COVERING SYSTEM FOR TIPPER TRUCKS

Installation Manual

- Translation of the original instructions in Italian language -
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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 and patented the Eletta® 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 Eletta® Covering System through the planned periodic maintenance.

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

1.2 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 the user. For this reason, it is relevant that the selling operation is carried out with mutual 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. 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 responsibility 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.

1.2.1 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 its 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 working 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 RESPONSIBILITY BY ACCEPTANCE OF THE MACHINE” to find under chapter 1.8.9 of the user 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 ELETTA® COVERING SYSTEM

2.1 Covering system components

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 making up the system.

1 - Front covering driving system (hand or motor operated).
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 by law in force.

Whoever modifies the machine assumes the obligation to issue:

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

![Diagram](image)

The replacement of whatever is usually called spare part is not regarded 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.

![Diagram](image)

- 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.
3.1 Fitting the rear tensioning plate

3.1.1 Informations

The following description of the rear tensioning plate installation concerns the standard covering systems; in case of:

- covering systems with cable’s quick-release system for three-sided tipper

please follow the described installation process for the specific case (paragraph 4.1.1).

3.1.2 Fitting of the rear tension plate

The installation of the rear tensioning plate 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 tension plate 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.

- Drill four M10 threaded holes on the side corresponding to the holes on the plate, at the distances shown in the figure above.
- Fasten the plate using the M10x35 countersunk screws supplied, making sure that the tensioning screw is directed towards the front of the vehicle.
- If proper threading is made difficult because of the thickness of the metal or the type of material (e.g., aluminium body), drill Ø 10.5 through holes and fasten the countersunk screws using UNI 7473 galvanized M10 self-locking nuts.

**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 plate fastening operation on the opposite board wall.

**Note:** The proper fitting of the rear plates is of primary importance since it is binding for the positioning of all the subsequent element.
3.2 Driving system installation - electric version

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

3.2.1 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 every kind of tipper body.

The entire system is intended for fastening with screws (supplied). It is not necessary to weld any part to the tipper body, allowing this way an easy maintenance in case of accidental breakage.

In this manual, reference will be made to standard assembly of the covering system.

3.2.2 Processing and preparation of the cab guard

- Drill the holes (Ø 9) of the fixing seats according to the dimensions shown in the following drawings:

  - Right view
  - Superior view
  - Superior view
  - Superior view

- Drill the holes (Ø 9) of the seats for the front attachment of the coverage extendable and reductor carters, according to the measurements shown in the following drawing:

  Frontal view

At this point the cab guard is ready for housing the various components as indicated below.
3.2.3 Installation of the lateral driving units - electric version

The first elements (1 per side) to be installed on the front cab guard are the side transmission groups right and left, to be placed on the front of the tipper.

- Position the unit as in figure, by joining the support plate to the side of the cab guard of the vehicle and adjacent to the front part.

- The unit is fastened laterally with 2 countersunk screws (A) and nuts. However, if there are impediments on the side to the correct fastening, it can be made also with the seats positioned on the upper rear part (holes for hexagonal-head screws B) or upper front (hole C).

- Proceed fastening the element to the cab guard using the screws, washers and self-locking nuts supplied, or alternatively (if the thickness allows it) threaded M8 and tighten the screws, making sure to insert suitable thread locker.

**Note:** In this case we recommend to use oil tolerant Loctite 243 medium strength, or alternatively Loctite 262 medium strength.

At this point the first lateral transmission assembly is fastened and it is possible to proceed with the fastening of the second.

- Proceed fastening in the same way as the previous group, paying attention to the alignment of the two groups.
3.2.4 Motor unit installation

For the electric version of the covering system, it is necessary to install the motor unit, which includes the gear motor and the transmission shaft, preassembled in the same unit.

1. CC motor.
2. Gear unit with pin for emergency operation.
3. Central support plate.
4. Drive shaft.

- Place the motor unit on top of the cab protection.
- WARNING! make sure there is a 3 mm space from the edge of the cab guard.
- Fasten the unit with the screws, washers and nuts supplied, using an appropriate threadlocker (see par. 3.2.3)
3.2.5 Telescoping shafts installation

In order to adapt to all types of tipping trailers, semi-trailers or roll-off bodies, the Eletta® cover is equipped with two telescoping drive shafts that greatly reduce installation time.

Each shaft can be extended by 300 mm. This makes it possible to cover bodies having a width of 2100 to 2700 mm, without any further intervention by the installer.

