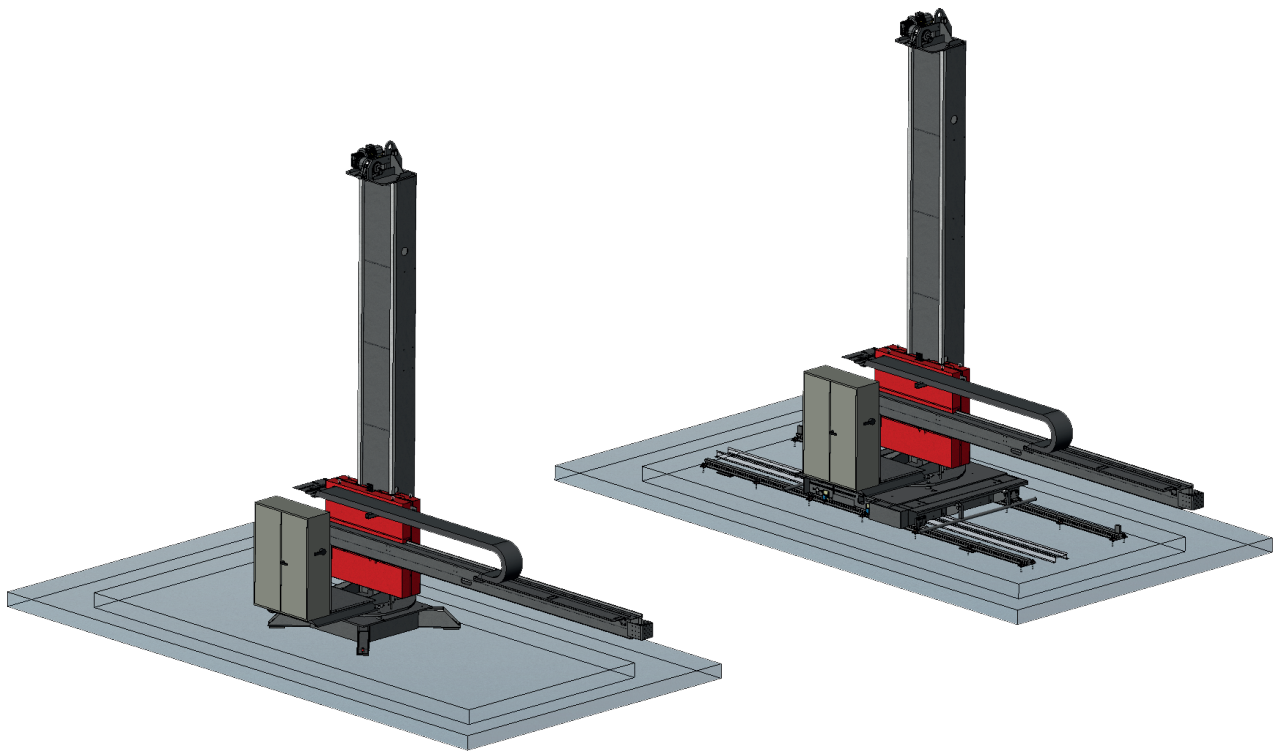


BOOM

LINE-MATIC CB LM-LF E-series

SAFETY INSTRUCTIONS FOR OPERATING AND MAINTENANCE



ISSUE : EN
REVISION : F
DATE : 03 - 2022

Instruction manual

REF : 8695 6019

Original instructions

Thank you very much for the trust you have shown by choosing this piece of equipment. It will give you trouble-free service if it is used and maintained as recommended.

Its design, component specifications and manufacturing are in accordance with applicable European directives.

Please refer to the CE declaration enclosed to identify the directives applicable to it.

The manufacturer shall not be liable for any combination of parts not recommended by it.

For your safety, please follow the non-limitative list of recommendations and obligations, a large part of which are included in the Labour Code.

Please inform your supplier if you find any error in this instruction manual.

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INFORMATION



This manual and the product with which it is associated refer to the applicable standards in force.



Please read this document carefully before you install, use or maintain the machine. Keep these instructions in a safe place for future reference. These instructions must accompany the described machine or equipment if there is a change in ownership, up to the time of destruction.



Display and pressure gauge:

Measurement instruments or displays of voltage, intensity, speed, accuracy etc. are to be considered as indicators, whether they are analogue or digital.



For operating instructions, adjustments, troubleshooting and spare parts, please refer to the special instructions for safe operating and maintenance.

This technical documentation is intended for the following machines/products:

- LINC-MATIC CB-LF 2532E
- LINC-MATIC CB-LF 3233E
- LINC-MATIC CB-LF 4243E
- LINC-MATIC CB-LF 5243E
- LINC-MATIC CB-LF 5253E
- LINC-MATIC CB-LF 6243E
- LINC-MATIC CB-LF 6253E
- LINC-MATIC CB-LM 2532E
- LINC-MATIC CB-LM 3233E
- LINC-MATIC CB-LM 4243E
- LINC-MATIC CB-LM 5243E
- LINC-MATIC CB-LM 5253E
- LINC-MATIC CB-LM 6243E
- LINC-MATIC CB-LM 6253E

REVISIONS

REVISION : B DATE : 10/14

DESCRIPTION	PAGE
New mechanical design	All

REVISION : C DATE : 04/15

DESCRIPTION	PAGE
Spare parts updated	F-43

REVISION : D DATE : 02/18

DESCRIPTION	PAGE
Logo changed	

REVISION : E DATE : 03/19

DESCRIPTION	PAGE
Complete update	

REVISION : F DATE : 03/22

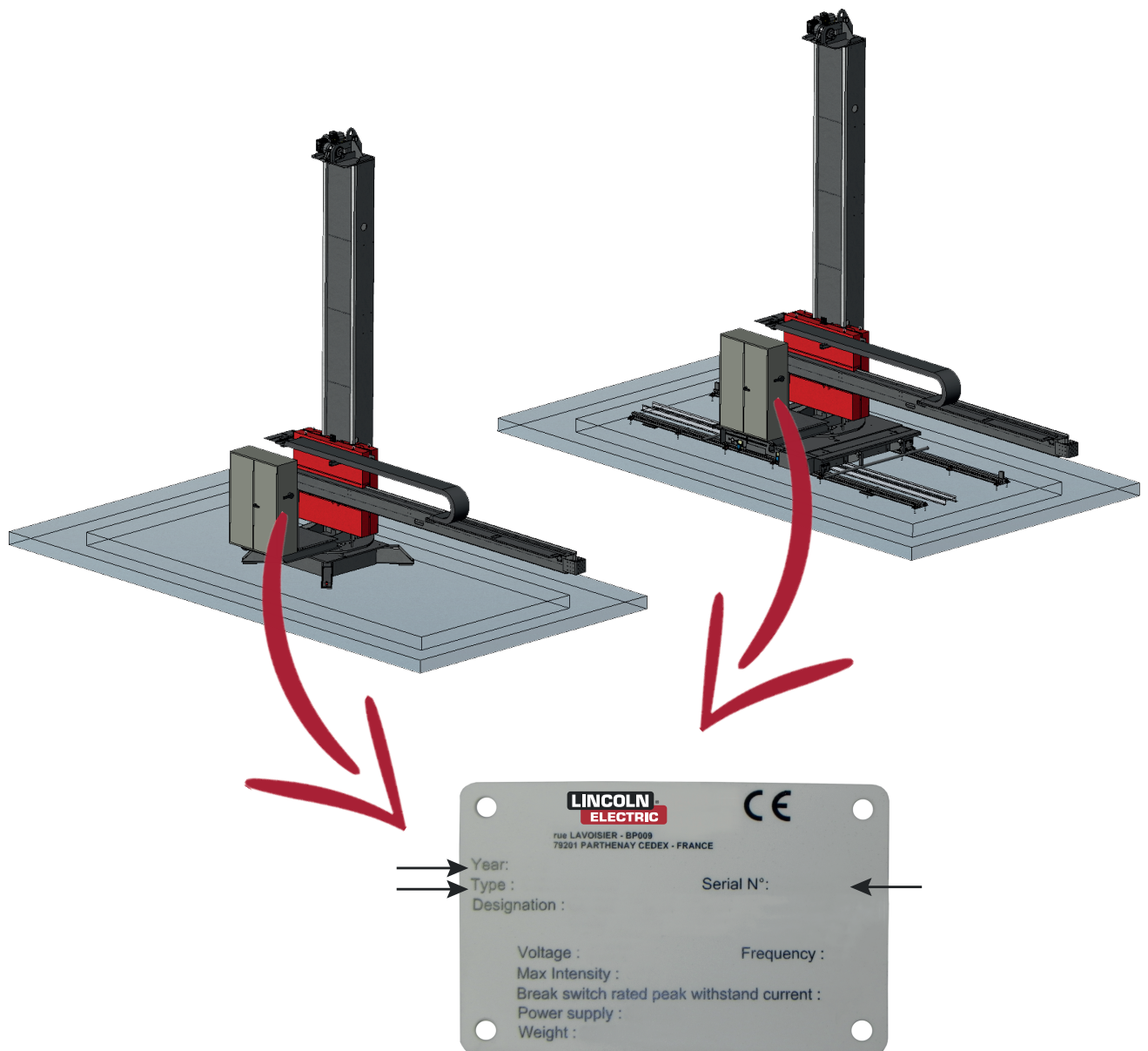
DESCRIPTION	PAGE
Complete update	All
Trade name changed	All

MEANING OF SYMBOLS

	Reading the manual/instructions mandatory.		Indicates a hazard.
	Use of safety shoes mandatory.		Warning of an electrical risk or hazard.
	Use of auditory protection mandatory.		Warning of a risk or hazard due to an obstacle on the ground.
	Use of safety helmet mandatory.		Warning of a risk or hazard of falling, with a level difference.
	Use of safety gloves mandatory.		Warning of a risk or hazard due to suspended loads.
	Use of safety glasses mandatory.		Warning of a risk or hazard due to the presence of a hot surface.
	Use of safety visor mandatory.		Warning of a risk or hazard due to moving mechanical parts.
	Use of safety clothing mandatory.		Warning of a risk or hazard due to the closing movement of moving mechanical parts of a machine.
	Cleaning the working area mandatory.		Warning of a risk or hazard due to the presence of a laser radiation.
	Use of breathing protection mandatory.		Warning of a risk or hazard due to an obstacle at a height.
	Visual inspection required.		Warning of a risk or hazard due to the presence of a pointed part.
	Indicates a lubrication operation.		Wearers of pacemakers may not be admitted in the designated area.
	Requires maintenance action.		

