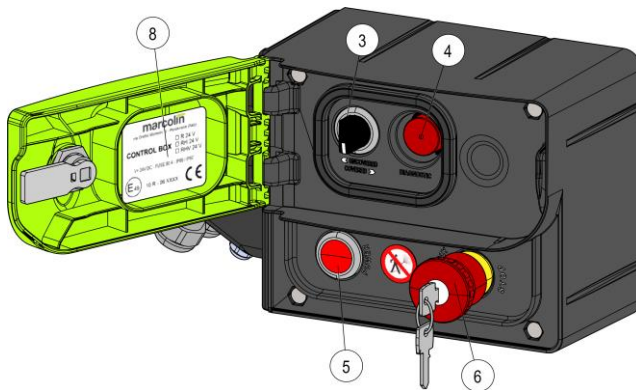
**IMPORTANT!**

The polarity of the connection to the motor determines the correspondence between the switching command and the related function. Verify the correct direction of rotation of the motor using the control selector. If, when you turn the selector to **"UNCOVERED"**, the tarp covers the body instead of uncovering it, reverse the polarity of contacts **3** and **4**.

### 3.9 Switch panel of the machine

#### 3.9.1 Description of the Control Box

The Control Box consists of:



1. Cover for the contacts of the 24V power supply and motor connection cables.
2. Controls door
3. Latching control selector (**UNCOVERED / COVERED**)
4. Diagnostics socket
5. LED-lit button (power and "TX MARCOLIN" radio remote control programming)
6. Emergency button with safety key reset
7. 4-channel "TX MARCOLIN" radio remote control
8. Identification plate



**WARNING!**

It is strictly forbidden to operate the Control Box when the vehicle is in motion.  
**The manufacturer disclaims all responsibility.**

### 3.9.2 Emergency pushbutton key, safety shutdown

The emergency pushbutton key is required for setting the machine in SAFETY SHUTDOWN to prevent that unauthorised persons could start the machine. The safety shutdown must be activated pressing the emergency mushroom pushbutton and locking it with its key if the running of the covering system is not foreseen (during day and overnight downtime, while executing maintenance or repair work, etc.).



#### CAUTION!

It is strictly forbidden to leave the machine running unattended.  
**The manufacturer denies any liability.**

### 3.9.3 Control switches of the Control Box for operators

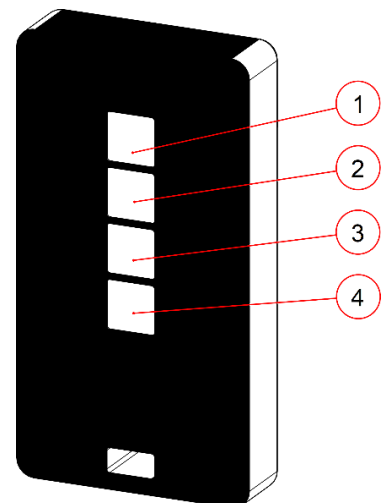
1. Control selector (**UNCOVERED / COVERED**)
2. Emergency mushroom head button with safety key reset
3. LED-lit button (power and "TX MARCOLIN" radio remote control programming)
4. "TX MARCOLIN" radio remote control

### 3.9.4 Description of the radio control system

The radio remote control "TX MARCOLIN" consists of a pocket remote control to be used also as a key fob.

#### Operation of the buttons:

1. **UNCOVERED**
2. **COVERED**
3. Auxiliary control. If you have installed a Control Box model RHV 24 V, this button may be used to activate the vibrator)
4. Free auxiliary control



#### ORDINANCE!



The remote control "TX MARCOLIN" **MUST BE KEPT AND USED EXCLUSIVELY** by the operator.

After each use, the remote control "TX MARCOLIN" must be stored in a not accessible place.

**Before using the pocket remote control "TX MARCOLIN", the operator must Check the absence of any unauthorised personnel close to the Control Box.**



#### WARNING!

It is absolutely forbidden to use the covering system with the remote control "TX MARCOLIN" when the vehicle is moving.

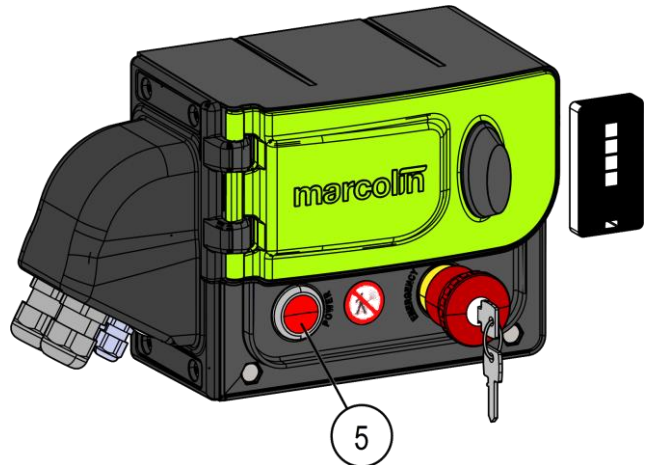
**The constructor declines any responsibility.**



### 3.9.5 Reprogramming the "TX MARCOLIN" radio remote control

Should it become necessary to reprogram a "TX MARCOLIN" radio remote control, please follow the procedure below.

1. Enter programming mode by pressing **7 times** the Control Box LED button (no. 5 in the figure). After having pressed the button 7 times, the Control Box will beep intermittently and the LED button will flash.
2. Now press any button of the "TX MARCOLIN" radio remote control: The Control Box will beep again and the LED button will turn off for one second, then it will turn back on and remain lit. The "TX MARCOLIN" radio remote control is now programmed.
3. Check the correct operation of the "TX MARCOLIN" radio remote control by testing the operation of the motor in the two directions by opening and closing the covering.



In case of errors or incorrect operation, contact Marcolin Covering Support Service or an authorized workshop.

### 3.9.6 Unfold the Ecotype tarpaulin for covering the tipper body

In the starting position of the system the tarpaulin is folded on the front part of the tipper body. To move it out operate as follows:

- Check that the upper edges of the tipper body are free from any obstacle.
- Remove all rubber straps (if provided for the version installed on your vehicle) from the front hooks so that the covering can be moved freely.
- Insert the key in the emergency pushbutton.
- Turn the key in **CLOCKWISE** direction to unlock the emergency pushbutton for giving the consent to restart the machine:

**i** By starting the Control Box gives out an acoustic signal.

**On remote control "TX MARCOLIN": PRESS THE PUSHBUTTON no. 2 (COVERED)**

**On Control Box: TURN THE SELECTOR TO THE RIGHT (COVERED)**

- Move out the tarpaulin completely and release the control button. The Control Box is equipped with an automatic motor shut-down when covering reaches the end stop.
- Close the covering on the rear side (in case of automatic rear closing system this operation takes place automatically).
- Hook the rubber straps into the lateral hooking points to fasten the tarpaulin for the transport way (if provided for the version installed on the vehicle).
- Press the emergency mushroom pushbutton and remove the key.
- Carry out a quick but attentive control, especially of the automatic hookings, to check that everything is in good order before moving the vehicle on the road.

### 3.9.7 Interruption of machine operations

To stop the movement of the covering, just release the control selector of the Control Box or release the button of the "TX MARCOLIN" radio remote control.

### 3.9.8 How do you stop the machine in case of emergency?

For setting the machine in **EMERGENCY STOP** press instinctively the mushroom pushbutton stated as no. 6 on the Control Box.