- Mount the first shaft coupling the joint of its fixed end to the output shaft of the reducer.
- Lock the coupling with the hex screws and the self-locking nut supplied.
- Extend the shaft.
- Attach the other end to the lateral drive unit using the pin supplied.
- Mount the other telescoping shaft following the same procedure.

Final result of the operation
3.3 Driving system installation - hand-operated version

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

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 every kind of tipper body.

The entire system is intended for fastening with screws (supplied). It is not necessary to weld any part to the tipper body, allowing this way an easy maintenance in case of accidental breakage.

Note: Normally, to facilitate the manual handling, the installation of the cover provides that the control element is installed on the left side (with respect to the direction of travel of the vehicle) of the cab guard: it is, in fact, more accessible for the driver leaving the vehicle.

In this manual, reference will be made to standard assembly of the covering system (on the left side referring to the direction of travel).

For the installation on the opposite side it will be sufficient to perform the operations mirrored on the opposite side, being careful to place the correct command group.

3.3.2 Processing and preparation of the cab guard

- Drill the holes (Ø 9) of the fixing seats according to the dimensions shown in the following drawings:

  ![Right view](image)
  ![Superior view – right side](image)
  ![Superior view – left side](image)

- Drill the holes (Ø 9) of the seats for the front attachment of the coverage extendable and reductor carters, according to the measurements shown in the following drawing:

  ![Frontal view](image)

At this point the cab guard is ready for housing the various components as indicated below.
3.3.3 Installation of the side transmission groups for hand-operated control

The first elements to be installed on the front cab guard is the side transmission groups right or left, to be placed on the front of the tipper, carefully examining the position on the right or left side of the cab guard (the drive units are not interchangeable).

- Position the unit as in figure, by joining the support plate to the side of the cab guard of the vehicle and adjacent to the front part.

- The unit is fastened laterally with 2 countersunk screws (A) and nuts. However, if there are impediments on the side to the correct fastening, it can be made also with the seats positioned on the upper rear part (holes for hexagonal-head screws B) or upper front (hole C).

- Proceed fastening the element to the cab guard using the screws, washers and self-locking nuts supplied, or alternatively (if the thickness allows it) threaded M8 and tighten the screws, making sure to insert suitable thread locker

| Note: | In this case we recommend to use oil tolerant Loctite 243 medium strength, or alternatively Loctite 262 medium strength. |
At this point the lateral manual transmission unit is fastened and it is possible to proceed with the fastening of the corresponding side transmission group, on the opposite side of the cab guard.

- Proceed fastening in the same way as the previous group, paying attention to the alignment of the two groups.

The unit is fastened laterally with 2 countersunk screws (A) and nut (D) and on the upper rear part, with hexagonal-head screws (B) and nuts (C).

### 3.3.4 Telescoping shafts installation

In order to adapt to all types of tipping trailers, semi-trailers or roll-off bodies, the Eletta® cover is equipped with two telescoping drive shafts that greatly reduce installation time.

Each shaft can be extended by 260 mm. This makes it possible to cover bodies having a width of 2290 to 2550 mm, without any further intervention by the installer.

- Attach the first shaft (left) on the side transmission group with the cylindrical plug.
- Place the second shaft (right) resting on the framework of the first, setting it within the desired length (Max 260 mm).

- Attach the other side of the second shaft on the side transmission unit with the cylindrical plug.

- Drill holes (Ø 6) for the seats of the shafts and secure with the two dowel pins supplied.

Final result of the operation
3.4 Installation of steel cables

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.

Before proceeding with the steel cable installation, it is necessary to verify the alignment between the upper driving pulley of the gear housing and the socket through which the steel cable runs.

**PAY ATTENTION!**

This activity is one of the most important for the proper working 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.

Loosen the rear tensioning plates:

- Loose the centrally arranged screw that fixes in place the guide pulley (1).
- Undo the screw adjusting the running of the guide pulley slide (2).
- Shift the pulley towards the front part.

3.4.1 Positioning of the covering tarpaulin

The covering is supplied completely assembled with bows, feet and sliding pads.

- Remove the covering from its packing and put it on the front of the body (cab protection), properly arranging the cover’s front and back ends.
- Pull out the iron rod from the feet bushings on the driver’s side (where the first of the two wire ropes will be placed).

3.4.2 Running of the left steel cable

The explanation begins with instructions for positioning the steel cable placed on the left side (in relation to the driving direction) in correspondence to the driver side.