A - IDENTIFICATION

The information below should be provided in all correspondence.



B - SAFETY INSTRUCTIONS



For general safety instructions, please refer to the specific manual supplied with the equipment.



AIRBORNE NOISE:

Refer to the special instructions 8695 7051 supplied with the equipment.

1 - Particular safety instructions



No object is to be placed on the rolling tracks.



Do not stand or move under the arms of the boom.



**“No climbing on the structure of the machine other than on platforms or gangways designed for that purpose.
To access equipment at heights, the user must use accessing means in accordance with the regulations, such as a safe mobile gangway, an aerial lift etc.”.**



**Before using the machine, make sure that all the guards are in place.
All guard covers must be screwed in.
Only authorised personnel may access electrical cabinets, which must have locking systems.**



The machine may only be operated by a single operator trained in safe use.



Before use, the operator must make sure that there is no risk of collision with personnel.



Clean the working area from time to time.



This machine may only be moved by its designer, namely Lincoln Electric.



**Never modify the machine.
The boom is **not** designed for anchoring lifting equipment.**



Store cable bundles behind the electrical cabinet of the boom.



The use of Personal Protective Equipment (PPE) is **mandatory**.



Machine maintenance must be carried out **with all the energy supplies switched off**.
The disconnection and padlocking of all energy sources is **mandatory**.
Sliding block **maintenance** may only be carried out **with all the energy supplies switched off**,
when the covers are removed.



The emergency stop and safety lines must be interlocked and tested in accordance with the electricity diagram of the machine.



LINC-MATIC CB LF boom with fixed column:

- It is absolutely necessary to anchor the boom to the ground for safe use.



LINC-MATIC CB LM boom with powered carriage:

- Check that the anti-tilt clamps have been reassembled correctly before use.
- Make sure that the mechanical stops have been welded at the ends of the rails.
- Make sure that the limit switch cams of the carriage are anchored to the ground before using the machine.



Slings eye

- The machine can be handled completely using the slinging eye
- Apply the lifting safety instructions
- Apply the lifting procedure specific to the L boom
- Observe the maximum capacity of the slinging eye (<6700Kg)



Before use for welding, lock the rotation of the column with the support screws.



Do not exceed the permissible load at the end of the arm (see table of dimensions).

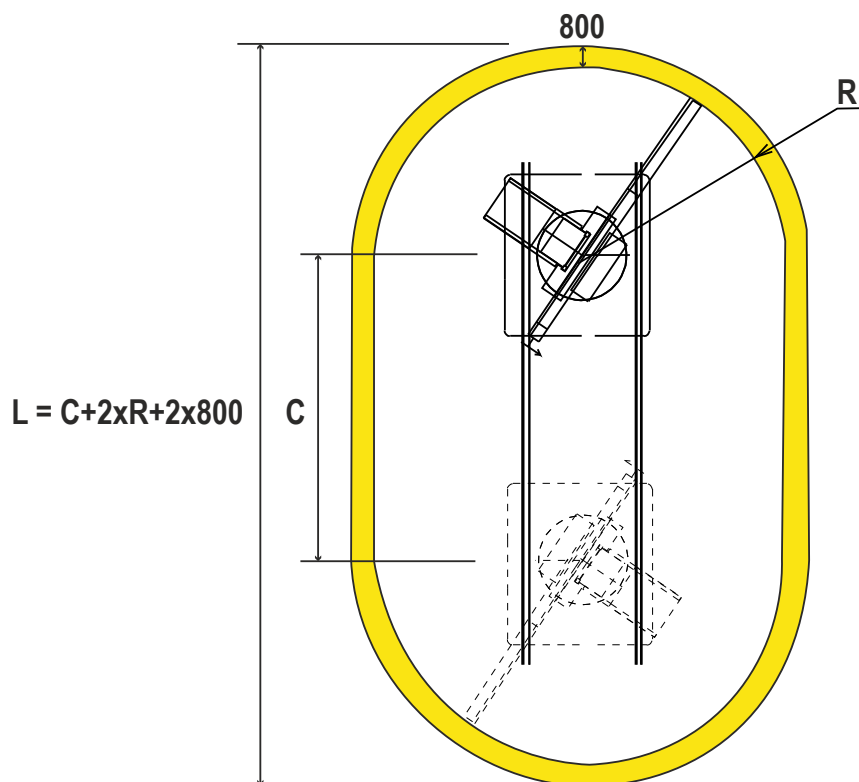
Make sure that no part of the machine can come within less than 500 mm of an obstacle.

Important: the operator passage way must absolutely be clear over a minimum width of 800 mm.

The floor should be marked out as shown in the drawing opposite.

NB:

- Dimension R (max dimension with the arm out at the stop) must be measured.
- Dimension C is determined according to the rail length.



Location given for an unequipped boom; for an equipped boom, see the specific drawing supplied.

1 - Description

This multiple-process welding boom makes it possible to position and move an automatic welding head (for example: SA, MIG, TIG, plasma).

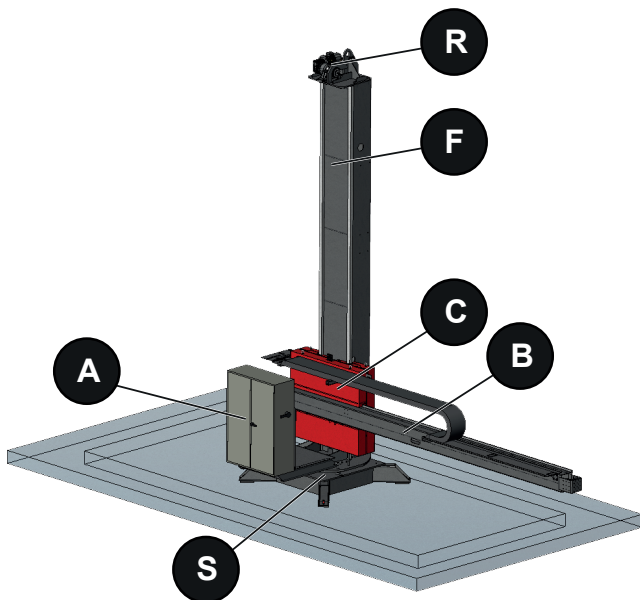
While welding, it is particularly designed for fabricating cylindrical bodies and also metal structures.

The movement speed is variable, and simultaneous movements are not possible while welding.

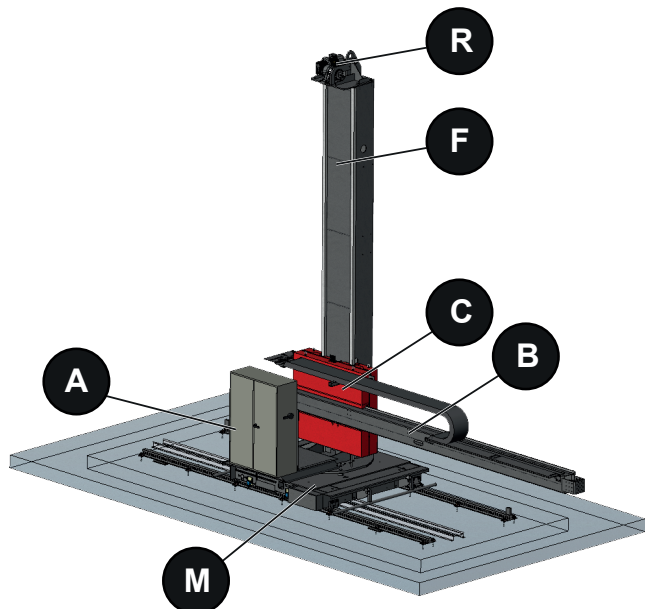
2 - Type of boom

The boom is available in:

Linc-Matic CB-LF fixed version with base



Linc-Matic CB-LM powered carriage version



A	Control and power cabinet
B	Arm
C	Sliding block
F	Column
R	Lifting power system
M	Powered carriage
S	Base

3 - Column (ref: F)

It is made up of bent mechanically welded metal. Two rolling tracks over the entire height ensure stable and smooth vertical movement of the arm support sliding block.

It is fixed to the carriage or the base by means of a slewing ring with a large diameter. It allows the column to rotate over 360° with no noticeable effort or play, thus allowing full manoeuvrability and easy arm positioning.

It is stopped from rotating by two screws with manually tightened bearings that are very easily accessible.

A plate that acts as the base for the lifting geared motor and a slinging eye for handling with a travelling crane are bolted at the top.

The column is supplied with a cable drag chain that prevents the bundles connecting the boom and the welding head from rubbing against the floor when the arm is down.

4 - Lifting (ref.: R)

The up and down movement is carried out by means of a three-phase geared motor.

The geared motor placed at the top of the column operates through a pinion on the triple-link chain that is oversized for the load to lift.

5 - Sliding block (ref: C)

It joins the column to the arm and allows the arm to move vertically and horizontally by means of wheels.