#### **CAUTION!**

It is strictly forbidden to leave the machine running unattended.  
**The manufacturer denies any liability.**

### 3.9.9 Restoring of standard operative conditions

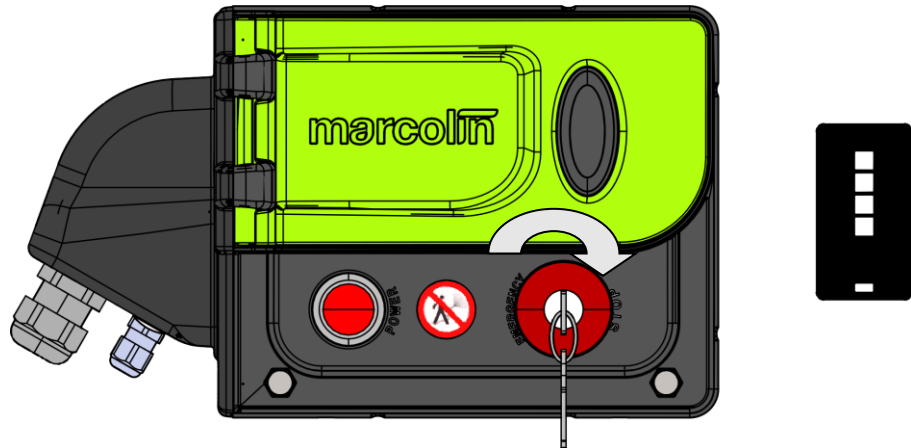


#### CAUTION!

Before restarting the machine correct the situation causing the event.

For restoring the machine after an emergency situation with pressing on the red mushroom pushbutton no. 6 proceed as follows:

- Insert the unlocking key in the emergency pushbutton of the Control Box
- Turn the key in clockwise direction and pull out the pushbutton.



### 3.9.10 Machine stop in safety conditions

- Release the control pushbutton on the Control Box or on the remote control "TX MARCOLIN".
- Set the machine in EMERGENCY STOP by pressing the mushroom pushbutton stated as no.6 on the Control Box.
- For setting the machine in SAFETY SHUTDOWN (if leaving the vehicle is required) remove the key from the emergency pushbutton (no. 6).

### 3.9.11 Retraction of the Ecotype tarpaulin for uncovering the tipper body

In the starting position of the system the tarpaulin is moved out on the tipper body. To fold it operate as follows:

- Remove all rubber straps (if provided for the version installed on your vehicle) from the lateral hooking points so that the covering can be moved freely.
- Insert the key in the emergency pushbutton.
- Turn the key in CLOCKWISE direction to unlock the emergency pushbutton for giving the consent to restart the machine:



*By starting the Control Box gives out an acoustic signal.*

**On remote control "TX MARCOLIN": PRESS THE PUSHBUTTON no. 1 (UNCOVERED)**

**On Control Box: TURN THE SELECTOR to the left (UNCOVERED)**

- Fold the tarpaulin completely and release the control button. The Control Box is equipped with an automatic motor shut-down when covering reaches the end stop.
- Carry out a quick but attentive control to Check that everything is in good order before starting the tilting movement of the tipper body.

### 3.9.12 How do you interrupt the machine operations?

Follow the process described in paragraph 3.9.7 .

### 3.9.13 How do you stop the machine in case of emergency?

Follow the process described in paragraph 3.9.8 .

### 3.9.14 Machine stop in safety conditions

Follow the process described in paragraph 3.9.10 .

### **3.9.15 In case of empty tipper body**

When the tipper body is totally empty two different behaviours of the operator are required:

- If the tipper should be loaded again on the same place where the unloading happened, the operator is allowed to let the rubber straps removed (if these are part of the equipment). Then, after loading, the operator moves out again the tarpaulin and fastens the rubber straps properly.
- If the vehicle should move on the road with empty tipper body, it is mandatory to fasten the rubber straps to their forward hooking points to prevent any risks of entanglement for persons or objects while moving on the road.
- Push the emergency pushbutton to set machine in SAFETY SHUTDOWN and remove the key.
- Carry out a quick but attentive control to Check that everything is in good order before moving the vehicle on the road.

### 3.10 What is to be done, when the electric operated handling system doesn't work?



#### WARNING!

It is forbidden to open the Control Box by removing the bottom cover.  
**Tampering will void the warranty.**

#### 3.10.1 Replacement of the internal fuse in emergency case

Prior to replace the internal fuse Check that the external one placed on the positive pole terminal of the battery hasn't blown. Otherwise that is the fuse which needs to be replaced.



#### IMPORTANT INFORMATION FOR USER SAFETY

The replacement of the internal fuse in emergency case should be executed by the operator only as an exception, advising to contact as a matter of priority, if the emergency situation allows it, the local installer for getting detailed information about the procedure to apply.



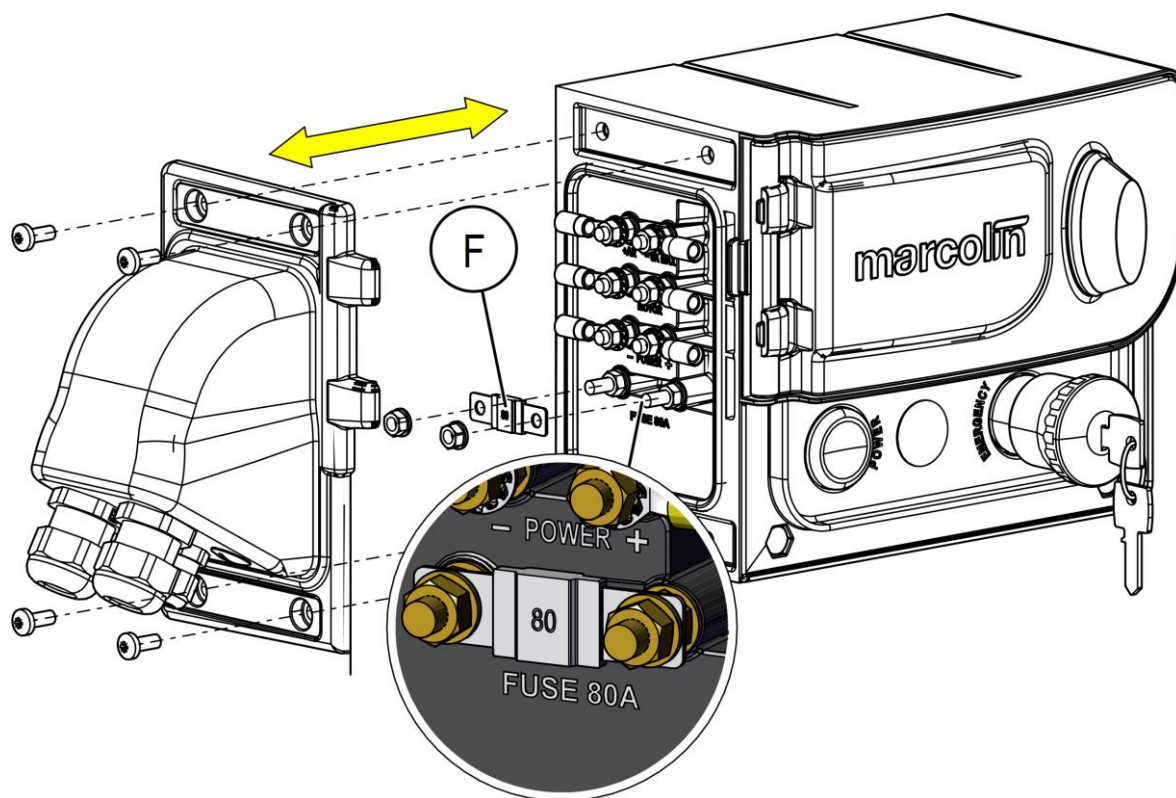
#### CAUTION!

Before opening the cover of the contacts of the Control Unit, disconnect the battery to isolate the unit..



#### WARNING!

This procedure must be absolutely performed by qualified personnel to avoid invalidation of warranty!



1. Using a suitable screwdriver, loosen the screws on the sides of the cable cover on the left side of the Control Box.
2. Remove the cover while taking care not to damage its gasket.
3. Replace the blown fuse (F).
4. Wait at least 8 hours before reclosing the cover, as the gasket needs a sufficient time to recover its shape. When closing the cover, be careful not to damage the gasket.