**Note:** The position of the cable is the same, both for the hand operated and motorised versions. If the covering is provided with the automatic steel cable release, follow the procedure described in paragraph 4.2

Scrupulously follow the instructions below for positioning the steel cable.
• Introduce the end of the rope at the front of the drive pulley on the lateral drive unit;

The bows that support the cover are provided with steel feet with low-set bushings to allow the passage of the rope (see figure below). A plastic sliding pad is fixed to the bottom to allow the cover to run along the edge of the body.

• Pass the rope through the bushings on all the feet and leave 10-15 cm length of rope out of the last one.

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

Now proceed with the lower end of the steel cable:

• Lead the lower end of the wire rope to the back of the body;
• Wind the rope around the rear transmission pulley (1);

• Lead the end of the wire rope back to the drawing (2).

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

Now that the steel cable has been properly positioned on its path the cable fixing 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.

1. Insert a clamp (3) 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 clamp (3).
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 inner side of the support plate (4).
4. Fasten both ends with a clamp (5) inserted in the inner side of the plate (4). Before tightening the clamp (5), pull the cable manually for tensioning it.
5. Loose the first fastened clamp (3) and refasten it holding both cables.
6. For greater safety, it is mandatory to fasten one additional clamp on the left (2) and right (6) of the previously fastened ones.

**WARNING!**
IT IS FORBIDDEN TO use different materials than those supplied with the system.
The cables must be secured with 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 fastening process from the described one can compromise the tarpaulin stability on the tipper body, causing its detachment with danger and damages to people and objects.

- After having fastened the steel cable, cut the excess length off, but leave about 100-150 mm usable for any necessary adjustments.

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

3.4.4 Running the right steel cable

Follow the same procedure described in par. 0 on the opposite side.
3.4.5 Steel cables tightening up

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

As a matter of fact, the rear guide pulleys have been developed and manufactured with the aim to allow the operator steel cable tension adjustments.

Operating alternately on the two guide pulleys proceed as follows:

- Use a 7 Nm torque wrench to tighten the screw placed on the front side (2) of the guide pulley.

As a consequence, the guide pulley and the slide move backwards tightening up the steel cable.

WARNING!

The left and right-hand ropes must be given the same amount of tensioning. The drive pulley is designed with a V-shaped groove to prevent slipping and therefore does not require excessive tensioning.

- When the required tension is achieved block the guide pulley tightening the central screw (1);
- Repeat the operation on the opposite guide pulley.

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.
3.5 Installation of the protective casings - electric version

After installing both the cover deployment ropes, mount the protective casings.

The supply includes 2 casings for protecting the gears and 3 casings for protecting the drive shafts and reducer assembly.

- Mount the gear protection casing either on the right side or on the left (the casings have the same shape and size) and fasten it to the lateral drive unit with the screws supplied, placing one at the bottom of the casing and two on the sides.

- Place the left protection casing on the support of the drive pulley of the left side transmission group (If too long on the redactor side, cut to size).

- Place the left protection casing on the support of the drive pulley of the right side transmission group (If too long on the redactor side, cut to size).

- Place the protection central casing of the reduction gearbox on top of the two casings already placed.
- Drill 2 holes (Ø7) at the seat for VE screw as shown in figure;
- drill 2 holes (Ø9) at the slotted holes of shafts casings;
- fasten the central casing to the shafts casing using the screws and locknuts supplied.

\((1 & 2) \rightarrow\)

- Fasten then all casings on the front of the cab guard, using the screws, washers and nuts supplied.
3.6 Installation of the protective casings - hand-operated version

After having fastened both ropes for handling, proceed to the insertion and fastening of the casings.

The equipment includes n° 2 casing for the protection of the gears and n° 3 casings for the coverage of the transmission shafts.

- Insert the first gear protective casing on the right or left side of the cab guard (depending on the placement of the manual transmission), and screw it to the lateral drive unit with the supplied screws: one at the bottom of the casing and the other laterally.

- Insert the second gear protective casing on the opposite side to the previous one, and screw the lateral drive unit with the appropriate screws supplied: one in the bottom of the casing and the other laterally.

- Place the left protective casing shaft on the pulley support of the left lateral manual transmission group.

- Place the right protective casing shaft on the pulley support of the right lateral manual transmission group.
• Place the central protection casing on top of the two casings already placed.

• Fasten the central protection casing on the two casings of the drive shafts (if too long, cut them to size and drill again Ø8), with the appropriate countersunk screws, washers and nuts supplied.

• Fasten then all casings on the front of the cab guard, using the screws, washers and nuts supplied.