A mechanical safety system called the safety gear that is integral with the sliding block stops the block, and therefore the arm, from falling suddenly if the triple-link lifting chain breaks.

Its operating principle is as follows:

A break releases two notched cams that are then firmly wedged on the outside, on both sides of the rolling tracks of the column, and prevent the sliding block from moving down.

If, during positioning, the arm and sliding block assembly hits an obstacle, the triple-link chain is no longer tensioned and the safety gear operates.

6 - Powered carriage (ref: M)

This carriage is mechanically welded and fully protects all the geared motor drive parts, which are thus kept safe from impacts and dust.

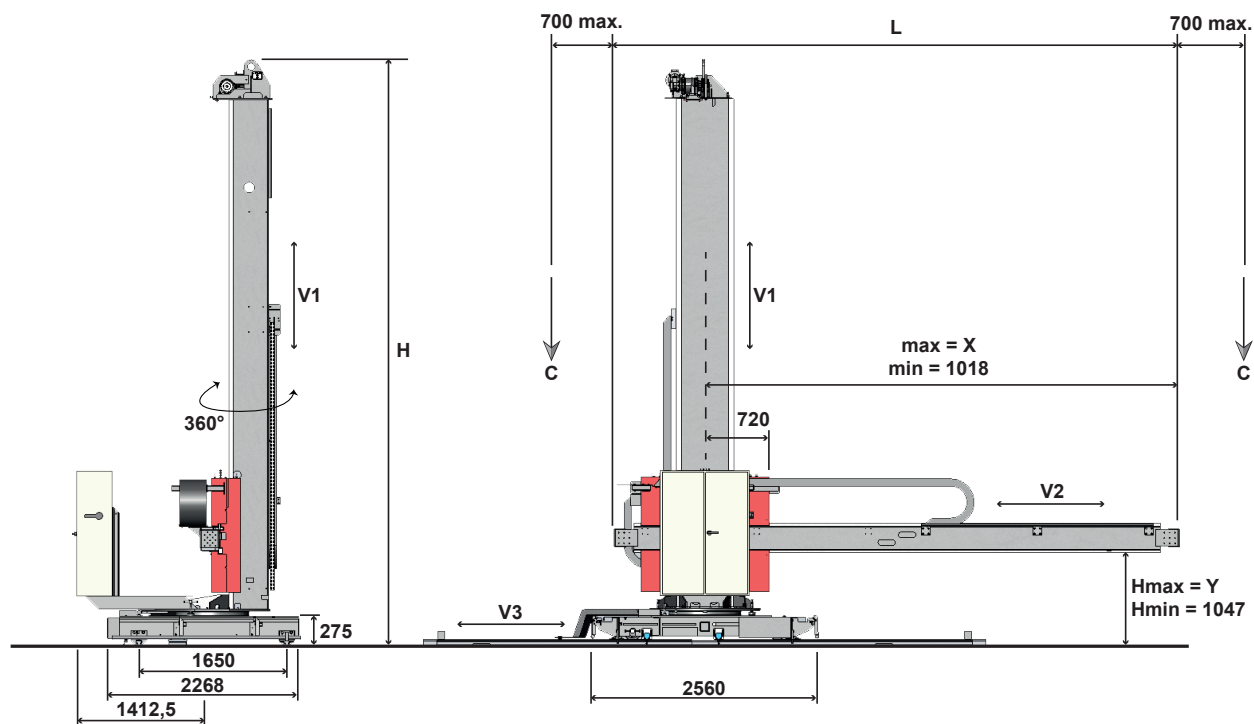
It moves on rails anchored to the floor.

It is guided by wheels that press against the sides of rails. These guide wheels can be adjusted to remove any play. Scrapers are fixed to the ends of the carriage to the front of the rolling wheels.

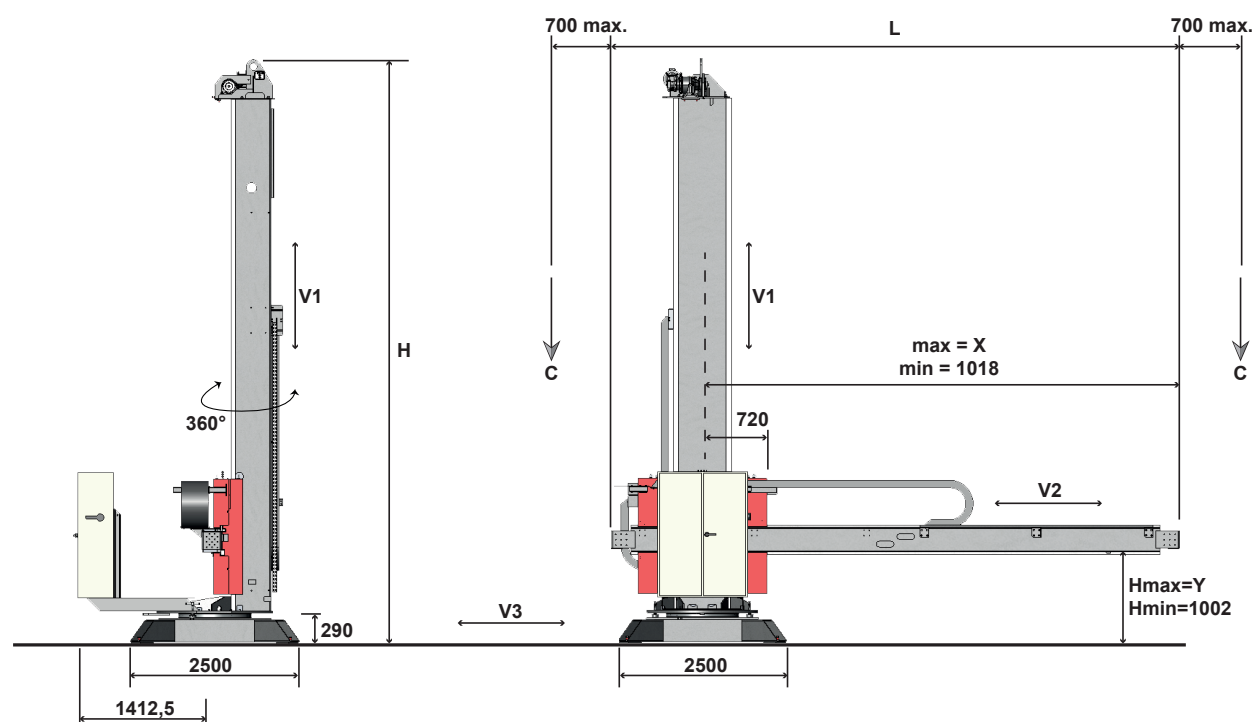
In order to keep the boom safe from tipping over, the carriage has four clamps that grasp the rails.

NB: If the carriage is a welding axis, the front and rear of the carriage have Full Stops limit switches, which stop the movement of the carriage if ever it hits an obstacle.

7 - Dimensions and travel ranges of the Linc-Matic CB LM boom



8 - Dimensions and travel ranges of the Linc-Matic CB LF boom



Refer to the special layout drawing supplied.

Description	Vertical travel (mm)	Horizontal travel (mm)	W (mm)	H (mm)	X (mm)	Y (mm)	C* (daN)	Weight without equipment (daN)
LM 25x23	2500	2300	4340	4900	3320	3550	300	3680
LM 32x33	3200	3300	5340	5600	4320	4250	300	3940
LM 42x43	4200	4300	6340	6600	5320	5250	300	4200
LM 52x43	5200	4300	6340	7600	5320	6250	300	4370
LM 52x53	5200	5300	7340	7600	6320	6250	150	4460
LM 62x43	6200	4300	6340	8600	5320	7250	300	4540
LM 62x53	6200	5300	7340	8600	6320	7250	150	4630
LF 25x23	2500	2300	4340	4850	3320	3500	300	3180
LF 32x33	3200	3300	5340	5550	4320	4200	300	3440
LF 42x43	4200	4300	6340	6550	5320	5200	300	3700
LF 52x43	5200	4300	6340	7550	5320	6200	300	3870
LF 52x53	5200	5300	7340	7550	6320	6200	150	3960
LF 62x43	6200	4300	6340	8550	5320	7200	300	4040
LF 62x53	6200	5300	7340	8550	6320	7200	150	4130

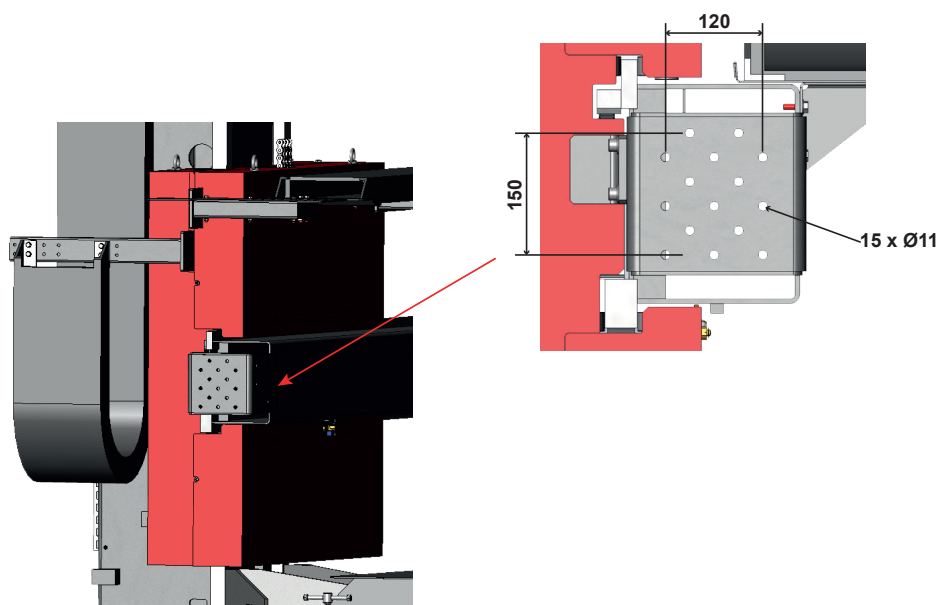
*C: Maximum load at each end of the arm excluding bundles

V1: 110 cm/min (5 to 160 cm/min as an option)

V2: 20 to 500 cm/min (5 to 500 cm/min as an option)

V3: 20 to 500 cm/min (5 to 500 cm/min as an option)

9 - Head interface



10 - Options

A large variety of applications of the **Linc-Matic CB** require a number of additional pieces of equipment.