## Chapter 4 ACCESSORY EQUIPMENT INSTALLATION

### 4.1 Automatic rear closing system

**Note:** The automatic rear closing system can be provided only together with the double pulling bow.

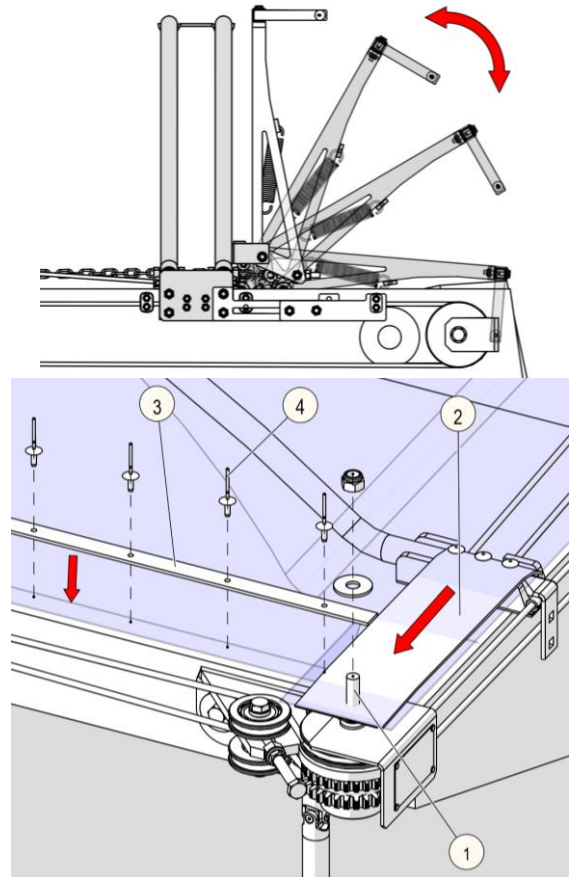
The covering system is available with an innovative rear closing system which avoids that the operator has to position by hand the end part of the tarpaulin when securing the tipper body.

This system requires a close attention during the fixing operation of the tarpaulin on the front side of the tipper body.

Here below the operations to perform:

- Move out (by hand or electrically depending on the installed covering version) and cover the tipper body stopping the pulling bow at a distance from the tailgate that corresponds to the length of the closing system when completely closed.
- Tighten now the front part of the tarpaulin.
- Fix the lateral PE flat strip (2) on the fixing screws of the front supports (1).
- Fix the tarpaulin on the top of the front tubular frame employing the specific clamping plate (3) and rivets(4).
- Cut the excess tarpaulin part off.

Now it is possible to set up the automatic rear closing system in order that while closing the tarpaulin manually or electrically, arriving at the end stop, the rear closure comes down automatically.



#### WARNING!

For carrying out certain maintenance work the access to the internal space of the tipper body is required. Make sure that the internal space is empty and clean to avoid any sliding and falling. Wear suitable protective clothing.

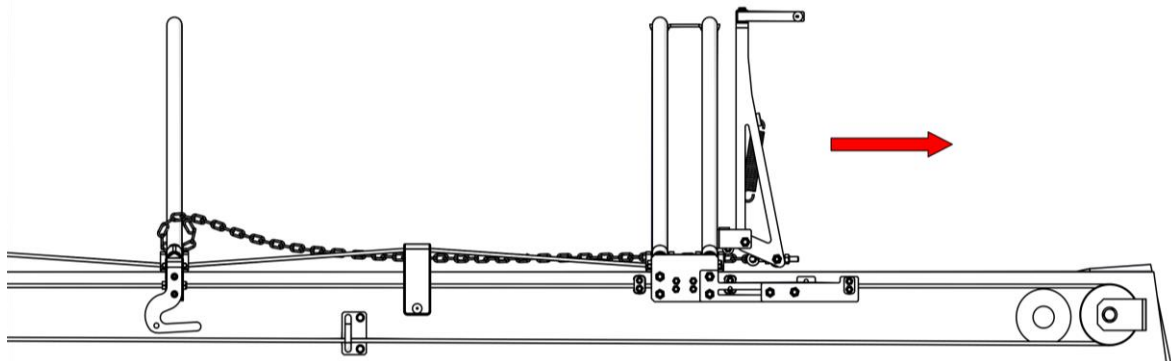


**ALL MAINTENANCE WORK MUST BE PERFORMED WITH STATIONARY VEHICLE AND DISCONNECTED EQUIPMENT'S**

**DO NOT WALK ON THE TARPAULIN!**

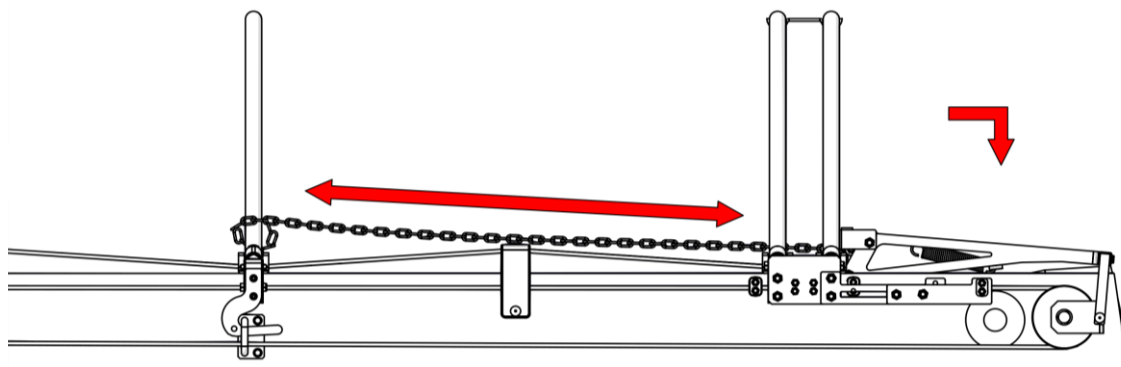
Marcolin Covering s.r.l. denies any responsibility.

- Unfold the tarpaulin (manually or electrically depending on the version) and cover the tipper body (fig. 1).



pic. 1

- Go into the internal space of the tipper body for setting up the chains (two n. 10 open-ended wrench are required);
- Push down manually the rear closing system and readjust the chain in order that it is perfectly tightened once the rear closure has come down (fig. 2).



pic. 2

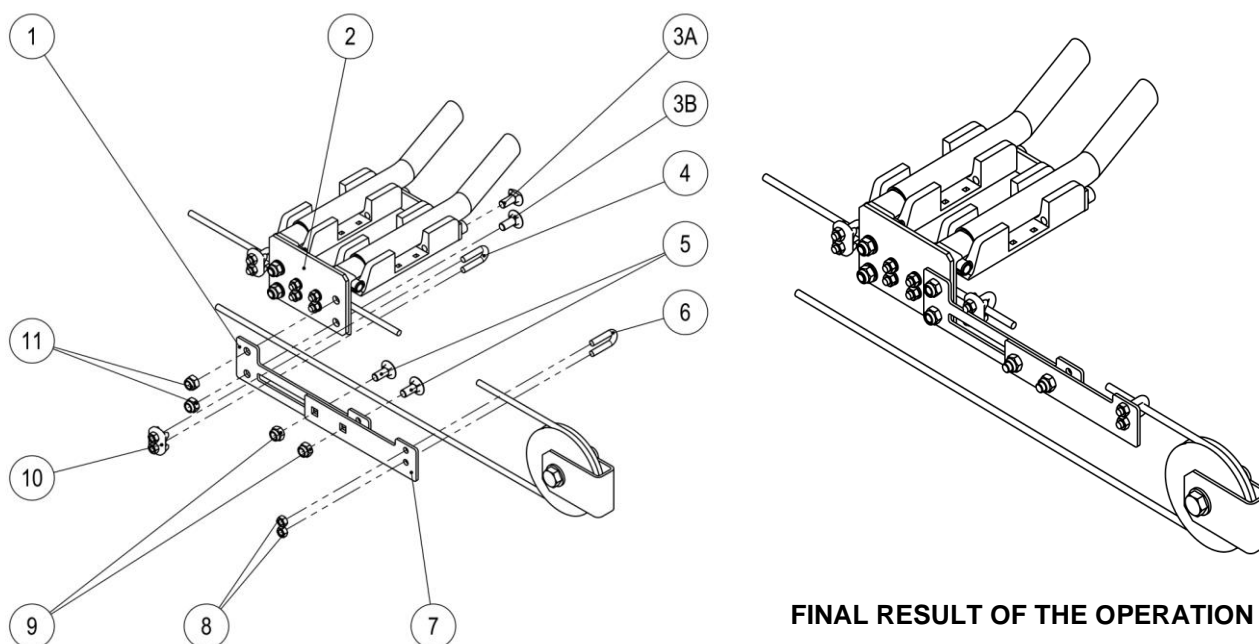
#### 4.1.1 Installation of reinforcing brackets for automatic rear closing in case of lowered cables