*Final result of the operation:*
3.7 Fastening of the operating rod (hand-operated covering system)

While installing the hand-operated covering system, after having mounted the handling 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) of the manual transmission group, with the supplied screws (3) and self-locking nuts (4) provided.

Fasten the holder for the rod:

- Find a suitable location for the rod in order that it does not become an obstacle;
- Drill the tipper body to fit the holder’s holes;
- Fasten the holder (7) with proper supplied rivets (9).
- Fasten the safety chain (11) of the forelock (8) with proper supplied rivet (10).
3.8 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 fastening the tarpaulin in case of automatic rear closing. 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 band (3) on the lateral superior casing;
- tighten up the front part of the tarpaulin;
- fasten the tarpaulin on the top of the carter, using the specific clamping plate (2) and rivets (1);
- cut off the excess part of the tarpaulin.
3.9 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.

3.9.1 Standard closure with automatic “L” hooking system

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.

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

- 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 the supplied self-locking nut (3).

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

**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 figure below:

Note: Before fastening the respective hooking, verify 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.

• 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.

3.9.2 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 fixing 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.
3.10 Electrical wiring for Eletta® Covering System

The application of the motorized 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:

- Motor Control Unit (X) ⇒ see paragraph 3.10.1
- Radio remote control
- Set of electrical contacts
- Electrical wiring

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.

<table>
<thead>
<tr>
<th>Length</th>
<th>Cable End 1</th>
<th>Reference Colour</th>
<th>Cable End 2</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.50 m</td>
<td>Open ended for cutting to length to connect to battery</td>
<td>A</td>
<td>80 A female plug</td>
<td>Connection from the tractor battery to the tipper trailer connection zone</td>
</tr>
<tr>
<td>2.50 m</td>
<td>80 A male plug</td>
<td>B</td>
<td>Open ended for cutting to length to connect to Motor Control Unit (Red – Black)</td>
<td>Connection from the tipper trailer connection zone to the Motor Control Unit power supply</td>
</tr>
<tr>
<td>2.50 m</td>
<td>Connection to Motor Control Unit terminals (Yellow – Yellow)</td>
<td>C</td>
<td>Open ended for cutting to length to connect to contact plate</td>
<td>Connection from Motor Control Unit (motor output) to contact plate</td>
</tr>
<tr>
<td>4.50 m</td>
<td>Connection to contact plate terminals</td>
<td>D</td>
<td>Open ended for cutting to length, for connection to the motor</td>
<td>Connection from contact plate to motor</td>
</tr>
</tbody>
</table>

**WARNING!**

Prior to establish the electrical connections, “disconnect the battery”.

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

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

3.10.1 Motor Control Unit models description

The following table summarizes the various types of the Motor Control Unit (X), with (X) = 1, or 2, or 3, depending on model.

<table>
<thead>
<tr>
<th>FAMILY PRODUCT</th>
<th>DESCRIPTION</th>
<th>DIFFERENCES FROM STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STANDARD model, in this version the mode of functioning provides two pushbuttons for withdrawing (“uncovered” switch) and deploying (“covered” switch) the tarpaulin.</td>
<td></td>
</tr>
<tr>
<td>MOTOR CONTROL UNIT 1</td>
<td>An emergency stop pushbutton with safety (none) lock is also installed. A timing circuit for tarp moving backwards is also installed, provided for tail lift tipper bodies.</td>
<td></td>
</tr>
<tr>
<td>FAMILY PRODUCT</td>
<td>DESCRIPTION</td>
<td>DIFFERENCES FROM STANDARD</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>MOTOR CONTROL UNIT 2</td>
<td>This model provides all the functionalities of the standard model, with the exception of the tarp partially moving backwards function provided for tail lift tipper bodies.</td>
<td>In this version the 4P1.00293 TIMING CIRCUIT FOR TARP MOVING BACKWARDS has been removed. The removal of this component does not change the functional structure of the motor control unit and the electromagnetic compatibility then.</td>
</tr>
<tr>
<td>MOTOR CONTROL UNIT 3</td>
<td>The difference between this motor control unit and the standard model is that the remote control has 4 channels instead of the standard two. The first two channels are devoted to the motor command (as the standard one), while the following 2 are used as auxiliary controls on the truck (with the verification of the electromagnetic compatibility carried out by the car manufacturer).</td>
<td>In this version the 4P3.00101 (2 CHANNEL MINI TRANSMITTER) has been changed in the 4P3.00393 (4 CHANNEL MINI TRANSMITTER).</td>
</tr>
</tbody>
</table>

### 3.10.2 Installation of the electrical components

Hereafter the required operations for installing the electrical components:

- Using proper hooking elements, fasten the Motor Control Unit 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 Motor Control Unit can be positioned anywhere on the tipper-trailer chassis, provided that it is fastened vertically (as shown in above figure).