- **ROLLING TRACK, 6m LONG => W000315250**
- **ROLLING TRACK, 3m LONG => W000315251**

The optional features defined below are designed for assembly in the factory and must be specified with the order.

Gas cylinder support	W000315260 Number to determine following the type of welding
Earth connector • 600 A • 1200 A • 2400 A	Earth connector rubbing against rail P95241995 P95241996 P91241995
Indexing • Linc-Matic CB LM boom • Linc-Matic CB LF boom	Allows manual indexing on column rotation P91244180 P91244185
Encoder • on arm • on carriage • on lifting	Allows the numerical positioning of the relevant axis P95248610
Longitudinal cable drag chain • 6 metres as standard • 6 metre extension • 3 metre extension	Installation on the ground along the centre line of the rails (number for simple installation) P95241300 P95241350 P95241360

1 - Installation conditions

The machine must be located in accordance with safety standards to keep personnel safe.



The following conditions must be fulfilled before the equipment is installed.

ELECTRICITY SUPPLY
see electrical diagram supplied**VERY IMPORTANT**

The power cable (customer supply) must have a section suitable for the power rating of the installation.
The customer is responsible for protecting the power cable and the installation itself.

Such protection must be appropriate for the neutral point treatment of the electricity supply.

The information required for rating the protection is provided on the identification plate of the machine.

GAS SUPPLY
see layout drawing supplied**PNEUMATIC SUPPLY**
see layout drawing supplied

The user must provide a source of compressed air with a regulator that can supply the required flow and pressure. The air must be clean, de-oiled and degreased.

QUALITY CLASS: as per standard

Solid pollutant class	Class 3	Grain size 5µm	Mass concentration 5mg/m3
Water class	Class 3	Maximum dew point under pressure -20°C	
Total oil class	Class 5	Concentration 25 mg/m3	

**Arrangement of cables and hoses**

The customer must provide the means to support and protect cables and hoses from mechanical, chemical or thermal damage from their source up to the entrance to the cable drag chain and from the machine up to the entrance to the control console.

2 - Floor preparation



see layout drawing supplied

The floor does not need any particular preparation for installing the machine; however, we recommend a concrete floor for the machine to be satisfactorily stable.

Concrete screed in a single stretch made at least 21 days before (standard BAEL 93). The thickness of the screed and its reinforcement are given for guidance, and must be verified depending on the characteristics of the floor.

Single concrete strip. 20 Mpa (350 kg/m³) concrete with metal reinforcement.

Flatness over the entire job with additional travelling tracks ± 5 mm.

3 - Handling of Linc-Matic CB LM & LF

For obvious reasons relating to transport convenience, the boom is dismantled for shipment into several parts that need to be reassembled on the site.

The shipped **LINC-MATIC CB LM** boom includes:

- the column with the sliding block
- the powered carriage
- the equipped platform*
- the arm and the welding equipment*
- the electrical cabinet and the control console

The shipped **LINC-MATIC CB LF** boom includes:

- the base and the column with the sliding block
- the equipped platform*
- the arm and the welding equipment*
- the electrical cabinet and the control console

*: Only if the **Linc-Matic CB** boom is delivered with welding equipment



Slinging is indicated as a principle, but is different for each machine depending on the model and equipment.



Slinging given for an unequipped boom; for an equipped boom, see the specific drawing supplied.



CAUTION: Protect the sensitive parts while slinging.
Use webbing



During any lifting operations, the use of appropriate PPE (Personal Protective Equipment) is **MANDATORY**.



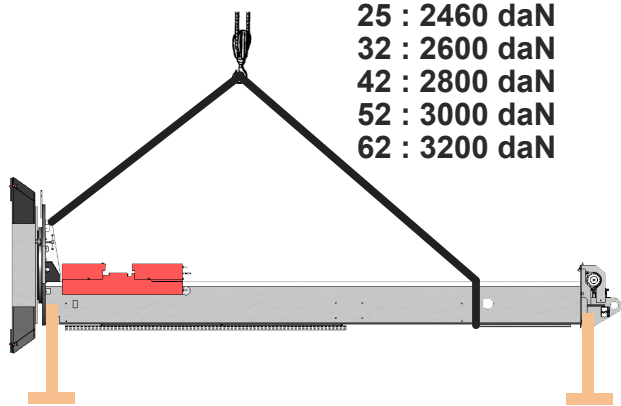
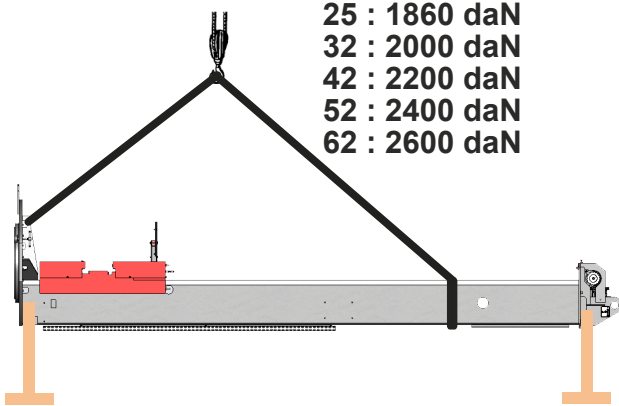
The components of the installation may only be transported using the slinging points provided, with appropriate slinging equipment.

LINC-MATIC CB LM

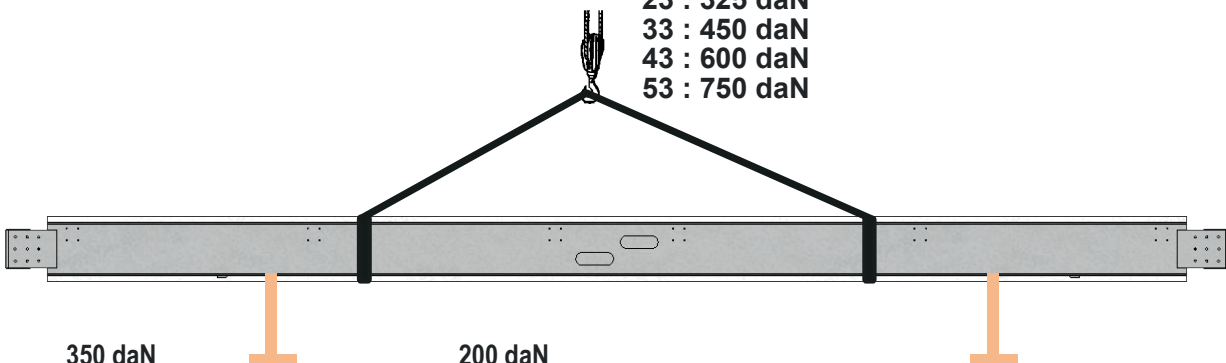
25 : 1860 daN
32 : 2000 daN
42 : 2200 daN
52 : 2400 daN
62 : 2600 daN

LINC-MATIC CB LF

25 : 2460 daN
32 : 2600 daN
42 : 2800 daN
52 : 3000 daN
62 : 3200 daN



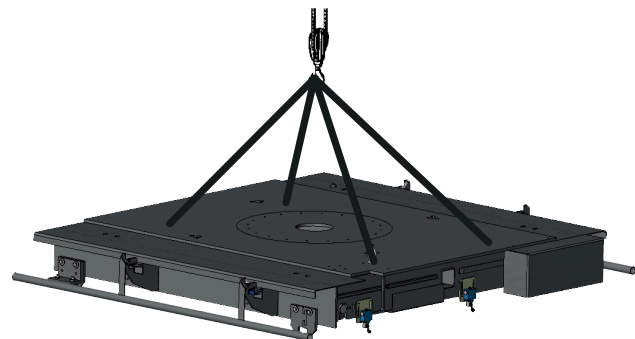
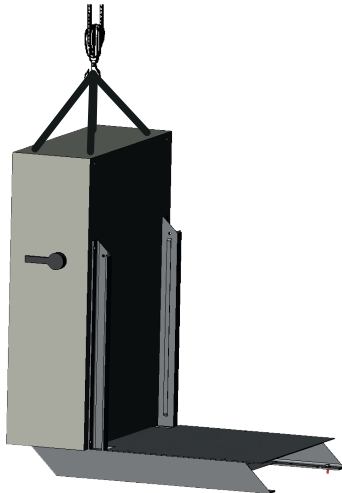
23 : 325 daN
33 : 450 daN
43 : 600 daN
53 : 750 daN