In case of installation of the "lower cable system", and **together**, of the automatic rear closing system, it is **absolutely mandatory** to assemble an additional reinforcing bracket kit on both sides of the covering.

This system has to be positioned between the rear idler pulley and the supports of the double pulling bow, and it is made up of:

- Reinforcing support plate and counterplate (with adjustable stroke) for the pulling double support;
- Clamp, screws and self-locking nuts for fastening the plates.

For installing, proceed as follows:



1. Remove the screws and the self-locking nuts from the external bow support of the double pulling bow (2).
2. Position and fasten the support plate (1) on the pulling bow support (2), with the supplied screws (3A and 3B) and self-locking nuts (11).
3. Put one supplied clamp (6) on the inner side of the support counterplate (7) and fasten it with the supplied self-locking nuts (8) to end of the cable which comes back from the rear side of the vehicle.
4. Adjust the desired stroke and fasten the counterplate (7) on the support plate (1) with the supplied screws (5) and self-locking nuts (9), or alternatively, use only the support plate (1).
5. Tighten properly the clamp (6).
6. For greater safety, it is mandatory to fasten one additional clamp (4) on the right of the pulling bow support, with the supplied nuts (10).



## 4.2 Automatic “Wheel-Hooking System”

With this lateral hooking system, the wheel-hooks automatically fit into the respective lower supports fastened on the side of the tipper body, with a “ROLLING” coupling.

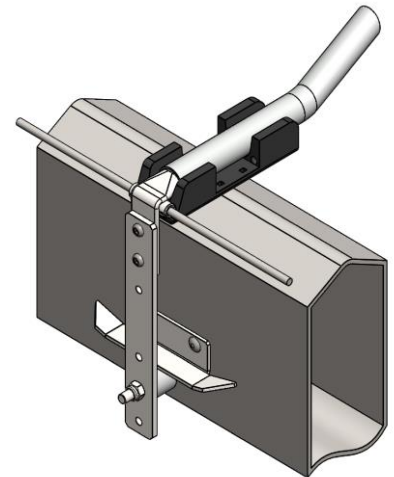
When the tipper body is covered the tarpaulin stops automatically and the vehicle is ready for moving on the road.

For installing it, proceed as follows:

- Move the covering and cover the tipper body entirely.
- Define the fastening points of the tarpaulin.

Generally, for fastening the covering, 2 or 3 wheel hooks, installed at the same height, are planned to be evenly distributed along the side of the tipper body.

The number of wheel hooks is in any case not binding as it can change according to the length of the tipper body or the customer's requirements.




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**Nota:** The positioning of the wheel hooks is essential for the proper working of the hooking system.

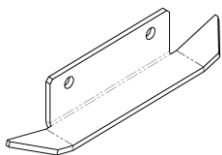
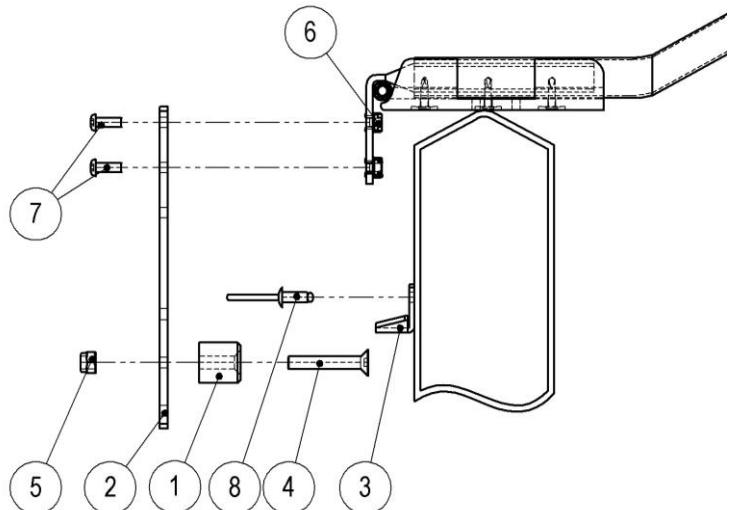
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- Fasten the wheel (1) on its support (2) with the supplied screw (4) and self-locking nut (5).
- Lean the wheel hook support (2) against the lateral side of the bow support.
- Fasten the wheel hook support (2) with the supplied screws (7) and nuts (6).

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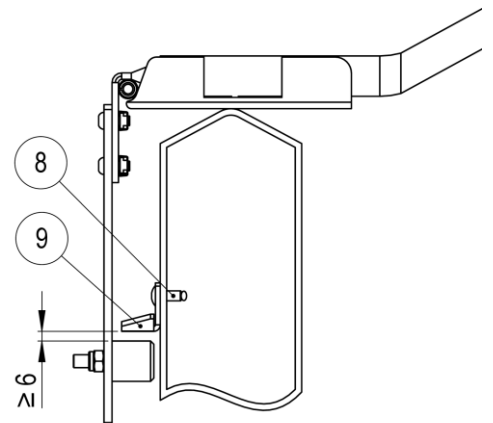
**Note:** Apply medium threadlocker Loxeal 54.03 for the supplied screws.

---



After having defined the wheel hook height, the lower support can be fastened on the tipper body as follows:

- place the support (3) 6 mm up from the wheel hook;
- drill the board wall of the tipper body and fasten the support with the supplied rivets (8).



Now the positioning of the remaining wheel hooks can be done.

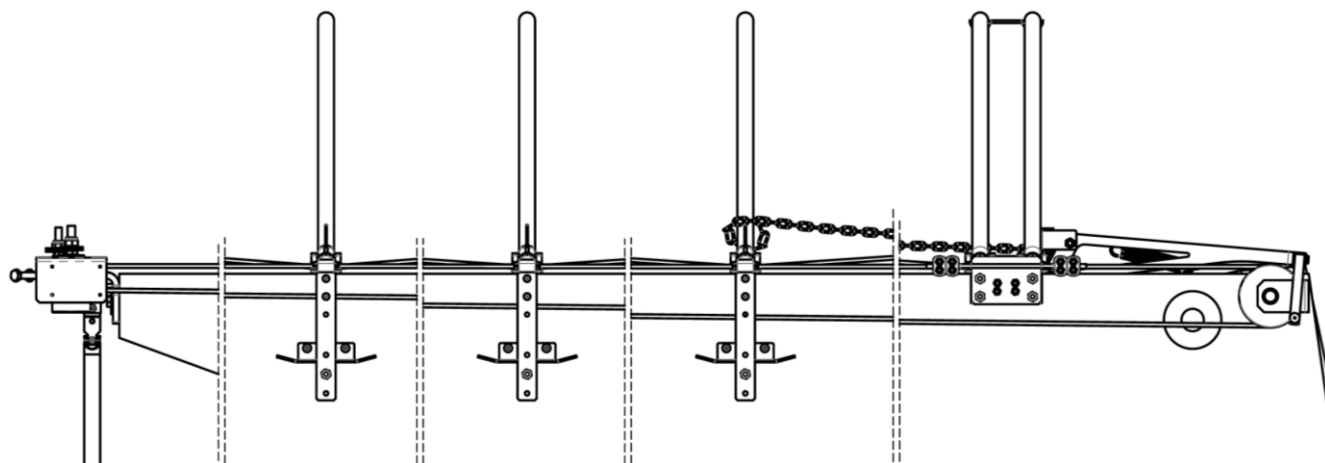


### WARNING!

From now on the evenly distribution of the wheel hooks and respective supports is the decisive factor for a proper working of the covering system.,



Proceed installing the remaining wheel hooks as shown in the below figure



---

**Note:** If obstacles interfere with the lower supports, shift the rolling hook upwards on the upper hole and repeat the above described fixing operations.