**IMPORTANT!**

The Motor Control Unit 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.

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

**Note:** Any installation made without authorization by Marcolin Covering s.r.l. can invalidate the warranty!
Once the main components are fastened, proceed with wiring the system.

**Note:** For a better understanding, consult the wiring diagram shown in paragraph 6.1

- By use of the supplied cables, connect the battery to the power supplying terminals of the Motor Control Unit;

- Connect a system safety fuse (70 A) (not supplied) to the positive pole of the power supply cable.

**WARNING!**

Do not reverse polarity while wiring!

- Then connect the Motor Control Unit output (yellow flat terminals) to the stationary contact plate;

- Connect the motor to the movable contact plate.

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

**Note:** The connection of the motor polarities determines the correspondence between the switching command and the related function.

### 3.11 Switch panel of the machine

#### 3.11.1 Description of the Motor Control Unit

The Motor Control Unit consists of:

1. Control unit 24V power supply terminals
2. Motor terminals
3. Aerial
4. **UNCOVERED** switch
5. **COVERED** switch
6. Emergency mushroom pushbutton with safety lock

**WARNING!**

It is absolutely forbidden to use the Motor Control Unit when the vehicle is moving.

**The constructor declines any responsibility.**
3.11.2 Emergency pushbutton key, safety shutdown

The emergency pushbutton key is required for setting the machine in SAFETY SHUTDOWN to prevent unauthorized people 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._

---

3.11.3 Control switches of the Motor Control Unit for operators

- **UNCOVERED** switch;
- **COVERED** switch;
- Emergency mushroom pushbutton with safety lock.

---

3.11.4 Description of the radio control system

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

Below the available switches:

1. **UNCOVERED** switch.
2. **COVERED** switch.

---

**ORDINANCE!**

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

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

Before using the pocket remote control, the operator must verify the absence of any unauthorised personnel close to the Motor Control Unit.

---

**WARNING!**

It is absolutely forbidden to use the remote control when the vehicle is moving.

_The constructor declines any responsibility._
3.11.5 Unfold the Eletta® 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 unfold it, operate as follows:

- Check that the upper edges of the tipper body are free from any obstacle.
- Remove all elastic strings (if provided for the version installed on your vehicle) from the front hooks so that the covering can move freely.
- Insert the key in the emergency pushbutton.
- Turn the key in CLOCKWISE direction to unlock the emergency pushbutton for giving the consent to start the machine:
  - When the Motor Control Unit is activated, it gives off an acoustic signal.
  - On remote control: PRESS THE PUSHBUTTON no. 2 (COVERED)
  - On Motor Control Unit: PRESS THE PUSHBUTTON no. 5 (COVERED)

- Unfold the tarpaulin completely and release the control pushbutton. The Motor Control Unit is equipped with an automatic motor shut-down system 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 elastic strings 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 hooks, to verify that everything is in good order before moving the vehicle on the road.

3.11.6 Interruption of machine operations

For stopping the covering moving, release simply the control pushbutton on the Motor Control Unit or on the remote control.

3.11.7 How do you stop the machine in case of emergency?

For stopping the tarpaulin motion, release simply the control pushbutton on the Motor Control Unit or on the remote control.

- For setting the machine in EMERGENCY STOP press instinctively the mushroom pushbutton stated as no. 6 on the Motor Control Unit.

CAUTION!
It is strictly forbidden to leave the machine unattended while the system is active.
The manufacturer denies any responsibility.

3.11.8 Restoring of standard operative conditions

CAUTION!
Before restarting the machine, correct the situation causing the event.

For restoring the machine after an emergency situation and after having pressed on the red mushroom pushbutton no. 6, proceed as follows:

- Insert the unlocking key in the emergency pushbutton of the Motor Control Unit
- Turn the key in clockwise direction and pull out the pushbutton.
3.11.9 Machine stop in safety conditions

- Release the control pushbutton on the Motor Control Unit or on the remote control.
- Set the machine in EMERGENCY STOP by pressing the mushroom pushbutton stated as no.6 on the Motor Control Unit.
- For setting the machine in SAFETY SHUTDOWN (if it is necessary to leave the vehicle unattended), remove the key from the emergency pushbutton (no. 6).