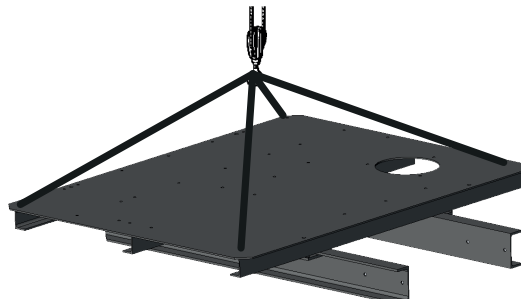
350 daN

200 daN

1000 daN



100 daN



Operator protection:
Helmet - Gloves - Safety shoes

4 - LINC-MATIC CB LM: Reassembly of column and carriage

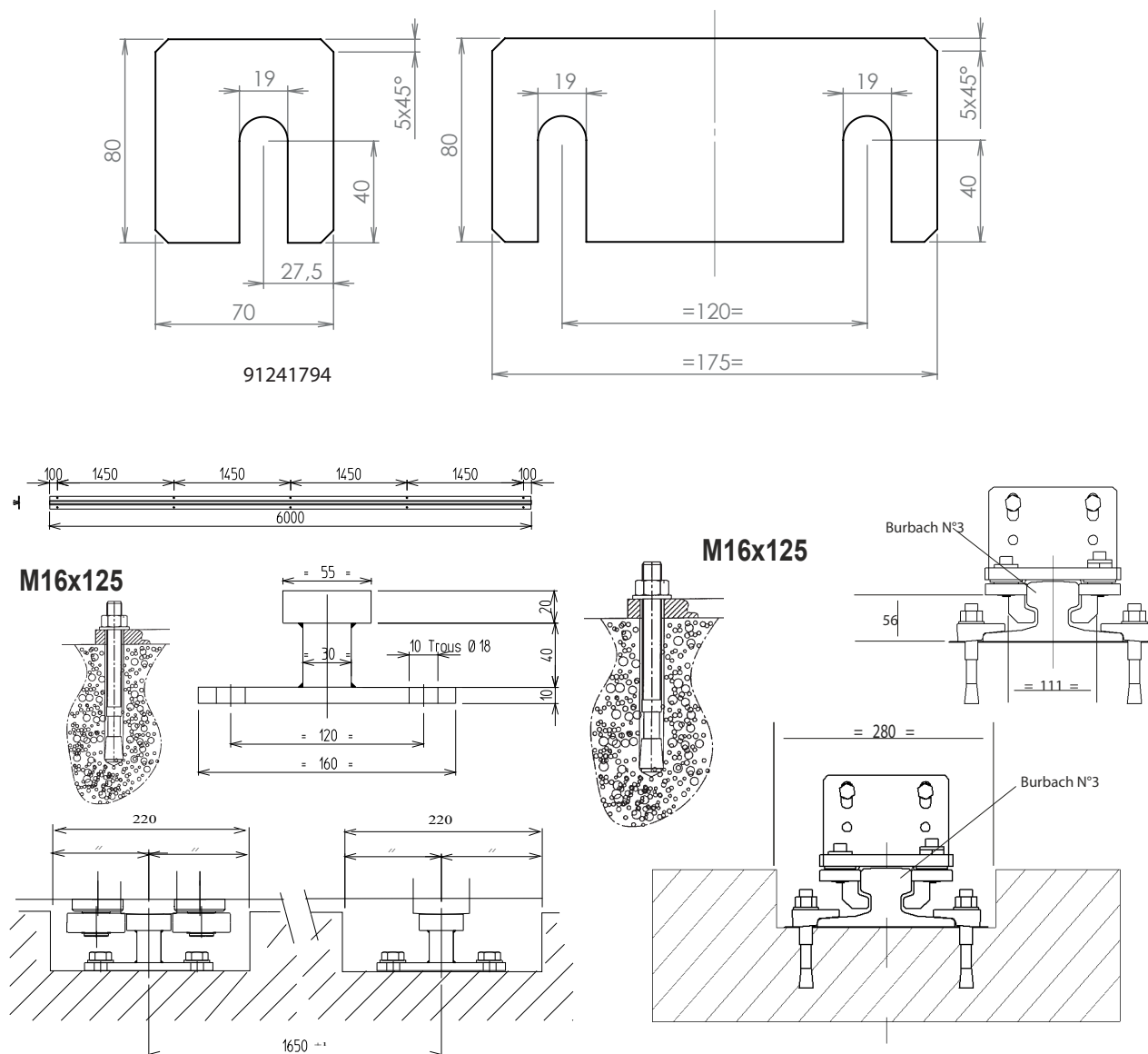
1 - Installing the rails



see layout drawing supplied.

Mark and drill the anchor location as shown in the layout drawing.

A set of shims (part no: 91241794) is available for adjusting the flatness of the rolling track (supplied with the rails).



2 - Installing the carriage

After positioning and anchoring the rolling tracks, place the carriage on the tracks, taking care to turn it so that the guide wheels are embedded in the machined track (3 sides) of the rolling path.

Remove the two guide wheel supports **C8** by unscrewing the screws **C9**.

Take off the anti-tilt clamps **C3** and put them back with the clamp turned down.

Put back the two guide wheel supports **C8**.

Before locking the screws **C9**, make the following adjustments:

- adjust the clamp horizontally to leave approximately 1mm between the track and the clamp and
- adjust the guide wheel vertically so that the wheel is approximately at mid-height from the track machining.

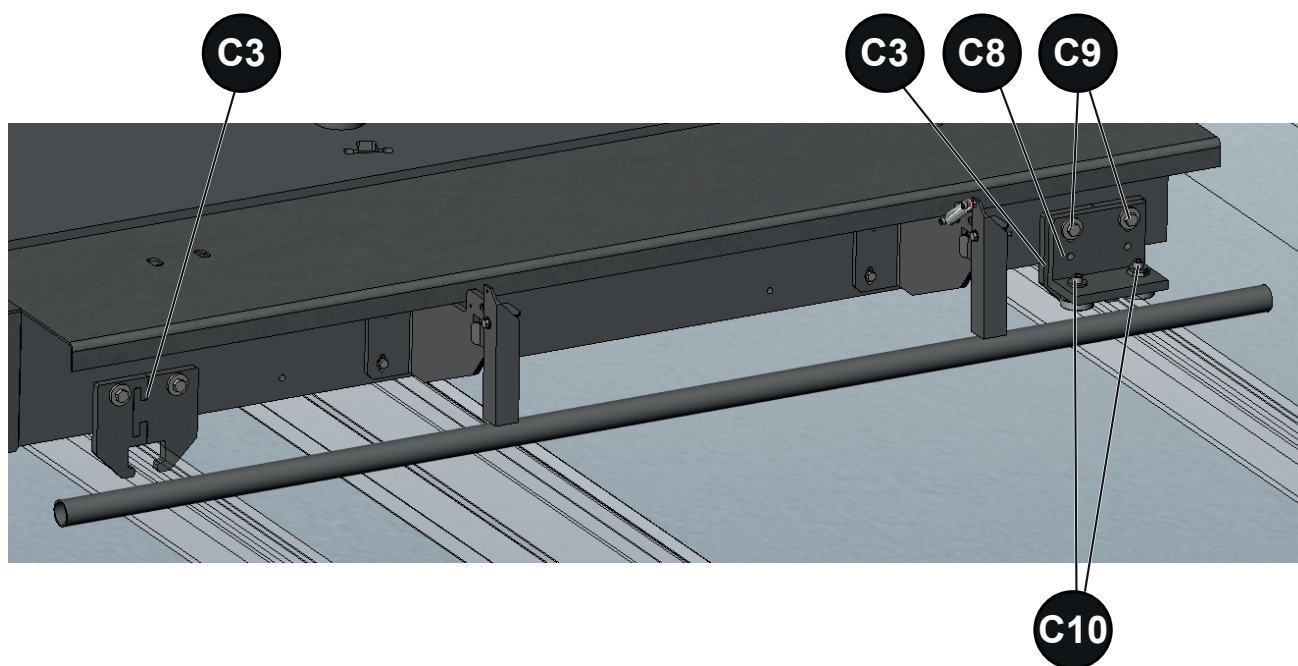
Proceed likewise with the anti-tilt clamp **C3** on the opposite side.

Check the adjustment of the guide wheels by sliding a 0.5mm thick shim between one bearing of each guide wheel and the machined side of the track.

If any adjustment is required, loosen the screw **C10** on the guide wheels on the outside and adjust by turning the eccentric pin.

Lock the screws **C10**.

Add pins once the clamps have been put in place.



3 - Placing the equipped column on the carriage



Before raising the column, check the following:

- no leaks from the geared motor,
- no impacts on the geared motor.



CAUTION:

Do not take off the hoist without first locking the fastening screws.

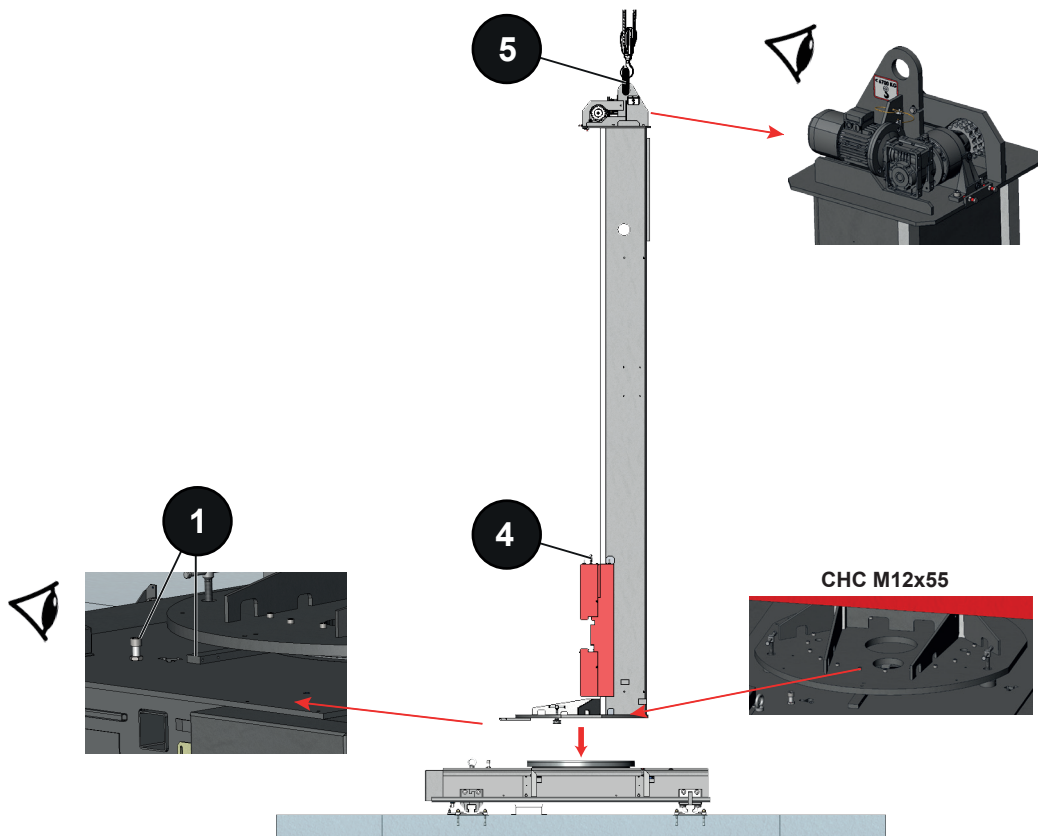


Before any handling, make sure that there is no risk of collision with personnel.