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- In the absence of any obstacles while moving the tarpaulin fix the lower support of the respective rolling hook.
  - Proceed fixing the subsequent wheel hooks.
- 



**WARNING!**

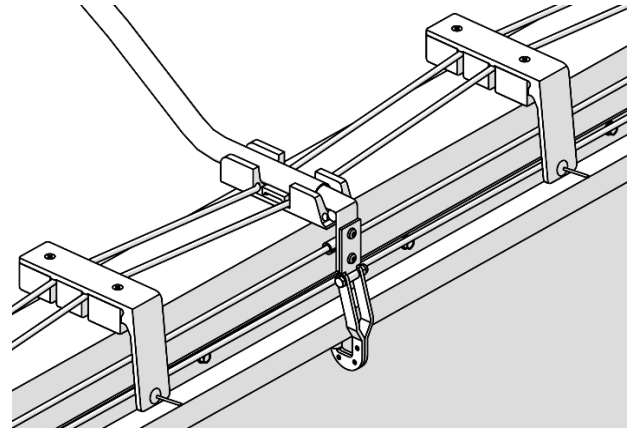
We recommend taking care of each rolling hook positioning in order to avoid operating troubles while handling the covering system.

### 4.3 Windsafe hooking system

With this type of lateral hooking system, the covering automatically fastens to the lateral Z-Section installed on the external side walls of the tipper body.

When the covering is completely unfolded, the tarp is locked automatically and the vehicle is ready to travel.

The number of hooks may vary based on the length of the body or the customer's requirements.



#### IMPORTANT!

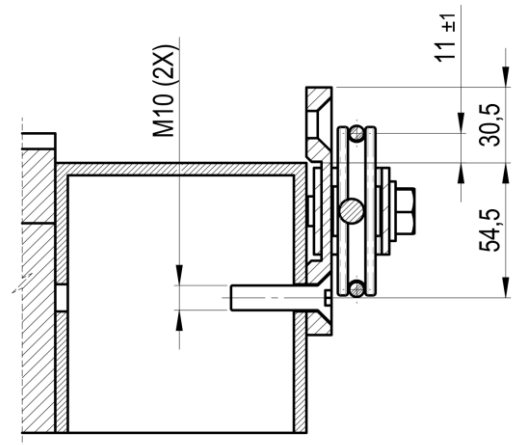
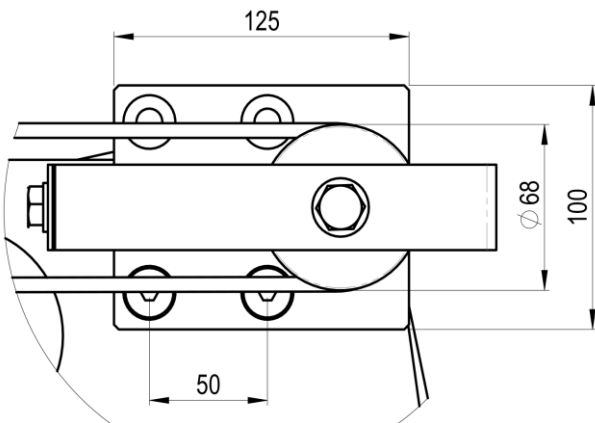
Coverings fitted with Windsafe Hooking system use a different rear tensioning plate with a 70 mm pulley compared with the standard system. As a consequence, the positioning of the rear tensioning plate has to be changed.

For installation, proceed as described below, depending on "standard" or "lowered" cable option used.

#### 4.3.1 Installing the rear tensioning plate with 70 mm pulley with "STANDARD CABLE SYSTEM"

The most appropriate location of the plate is as close as possible to the rear edge, but, at the same time, at such a distance as not to hinder the movement of hinges and similar.

1. For the correct operation of the covering, ensure that the axis of the lower plate fixing hole is located at a distance of 54.5 mm from the upper edge of the body.



2. Proceed with two M10 threaded holes on the side wall, in correspondence with the holes on the plate.
3. Secure the plate using the bevelled head screws M10x40 provided with the kit, ensuring that the tensioning screw is facing the front of the vehicle.



#### WARNING!

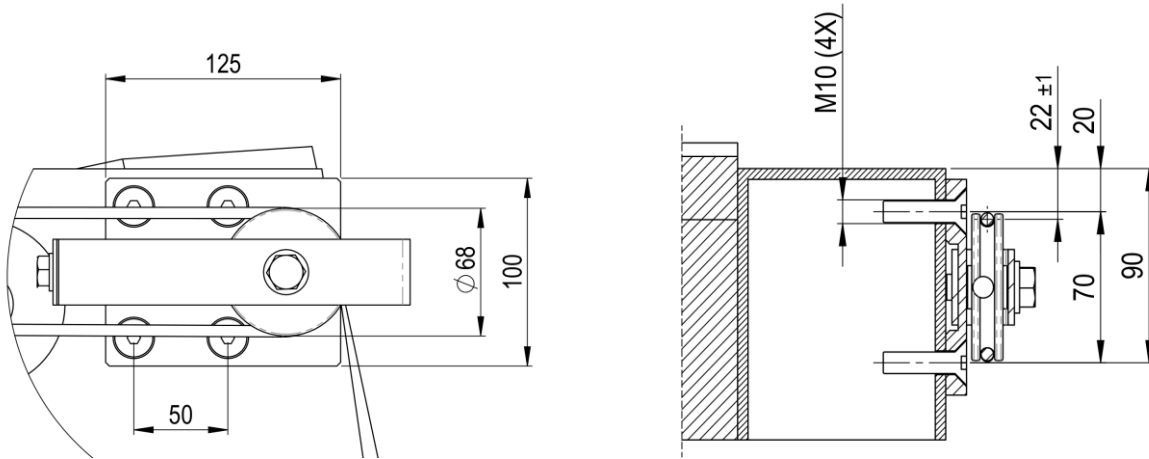
Incorrect placement could cause damage to the covering itself or to the body.  
If in doubt, it is advisable to try out the movement of the rear moving parts to avoid unpleasant surprises.

4. Mount the plate on the opposite side using the same procedure.

#### 4.3.2 Installing the rear tensioning plate with 70 mm pulley with "LOWERED CABLE SYSTEM"

The most appropriate location of the plate is as close as possible to the rear edge, but, at the same time, at such a distance as not to hinder the movement of hinges and similar.

1. For the correct operation of the covering, ensure that the axis of the lower plate fixing hole is located at a distance of 90 mm from the upper edge of the body.



2. Proceed with four M10 threaded holes on the side wall, in correspondence with the holes on the plate.
3. Secure the plate using the bevelled head screws M10x40 provided with the kit, ensuring that the tensioning screw is facing the front of the vehicle.



#### WARNING!

Incorrect placement could cause damage to the covering itself or to the body.  
If in doubt, it is advisable to try out the movement of the rear moving parts to avoid unpleasant surprises.