3.11.10 Retraction of the Eletta® tarpaulin for uncovering the tipper body

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

- Remove all elastic strings (if provided for the version installed on your vehicle) from the lateral hooking points so that the covering can move 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 Motor Control Unit gives out an acoustic signal.
  - On remote control: PRESS THE PUSHBUTTON no. 1 (UNCOVERED)
  - On Motor Control Unit: PRESS THE PUSHBUTTON no. 4 (UNCOVERED)
- Fold the tarpaulin completely and release the control pushbutton. The Motor Control Unit is equipped with an automatic motor shut-down when covering reaches the end stop.
- Carry out a quick but attentive control to verify that everything is in good order before starting the tilting movement of the tipper body.

3.11.11 How do I interrupt the machine operations?

Follow the process described in paragraph 3.11.6.

3.11.12 How do I stop the machine in case of emergency?

Follow the process described in paragraph 3.11.7.

3.11.13 Machine stop in safety conditions

Follow the process described in paragraph 3.11.9.

3.11.14 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 elastic strings removed (if these are part of the equipment). Then, after loading, the operator unfolds again the tarpaulin and fastens the elastic strings properly.
- If the vehicle should move on the road with empty tipper body, it is mandatory to fasten the elastic strings to their frontal hooking points to prevent any risks of entanglement for persons or objects while travelling on the road.
- Push the emergency pushbutton to set the machine in SAFETY SHUTDOWN and remove the key.
- Carry out a quick but attentive control to verify that everything is in good order before moving the vehicle on the road.
3.12 What is to be done, when the electric operated handling system does not work?

3.12.1 Replacement of the internal fuse in emergency situation

Prior to replace the internal fuse, verify that the external one placed on the positive pole terminal of the battery hasn’t blown. If this is the case, that one is the fuse that needs to be replaced.

**IMPORTANT INFORMATION FOR USER SAFETY**

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

**CAUTION!**

Prior to open the Motor Control Unit, disconnect the battery from power supply.

**WARNING!**

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

- By using a suitable screwdriver, loosen the screws at the corners of the Motor Control Unit cover.
- Remove the cover taking care not to damage the existing seal.
- Replace the blown fuse.
- Close again the Motor Control Unit with its cover, taking care not to damage the existing seal.

3.12.2 Motor unlocking in emergency situation

**WARNING!**

Prior to perform this operation push the emergency pushbutton on the Motor Control Unit and remove the key!

**Note:** The improper use can cause damages to the drive shaft, compromising the future efficiency.

For the emergency manual handling, proceed as follows:

- Locate the gearbox protruding shaft on the front side, near the central protective casing.
- Insert the supplied hand-lever into the shaft.
- Turn the hand-lever to deploy or withdraw the covering, working directly on the gearbox screw.

**CAUTION!**

DURING THE TRAINING COURSE IT IS MANDATORY TO INFORM THE CUSTOMERS that it is forbidden to handle the machine when the hand lever is fitted into the shaft.
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 fastening operation of the tarpaulin on the front side of the tipper body.

Here below the operations to perform:

- Unfold the covering (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 up and fasten the PE flat strip (3) on the superior lateral casing.
- Tighten up the front part of the tarpaulin.
- Fasten the tarpaulin and the PE flat strip (3) on the top of the tipper body, using the specific clamping plate (2) and rivets (1).
- 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 BY STATIONARY VEHICLE AND DISCONNECTED EQUIPMENTS

DO NOT WALK ON THE TARPALIN!

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

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

fig. 1

fig. 2
• Go into the internal space of the tipper body for setting up the chains (two n. 10 open-ended spanner are required);
• Let the rear closing system manually come down (fig. 2);
• Readjust the chain in order that it is perfectly tightened once the rear closure has come down (fig. 3).

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 tensioner plate 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 Quick cable release system

This system allows to remove the lateral steel cable by setting the upper edge free and making possible to tip sideward or to swing out the board walls. Of course, removing the steel cable following the standard procedure would be infeasible.

For this reason, we developed the cable quick release system. It differs from the standard system in the following items:

- the rear guide pulley;
- the tightening system of the steel cable.

Hereinafter the description of the operations for mounting the accessory equipment which makes the quick release of the steel cables possible.

4.2.1 Installation of the rear guide pulley

In the quick cable release system, the plate with the rear guide pulley is the component which differs from the standard system. For carrying out the installation proceed as follows:

- Pay close attention while choosing the installation position in order to avoid to form any obstacle for mobile elements as the tailgate. The best position for the plate is the one as close as possible to the rear board, but at a sufficient distance for avoiding to be an obstacle for hinges.