We recommend the use of a lift truck and travelling crane to raise the column to the vertical.

Make sure that the triple link chain for raising the sliding block is tensioned (**Ref 4**)
Raise the column to the vertical using the slinging eye (**Ref 5**) on its upper part.
Bring the column close to the vertical from the centre line of the carriage.
Turn the lower part of the slewing ring to line up the holes for fastening the carriage
Place the column on the powered carriage.
Engage the fastening M12 Allen screws and lock them (tightening torque: 80 N.m).
Make sure that the column turns over 360° and that the mechanical stop (**Ref 1**) is in place.
Lock rotation with the locking handles.
Take off the air intake plug covers of the lifting reduction gear.
Release the sliding block from the ties holding it for transport.



5 - LINC-MATIC CB LF: Reassembling the column with the base

1 - Placing the equipped column with its base



Before raising the column, check the following:

- no leaks from the geared motor,
- no impacts on the geared motor.



CAUTION:

Do not take off the hoist without first locking the fastening screws.



Before any handling, make sure that there is no risk of collision with personnel.

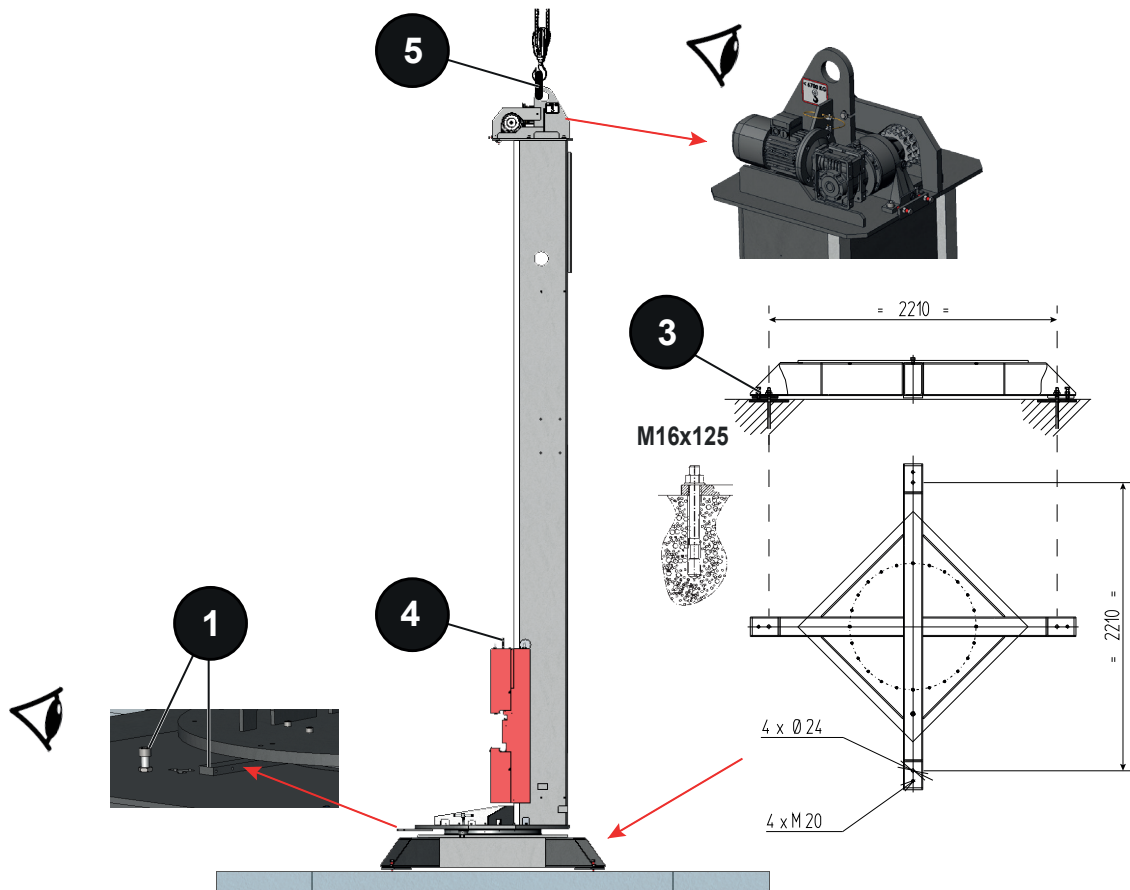


We recommend the use of a lift truck and travelling crane to raise the column to the vertical.

Make sure that the triple link chain for raising the sliding block is tensioned (**Ref 4**)
Raise the column to the vertical using the slinging eye (**Ref 5**) on its upper part.
Bring the column close to the vertical from the centre line of the carriage.
Turn the lower part of the slewing ring to line up the holes for fastening the carriage
Placing the column on the base.

- set the base plumb with the adjustment screws (**ref 3**) (cross-test level and plumb recommended)
- fasten the base to the floor using the nuts of the anchoring rods.

Make sure that the column turns over 360° and that the mechanical stop (**Ref 1**) is in place.
Lock rotation with the locking handles.
Take off the air intake plug covers of the lifting reduction gear.
Release the sliding block from the ties holding it for transport.



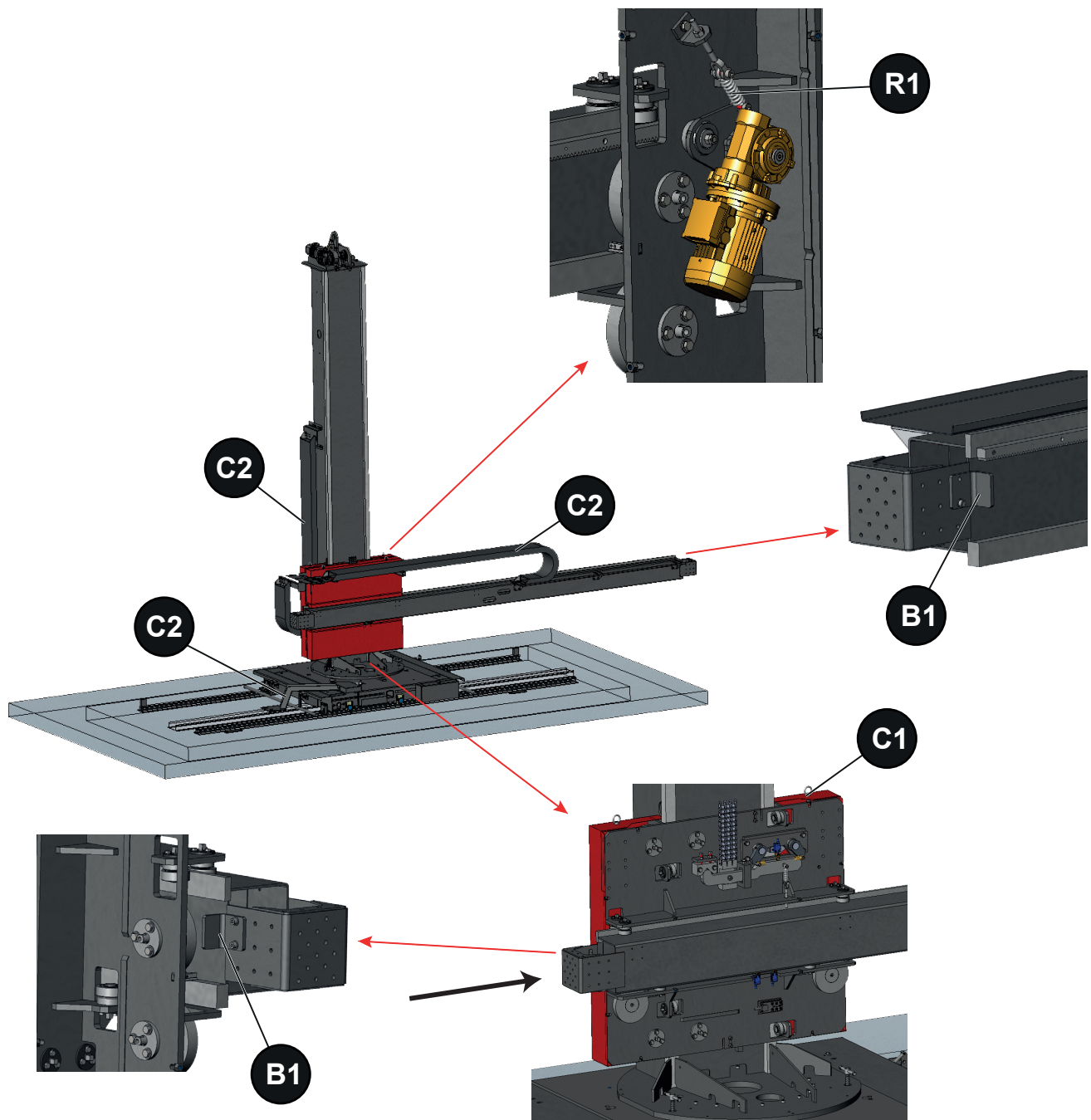
6 - LINC-MATIC CB LM and LF: Reassembling the arm