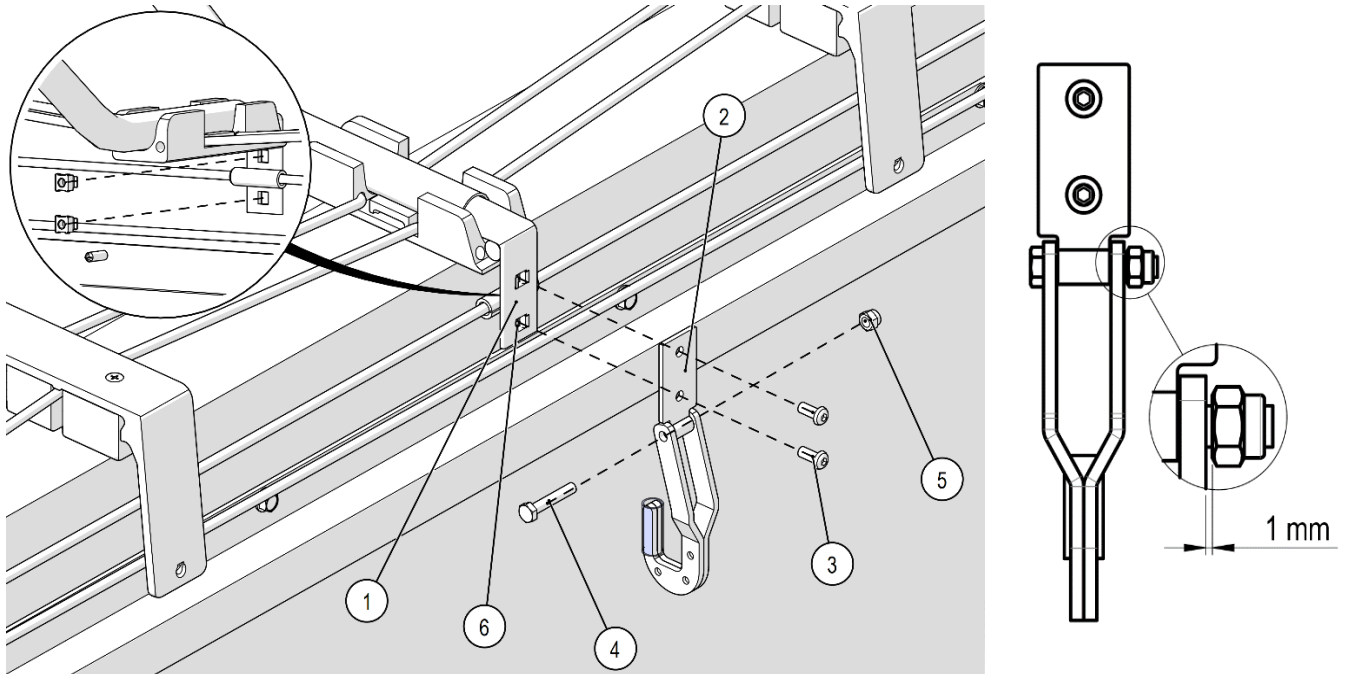
4. Mount the plate on the opposite side using the same procedure.

**Note:** During its lifetime, the structure will be subject to vibrations and stresses. It is therefore recommended to use a medium or high strength thread locking fluid.

### 4.3.3 Installing hooks and side guides

For installation, proceed as described below:

1. Unfold the covering to cover the body entirely.
2. Determine where to fix the hooks.



1. Place the hook support (2) on the side of the support foot bracket (1).
2. Secure the bracket to the support using the round head screws (3) provided.

**Note:** Use medium-strength Loxeal 54.03 thread locking fluid on the round head screws (3) provided.

3. Secure the hook to the support using the hex bolt (4) and the self-locking nut (5) provided.



#### IMPORTANT!

Leave a minimum clearance of **1 mm** between the nut and the side plate of the hook.

After determining the height of the hooks, you can install the Z-section guides on both sides of the body.

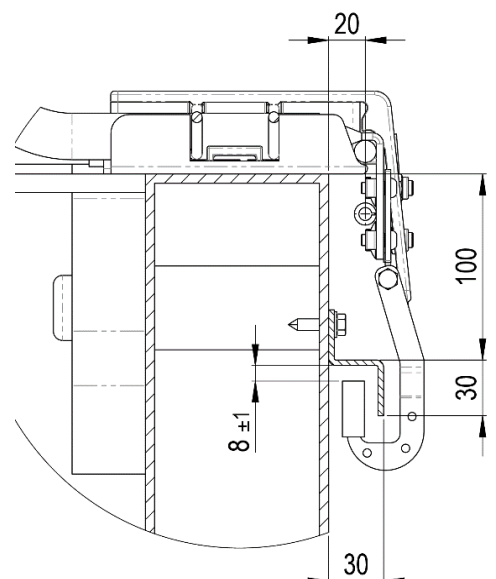


#### IMPORTANT!

The standard size of the Z-section guide is 30x30x3 mm. Different sizes could jeopardize the correct operation of the anchoring system and damage the covering tarpaulin.

4. Place the Z-section guide (7) at approx. 8 mm from the top of the hook tip, as show in figure. →

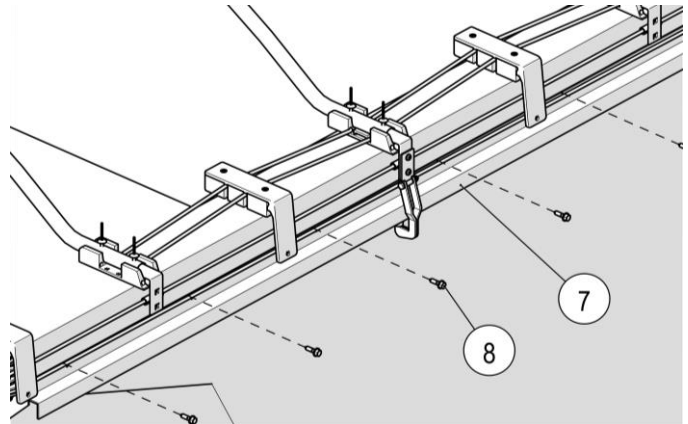
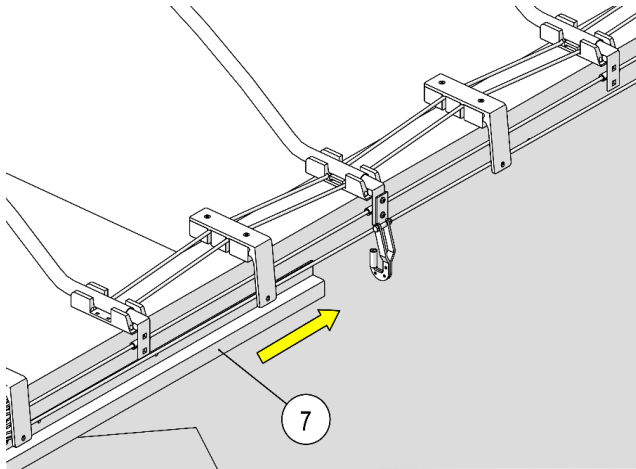
**Note:** The installation position of the Z-section guide is the same with both normal and lowered cables.





**IMPORTANT!**

Pay special attention to the location of the Z-section guide: **When the covering is fully retracted**, the first hook must be located **inside the guide**.



5. drill the side of the body and secure the Z-section guide using the self-tapping **(8)** screws provided.