**WARNING!**

A wrong positioning of the tension plate could be cause of damages for the covering or for the tipper body.

In case of any doubt, we recommend to make some movement tests on the rear movable parts to avoid any bad surprise.

- For a proper working of the covering system position the plate the highest possible (accordingly to the board wall type).
- Drill the four holes Ø 8, tap and screw on the plate with the supplied screws.
- Apply Loctite® screwlock liquid.
- If the thickness of the board wall should be less than 6 mm use through bolt with washer and locking nuts (not included in the equipment).

**Note:**  The proper positioning of the rear guide pulleys is binding for the positioning of the subsequent elements.

- Repeat now the plate fastening operation on the opposite board wall.
4.2.2 Tightening up system

The automatic tightening up system is the main element that allows to release the steel cable.

Carry out the positioning activities of the steel cable described in the respective paragraph 3.4 applying the necessary adjustments:

- Open the release system.
- Fasten the steel cable as described in the paragraph 3.4.3 and verify that the cable is so tightened that, with open tightener, the cable can be removed from the rear plate and, with closed tightener, the proper motion of the tarpaulin can be performed.

**Note:** Make sure that the bows keep being perpendicular to the board walls in order to avoid any later readjustments.

The quick cable release system is equipped with a lever for opening and closing the release system.

To release the cables, operate in this way:

- insert the lever (2) in the central hole of the release device;

- **open the release device** turning the lever in the direction shown in the figure (A);

- remove the locking pin (1) from the pivot of the plate;

- remove now the steel cables pulling out the release device from the plate.

For tightening up again the steel cables repeat the operations in reverse order.

---

**CAUTION!**

A wrong repositioning of the cables could be cause of damages to the covering or to the tipper body.

Check that the steel cables are still positioned on the grooves of the pulleys.

**VERIFY** that the locking pin has been repositioned on the plate.
4.2.3 Automatic “Wheel-Hooking System”

With this lateral closure system, the covering hooks automatically 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 heights, 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.

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

- 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 with the supplied screws (7) and nuts (6).

**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 (4) 6 mm up from the wheel hook;
- drill the board wall of the tipper body and fasten the support with the supplied rivets (5).

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

**WARNING!**

From now on, the even 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:

![Diagram of wheel hooks]

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

• In the absence of any obstacles while moving the tarpaulin fix the lower support of the respective rolling hook.

• Proceed fastening 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.
Chapter 5  MAINTENANCE WORK OF THE ELETTA® COVERING SYSTEM

The covering system is subject to stress and wear, as well as it is exposed to weather agents. 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.

- Find out the bow that needs to be replaced;
- Remove the rivets positioned on the tarpaulin upper side that fasten the tarp 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 TARPALIN!**
The manufacturer denies any liability.

- Inside the tipper body remove the cable plastic ties which fasten the tarpaulin to the bow support.
- Undo the self-tapping screws which fasten 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;
- Fasten the supports using the suitable self-tapping screws;
- Inside the tipper body, fasten the tarpaulin to the bow by using common cable ties (in case of fire-resisting PVC-tarpaulin or silicon apply fire-resisting cable ties);

**CAUTION!**
For fire-resisting PVC tarpaulins the application of standard cable ties is not permitted. Demand the proper cable ties for fire-resisting tarpaulins from the manufacturer.
The manufacturer denies any liability.
• Reposition the rivets for fastening the tarpaulin and the PE band to the support.
• After the replacement of the bow, the tarpaulin is ready for use again.

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 fasten the tarp 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 TARPALIN!
The manufacturer denies any responsibility.

• On the frontside of the tipper body remove the aluminium flat bar which fastens 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!
For fire-resisting PVC tarpaulins the application of standard cable ties is not permitted. Demand the proper cable ties for fire-resisting tarpaulins from the manufacturer.
The manufacturer denies any liability.

• Reinsert the plastic band inside the tarpaulin lateral sleeves
• Reposition the rivets that hold the tarpaulin in place.
• Tighten up the front part of the tarpaulin.
• Fasten the tarpaulin on the top of the gear housing by employing the specific clamping plate and rivets.
• Cut off the excess part of the tarpaulin.

5.3 Steel cable replacement
For replacing the steel cables refer to paragraph 3.4.
5.4 Extraordinary maintenance work – Annual 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 where needed.