Take off the rear right-hand cover (**Ref C1**) of the sliding block,
Take off the spring (**Ref R1**) to release the pinion from the rack,
Sling the arm exactly horizontally,
Take off the mechanical stop (**Ref B1**),
Insert and push the arm from left to right between the wheels,



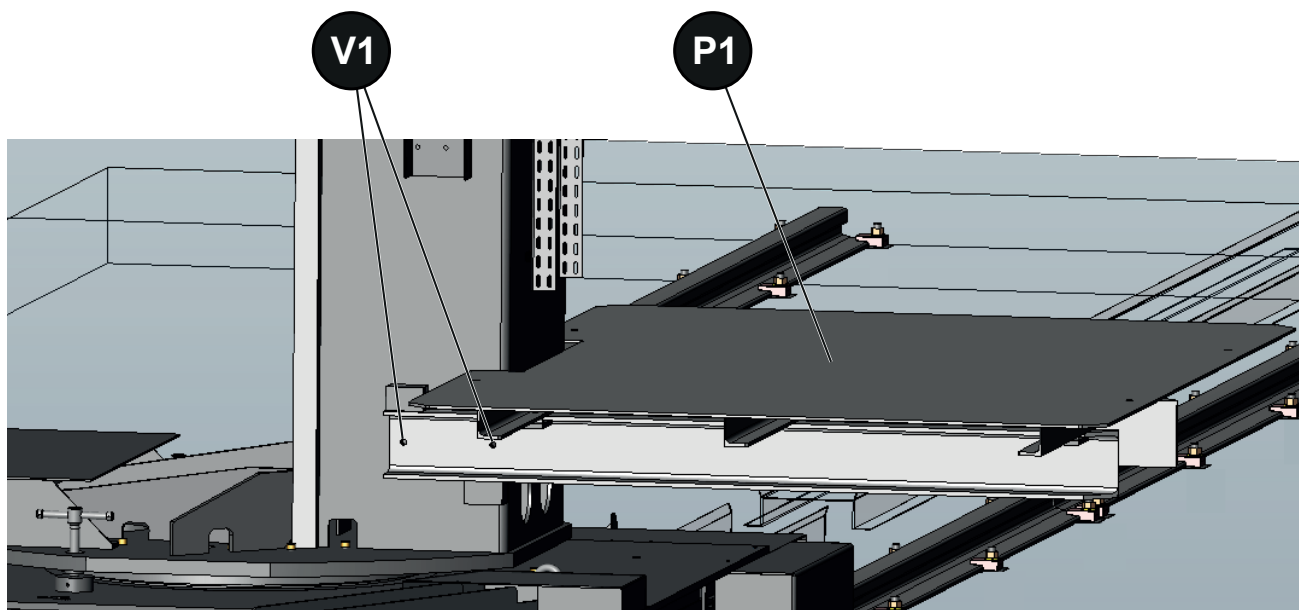
CAUTION:
Lift the arm rail scrapers while inserting the arm.

Put back the mechanical stop (**Ref B1**),
Hang the spring (**Ref R1**) to engage the pinion in the rack,
Put back the rear right-hand cover (**Ref C1**) of the sliding block,
Assemble the cable drag chains (**Ref C2**) on the column and arm,



7 - LINC-MATIC CB LM and LF: Reassembling the platform

Assemble the platform (**Ref P1**) by fixing it with the 4 screws (**Ref V1**),

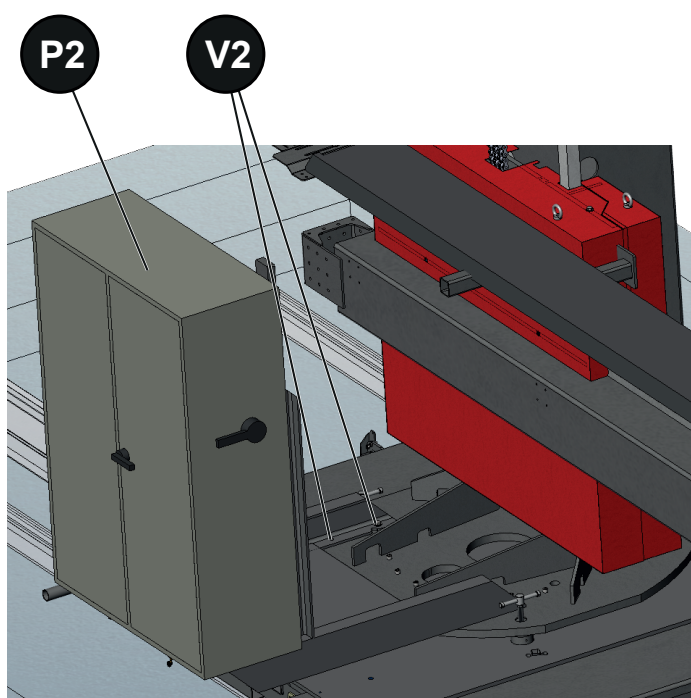


8 - LINC-MATIC CB LM and LF: Reassembling the cabinet

Assemble the cabinet (**Ref P2**) with its support, fixing it with the 4 screws (**Ref V2**),
Connect all the bundles electrically



see electrical diagram supplied



1 - Control buttons on cabinet



C1	Main machine disconnect
C2	Power on indicator
C3	Powering up
C4	Emergency stop

2 - Control buttons on operator console

Refer to the corresponding instructions:

➡ Pilot Advance



➡ Pilot Pro



3 - Starting up and shutting down



REMINDER: The operator station is located before the control console.
The machine is designed to work with only one operator.

POWERING UP:

- Set the disconnecter **C1** to the position **I**; the indicator **C2** will go on.

STARTING UP:

- Make sure that the emergency stops are released.
 - =>on the cabinet **C4**
 - => on the **Pilot Pro** or the **Pilot Advance**
- Start up the boom by pressing **C3**; the indicator **C3** will light up.

SHUTTING DOWN:

- Use an emergency stop

POWERING DOWN:

- Set the disconnecter **C1** to the position **0**



CAUTION: Power continues to be supplied upstream from the disconnecter.

4 - Execution of a welding cycle



To execute movements and/or cycles, refer to the instructions of the associated welding equipment.

1 - Care

For a long and trouble-free life, the machine requires a minimum level of care and maintenance.

The frequency of such maintenance is indicated for production in one work shift per day, or maximum 2 hours of daily running for each movement axis. For higher production rates, increase the maintenance frequencies accordingly.

Your maintenance department could photocopy these pages to track maintenance frequencies and times and the operations completed (tick the appropriate box).



Before working on the machine, it is **MANDATORY** to lock out all the supplies of utilities to the machine (electricity, air, gas etc.).
Locking an emergency stop button is not sufficient.



CAUTION: All work at heights (maintenance, troubleshooting etc.) on the boom must be carried out with appropriate personnel lifting equipment.



REMINDER: Sliding block **maintenance** may only be carried out **with all the energy supplies switched off**, when the covers are removed.



The condition of the chain is crucial for the up-and-down movement of the arm, sliding block and automatic welding head assembly. It must be monitored and any link with anomalies must be replaced.



CAUTION: The chain must be kept clean, lubricated, absolutely free from oxidation, and flexible (no seizing point between links).



IMPORTANT: The chain may only be lubricated after it is cleaned. Clean with hot water and solvent.



Grease **MAY NOT BE USED** for the chain.



REMINDER: At least once a year, cause the entire vertical displacement system (motor winch, triple chain, pinion, safety gear, limit switch contact) to be inspected by a safety body or **Lincoln Electric** personnel.



The removal and/or replacement of mechanical components of the **LINC-MATIC CB** boom are **FORBIDDEN**. Contact the After-Sales Service department of **Lincoln Electric**.

2 - Maintenance schedule



This schedule must **absolutely** be followed.
We recommend putting in place a traced system for tracking all your maintenance operations.

Sub-assembly	Component	Type of inspection	Action	Frequency			Time (in hours)			Step
				1 month	6 months	1 year	200 (1)	2500 (2)	6000 (3)	
Lifting	Brake	Dimensional	Adjustment			X				A
	Reduction gear	Visual	Lubrication		X					B
		-	Oil change				X	X		
	Geared motor	-	Replacement*						X	C
	Pinion	Visual	Cleaning		X					D
			Lubrication							
	Chain	Visual	Replacement*							E
			Cleaning	X						
			Lubrication							
		Dimensional	-			X				
	Limit switch	Operation	Test		X					F
Safety gear	Assembly	Operation	Test		X	X				G
Column	Rail	Visual	Cleaning	X						H
	Rotation brake	Operation	-		X					I
Sliding block	Wheel	Visual	-		X					J
	Rail scraper	Visual	-		X					K
Arm	Rack	Visual	Cleaning	X						L
	Rail	Visual	Cleaning	X						M
	Limit switch	Operation	Test		X					N
Arm motor drive	Pinion	Visual	Cleaning		X					O
	Reduction gear	Visual	Lubrication		X					P
Rotation	Ring	-	Lubrication			X				Q
Rotation motor system	Pinion	Visual	Cleaning		X					R
	Reduction gear	Visual	Lubrication		X					S
	Limit switch	Operation	Test		X					T
Carriage	Bearing housing	-	Lubrication			X				U
	Scraper	Visual	-	X						V
	Reduction gear	Visual	Lubrication		X					W
	Full stop	Operation	Test		X					X
	Limit switch	Operation	Test		X					Y
	Clamp	Visual	-		X					Z

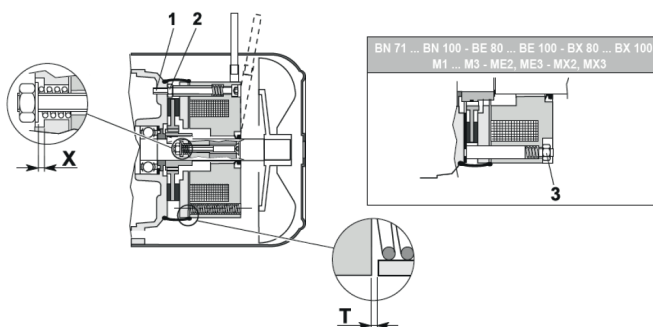
*: Contact the After-Sales Service department of **Lincoln Electric**

(1): Or 6 months, whichever is earlier.