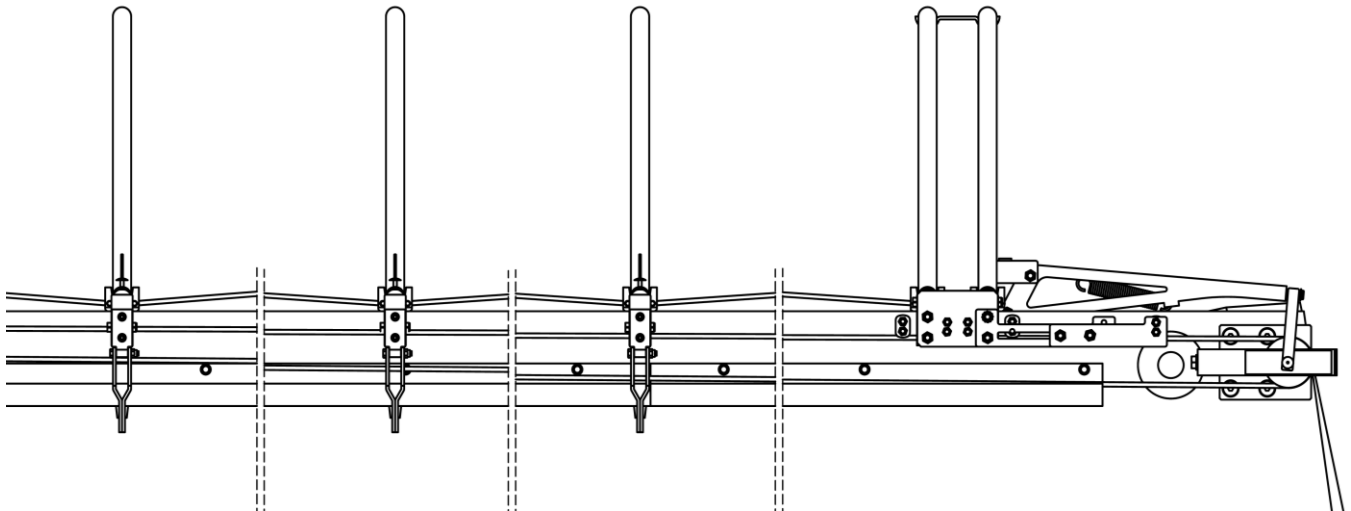
You can now proceed with positioning the other hooks.



**WARNING!**

To ensure the correct operation of the covering, it is important to position the windsafe hooks at regular intervals.

6. Proceed with installing the other hooks following the example shown in the figure.



**Note:** If you find problems with the smooth sliding of the covering, check the height of the Z-section guide.



**WARNING!**

Please pay special attention to the correct positioning of each individual windsafe hooks to prevent later problems with the operation of the system.

**Note:** The correct diameter of the rear pulley, the size of the side guide and the location of the hooks are of fundamental importance for the correct operation of the anchoring system. A non-standard size side guide or a rear pulley positioned incorrectly may prevent the correct operation of the system.

## Chapter 5 MAINTENANCE WORK OF THE ECOTYPE COVERING SYSTEM

The covering system is subject to stress and wear and tear as well as it is exposed to weather effects. For these reasons the system components can suffer wear and tear and their replacement can become necessary.

Hereinafter the description of the operations for the necessary replacements of the main components of the covering system.

### 5.1 Bow replacement

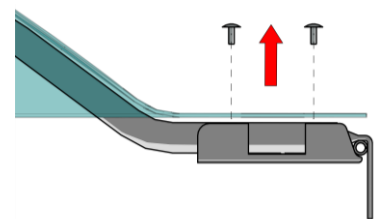
For replacing a bow proceed as follows:



#### WARNING!

In case of electrically operated covering system, before every maintenance work, take care to activate the safety shutdown with the key. As soon as the maintenance or repairing work has been performed remember to remove the key from the emergency mushroom pushbutton.

- Find out the bow that needs to be replaced;
- Remove the rivets positioned on the tarpaulin upper side which fix the same to the bow support;



#### WARNING!

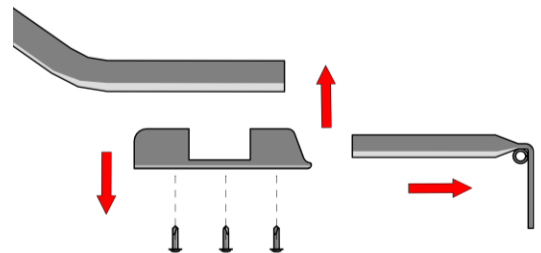


For carrying out certain maintenance work the access to the internal space of the tipper body is required. Make sure that the internal space is empty and clean to avoid any sliding and falling. Wear suitable protective clothing.

#### DO NOT WALK ON THE TARPAULIN!

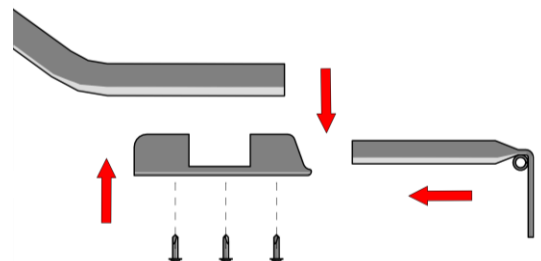
The manufacturer denies any liability.

- Inside the tipper body remove the cable ties which fasten the tarpaulin to the bow support.
- Undo the self-tapping screws which fix the bow to its support;
- Carry out the described operation on both sides;
- Pull out both supports and remove the bow.;



At this point the damaged bow has been removed and the new one can be assembled.

- Insert both supports in the respective end parts of the bow taking care that the passage axis of the cables is the same of the others;
- Fix the supports using the suitable self-tapping screws;
- Inside the tipper body fasten the tarpaulin to the bow by using common cable ties. Use fire-resistant cable ties with fire-resistant PVC or polyurethane tarpaulins.



#### CAUTION!

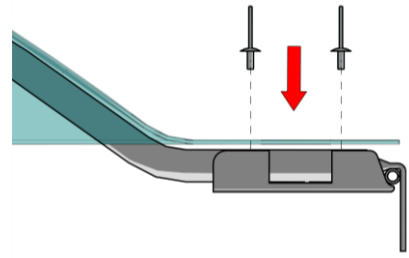


Using standard cable ties is not permitted with fire-resistant PVC or polyurethane tarpaulins.

Demand the proper cable ties for fire-resisting tarpaulins of the manufacturer.

The manufacturer denies any liability.

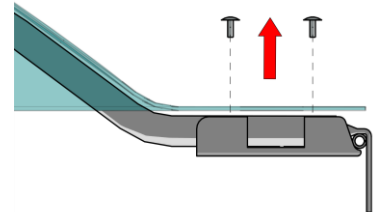
- Reposition the rivets for fixing the tarpaulin and the PE flat stripe to the support.
- After the replacement of the bow the tarpaulin is again ready for use.



**Note:** In case of electrically operated handling system remember to restore the emergency case standby by unlocking using the relative key.

## 5.2 Tarpaulin replacement

- Remove the rivets positioned on the tarpaulin outside which fix the same to the supports of the various bows;



### WARNING!

For carrying out certain maintenance work the access to the internal space of the tipper body is required. Make sure that the internal space is empty and clean to avoid any sliding and falling. Wear suitable protective clothing.

### DO NOT WALK ON THE TARPAULIN!

The manufacturer denies any liability.

- On the frontside of the tipper body remove the profile which fixes the tarpaulin.
- Inside the tipper body remove the cable ties which fasten the tarpaulin to the bows
- Remove the damaged tarpaulin.
- Proceed to position the new tarpaulin.
- Inside the tipper body fasten the tarpaulin to the various bows by using common cable ties for standard PVC tarpaulins.



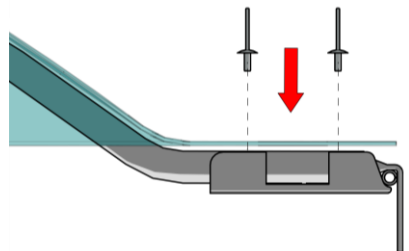
### CAUTION!

Using standard cable ties is not permitted with fire-resistant PVC or polyurethane tarpaulins.

. Demand the proper cable ties for fire-resisting tarpaulins of the manufacturer.

The manufacturer denies any liability.

- Reposition the rivets which hold the tarpaulin in place.
- Tighten up the front part of the tarpaulin.
- Fix the tarpaulin on the top of the tubular frame employing the specific clamping plate and rivets.
- Cut the excess tarpaulin part off.