The tightening up of the screw connections must be carried out observing the following screw tightening torque:

<table>
<thead>
<tr>
<th>Nominal diameter (mm)</th>
<th>Tightening Torque (N x m) - Class 8.8</th>
<th>Tightening Torque (N x m) - Class 10.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6</td>
<td>10.5</td>
<td>14.6</td>
</tr>
<tr>
<td>M8</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>M10</td>
<td>50</td>
<td>70</td>
</tr>
<tr>
<td>M12</td>
<td>85</td>
<td>120</td>
</tr>
<tr>
<td>M14</td>
<td>127</td>
<td>187</td>
</tr>
</tbody>
</table>

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

Verify especially the wear and tear status of the most stressed parts like the frontal fastening and the lateral fastening of the bows.

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

Verify 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 motorized covering system), and if necessary provide for their cleaning.

5.4.6 Checking of the sliding conditions of the covering system

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

5.4.7 Thoroughly checking of the pulleys

Verify 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

- Replace the hooks at the first sign of wear and tear.
5.4.9 Lubricate and grease thoroughly the covering system

GREASE THE LATERAL DRIVING UNITS

⚠️ Make use of lithium-based grease.

IMPORTANT!

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

WARNING!

Before carrying out maintenance work, take care to “disconnect the battery”!

• Before greasing it is necessary to remove the protecting casings.

GREASE THE COUPLING OF THE TELESCOPING DRIVE SHAFTS.

⚠️ Make use of lithium-based grease.

• After greasing, reposition the protective casings.

WARNING!

It is forbidden to handle the machine without repositioning the protective casing. The manufacturer denies all liability.

5.4.10 Filling 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 breakdowns or operating troubles.

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Possible cause</th>
<th>Problem solving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressing any pushbutton of the remote control the motor does not start running.</td>
<td>Emergency stop activated.</td>
<td>Check the emergency pushbutton.</td>
</tr>
<tr>
<td></td>
<td>Wrong electrical connections.</td>
<td>Check the electrical connections (positive – negative battery pole).</td>
</tr>
<tr>
<td></td>
<td>The safety fuse has tripped.</td>
<td>Check fuses integrity, one fuse on the power supply line, the second one inside the Motor Control Unit.</td>
</tr>
<tr>
<td></td>
<td>Contact plate is defective.</td>
<td>Check that the existing contact plates are properly coupled.</td>
</tr>
<tr>
<td></td>
<td>Malfunctions inside the Motor Control Unit.</td>
<td>Contact the manufacturer or authorised qualified personnel for intervention.</td>
</tr>
<tr>
<td>Pressing the remote control pushbutton, the red indicator light does not light up.</td>
<td>Remote control batteries are discharged.</td>
<td>Replacement of remote control batteries.</td>
</tr>
<tr>
<td>The motor runs always in the same direction.</td>
<td>Coding defects of the switch plate.</td>
<td>Call customer service for remote control reprogramming.</td>
</tr>
<tr>
<td>The Motor Control Unit works only by pressing its pushbuttons and not by using the remote control.</td>
<td>Power supply voltage reversal.</td>
<td>Check that the positive pole (+) of the battery is connected to the RED terminal of the Motor Control Unit, and, that the negative pole (−) is connected to the BLACK terminal of the Motor Control Unit.</td>
</tr>
<tr>
<td>The Motor Control Unit seems to be functioning (the internal relay can be heard) but the motor does not run.</td>
<td>Possible oxidation of the electrical contacts.</td>
<td><strong>ATTENTION!</strong></td>
</tr>
<tr>
<td></td>
<td>Prior to proceed with cleaning disconnect the power supply. (press the emergency pushbutton or unplug the dumper).</td>
<td>Check that the electrical contacts existing between tipper body and chassis frame are clean and free from oxidation.</td>
</tr>
<tr>
<td></td>
<td>If required proceed with cleaning by using a dry cleaning cloth.</td>
<td>Any stubborn stains due to oxidation can be removed by fine-grained sandpaper (400 grade or higher).</td>
</tr>
<tr>
<td></td>
<td>Possible breaking of a ring terminal.</td>
<td>Check that the ring terminals of the motor and contact plate connection cables are not damaged or broken. If required, let them replace by an authorised customer service or by a car electrical repair shop.</td>
</tr>
<tr>
<td>Pressing the “COVERED” pushbutton, the covering withdraws instead of deploying.</td>
<td>Motor voltage reversal.</td>
<td><strong>ATTENTION!</strong></td>
</tr>
<tr>
<td></td>
<td>Invert the two cables on the yellow electrical contacts of the Motor Control Unit.</td>
<td>Prior to proceed disconnect the power supply.</td>
</tr>
</tbody>
</table>
Chapter 6  ENCLOSURES

6.1 Reference diagram for electrical connections