## 5.3 Steel cable replacement

For replacing the steel cable refer to paragraph 3.4.



## 5.4 Extraordinary maintenance work - Operations to be carried out on the customer's covering system

### 5.4.1 General tightening up of the screw connections

After the first 20/30 operating hours and later on every three months the screw connections have to be checked for excluding any loosening on the machine and for providing the tightening up when needed.



#### **WARNING!**

**Firmly tighten all bolts and screws of the covering!**

### 5.4.2 Checking of the conservation status of metal structure and bows



#### **WARNING!**

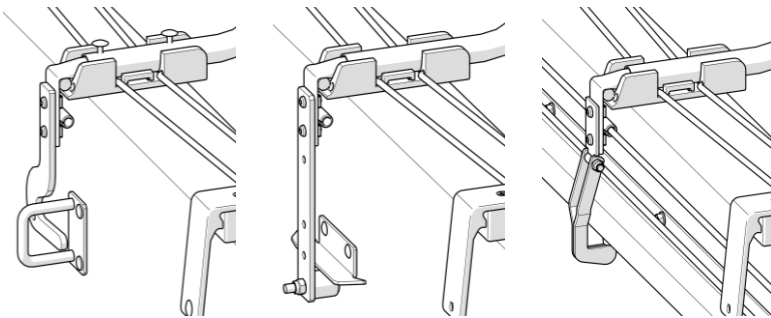
If damages are ascertained

**NOTIFY THE CUSTOMER THAT THE MACHINE REQUIRES PROBLEM-SOLVING INTERVENTION!**

### 5.4.3 Checking of the tarpaulin conservation status

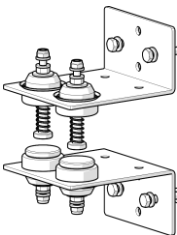
Check especially the wear and tear status of the most stressed parts like the front hooking and the lateral fixing of the bows.

#### 5.4.4 Checking of the elastic strings or the automatic safety hooks (only if installed)



Check the conservation status of the hooking components, if necessary provide for their replacement.

#### 5.4.5 Checking of the contact plates (only if installed)



Check the conservation status of the contact plates (if installed, only for motorised covering system), and if necessary provide for their cleaning.

Protect the contacts using synthetic moisture-repellent grease.

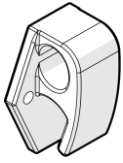
### 5.4.6 Checking of the sliding conditions of the tarpaulin

Check that the upper edges of the tipper body are free of damage and straight-line (absence of breaches on the locating surface) so that the covering doesn't hit upon any defects while sliding.

### 5.4.7 Thoroughly checking of the pulleys

Check that the various pulleys are free of damage so that the covering can slide properly and regularly without meeting any anomaly.

#### 5.4.8 Replacement of broken or damaged fastening hooks on the outer board wall (only when the components are present)



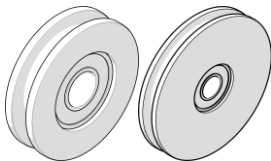
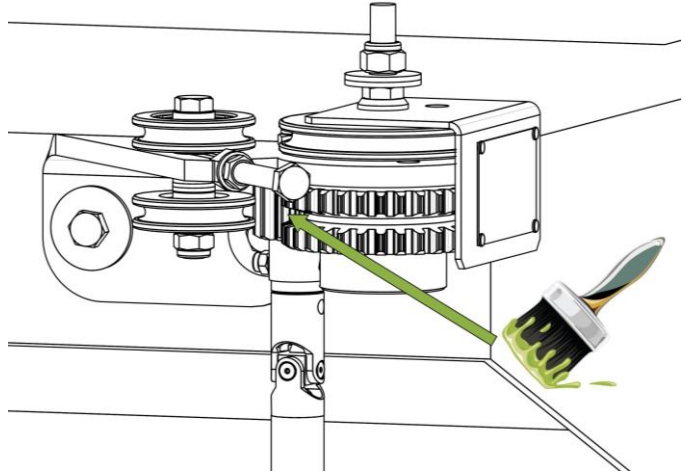
- Replace the hooks at the first sign of wear and tear.

#### 5.4.9 Lubricate and grease thoroughly the covering system

- 1) GREASE THE INTERNAL COUPLING BETWEEN PINION AND GEAR (hand-operated version)



- ❶ Make use of lithium-based grease.



#### IMPORTANT!

CLEAN AND LUBRICATE THE VARIOUS PULLEYS LOCATED ON THE MACHINE, CABLES, GROOVES AND SLOTS OF THE PULLEYS, BY APPLYING SVITOL® or WD-40 LUBRICATING OIL OR A SIMILAR PRODUCT.

#### 5.4.10 Filling in the machine control register

The manual handed over to the customer includes a chapter referred to as “**Control register**”.

The Control register **MUST ALWAYS BE fulfilled**, completed with a report and duly signed by the firm that carried out the extraordinary maintenance work on the machine.



#### WARNING!

In the event of a legal dispute the lack of the necessary entries in the Control register of the customer's machine could also implicate for you an involvement in civil and criminal objective liability.

## 5.5 Troubleshooting table for electrically operated covering system

The following table lists some possible break downs or operating troubles.

Type of fault	Possible cause	Possible solution
The motor is not running after pressing a button of the "TX MARCOLIN" radio remote control or turning the control selector of the Control Box	Emergency engaged.	Check that the emergency button is reset.
	Incorrect electrical connections.	Check the electrical connections (positive - negative of the battery).
	The safety fuse has blown.	Check the fuses. One is located in line with the power supply, the other is inside the Control Box.
	The contacts of the motor have become disconnected.	Check that the contacts of the motor are firmly connected.
When you press a button on the "TX MARCOLIN" radio remote control, the red indicator light does not come on.	The battery of the "TX MARCOLIN" radio remote control is flat.	Replace the battery of the "TX MARCOLIN" radio remote control.  If the case, reprogram the "TX MARCOLIN" radio remote control following the instructions described at para. 3.9.5
The Control Box operates only with the control selector and not with the "TX MARCOLIN" radio remote control.	The "TX MARCOLIN" radio remote control has lost the correct programming.	Reprogram the "TX MARCOLIN" radio remote control following the instructions described at para. 3.9.5  If, after reprogramming, the radio remote control continues not to work, check the Control Box for faults.
The Control Box appears to be working (you can hear its relay acting) but the motor is not running.	<p>The electrical contacts may be oxidised.</p> <p><b>WARNING!</b></p> <p>Isolate the power supply before cleaning.</p>	<p><b>WARNING!</b></p> <p>Isolate the power supply before cleaning (press the emergency button or disconnect the plug from the tractor).</p> <p>Check that the electrical contacts of the contact plate (between body and frame) are not dirty or oxidised.</p> <p>Check that the electrical contacts of motor and Control Box are not dirty or oxidised.</p> <p>If necessary, clean with a dry cloth and protect with synthetic moisture-repellent grease.</p> <p>Stubborn oxidation may be removed using very fine sandpaper (400 or finer)</p>
	Burnt motor	Replace the motor. To do so, contact Marcolin Technical Support or an authorised service centre.
	A cable terminal or an eyelet of an electrical wire might have broken, or the electrical cables might be broken or damaged.	<p>Check the cable terminals on the cables of the motor and the contact plate are not damaged or broken.</p> <p>Check that the wiring is free from faults.</p> <p>Restore the correct operation of the circuit by replacing any damaged parts at a service centre or an at electrical vehicle repair shop.</p>

Type of fault	Possible cause	Possible solution
When you turn the control selector to “ <b>UNCOVERED</b> ”, the covering covers the body instead of uncovering it.	The polarity of the motor is reversed	Reverse the two wires connecting the contacts <b>3</b> and <b>4</b> of the Control Box.  <b>WARNING!</b>  Isolate the Control Box beforehand.

## Chapter 6 ENCLOSURES

### 6.1 Reference diagram for electrical connections