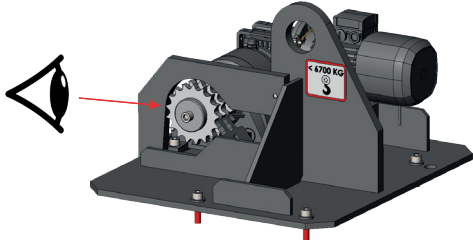
(2): Or 5 years, whichever is earlier.

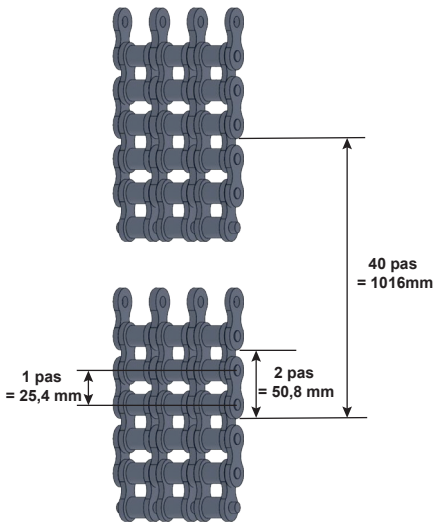
(3): Or 10 years, whichever is earlier.

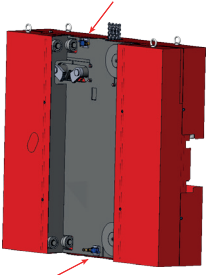
3 - Lifting system maintenance

Step	Operation	OK	NOK																																																							
A	<i>Brake (asynchronous motor only)</i>	✓	✗																																																							
	Periodic verification by the Maintenance department of the setting of the gap and the state of wear of the linings (see procedure) Replacement of the linings before the minimum thickness limit is exceeded (1.5mm). PROCEDURE FOR INSPECTING AND ADJUSTING THE BRAKE OF THE LIFTING GEARED MOTOR. Take off the rear casing of the motor.  CAUTION: The value of the gap T must be verified from time to time. It must be located between minimum and maximum values stated in the table. If the gap values are greater than the maximum value, the brake becomes noisier and releasing it may become impossible. In the presence of the releasing lever, an excessive increase in the gap could cancel the breaking torque, because of the take-up of the slack of the rods of the releasing lever.  CAUTION: The distance X must necessarily be greater than or equal to the value indicated in the table. Otherwise, replace the brake disc lining. Adjust the gap T by adjusting the nuts (3), to the minimum value indicated in the table. The value of the gap must be verified from time to time. It must be located between minimum and maximum values stated in the table. If the gap values are greater than the maximum value, the brake becomes noisier and releasing it may become impossible. In the presence of the releasing lever, an excessive increase in the gap could cancel the breaking torque, because of the take-up of the slack of the rods of the releasing lever. The distance X must necessarily be greater than or equal to the value indicated in the table. The thickness of the disc brake lining must be greater than 1.5mm.  <table><tr><th colspan="9">TYPE OF BRAKE</th></tr><tr><th>FD</th><th>FD 02</th><th>FD 03 FD 53</th><th>FD 04 FD 14</th><th>FD 05 FD 15 FD 55</th><th>FD 06S</th><th>FD 06 FD 56</th><th>FD 07</th><th>FD 08 FD 09</th></tr><tr><th>FA</th><th>FA 02</th><th>FA 03</th><th>FA 04 FA 14</th><th>FA 05 FA 15</th><th>FA 06S</th><th>FA 06</th><th>FA 07</th><th>FA 08</th></tr><tr><td rowspan="2">T</td><td>Min</td><td>0.2</td><td>0.2</td><td>0.3</td><td>0.3</td><td>0.35</td><td>0.35</td><td>0.4</td><td>0.5</td></tr><tr><td>Max</td><td>0.5</td><td>0.5</td><td>0.6</td><td>0.6</td><td>0.7</td><td>0.7</td><td>0.8</td><td>1.0</td></tr><tr><td>X</td><td>≥ 0.8</td><td>0.8</td><td>1.0</td><td>1.0</td><td>1.1</td><td>1.1</td><td>1.2</td><td>1.5</td></tr></table> T (mm) = Gap	TYPE OF BRAKE									FD	FD 02	FD 03 FD 53	FD 04 FD 14	FD 05 FD 15 FD 55	FD 06S	FD 06 FD 56	FD 07	FD 08 FD 09	FA	FA 02	FA 03	FA 04 FA 14	FA 05 FA 15	FA 06S	FA 06	FA 07	FA 08	T	Min	0.2	0.2	0.3	0.3	0.35	0.35	0.4	0.5	Max	0.5	0.5	0.6	0.6	0.7	0.7	0.8	1.0	X	≥ 0.8	0.8	1.0	1.0	1.1	1.1	1.2	1.5		
TYPE OF BRAKE																																																										
FD	FD 02	FD 03 FD 53	FD 04 FD 14	FD 05 FD 15 FD 55	FD 06S	FD 06 FD 56	FD 07	FD 08 FD 09																																																		
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T	Min	0.2	0.2	0.3	0.3	0.35	0.35	0.4	0.5																																																	
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X	≥ 0.8	0.8	1.0	1.0	1.1	1.1	1.2	1.5																																																		

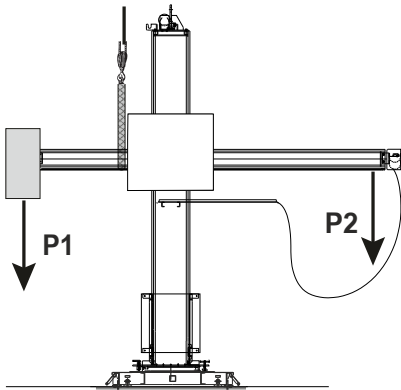
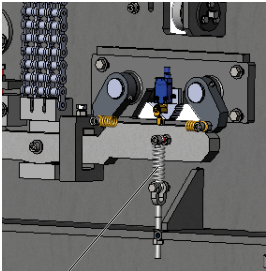
Step	Operation	OK	NOK
B	<u>Reduction gear</u>	✓	✗
	 All reduction gear must be maintained to offer maximum efficiency by carrying out the scheduled maintenance operations recommended by the manufacturers. Proper maintenance will offer best performance, a longer life and safe working. • <u>Reduction gear W 63 UFC2 38 P71 B5 B3</u> Check visually for leaks. R1: filling plug V1: draining plug Quantity of oil: 0.5 litre Type of "synthetic" oil: • OMALA S4 WE 320 • Klübersynth GH 6 320 • Mobil Glygoyle 320 • Alphasyn PG320 • Carter SY 320 • <u>Reduction gear 3 01 L 2 30.7 PC EOVC EA LM</u> Check the oil level by unscrewing the plug N1. Top up if needed. Check visually for leaks. R2: filling plug N1: level plug V2: draining plug Quantity of oil: 1.1 litre Type of "synthetic" oil: • OMALA S4 WE 300 or S4 GX 300 • Blasia S 300 • Klübersynth GH 6 300 • Mobil Glygoyle 300 • Alphasyn PG320 • Carter SY 320		

Step	Operation	OK	NOK
D	<u>Pinion</u>	✓	✗
	- Check that there is no marking due to the chain being caught between the pinion and the structure. If there is any marking, the motor system, pinion and chain must be changed. - Check if the pinion is clean. Clean with hot water and solvent. 		

Step	Operation	OK	NOK
E	<u>Chain</u>	✓	✗
	<u>Visual inspection</u> - No corrosion → if corroded, the chain must be changed. - Flexibility: no stiffness or seizing of articulations → if not flexible, the chain must be changed - Cleanliness: no fouling or build-up of grease and dust → if the chain is fouled, clean it with grease remover/mechanical solvent, then oil it - Presence of lubricant: chain not dry → if the chain is dry, oil it Oil over the whole functional length of the chain with a brush, using non-detergent mineral oil with viscosity appropriate for the operating temperature. - Operating temperature (°C) 0 to 50°C - Recommended viscosity grade (ISO - VG) 46 to 150 - Type of oil: KLUEBER structovis BHD75S Once the boom is operating, carry out several lifting cycles to spread the oil and allow it to penetrate. Wipe away any excess lubrication. <u>Verification of wear</u>  Change the triple chain and the pinion if elongation is greater than 2%. The length is measured on 40 links (40 increments): - Normal length: 1016 mm - Max. length: 1036.32 mm Take the measurement: - with a tape measure, - with the sliding block down, - with the chain stretched by the load, - at 3 points (at the sliding block, at the middle and under the lifting plate)		

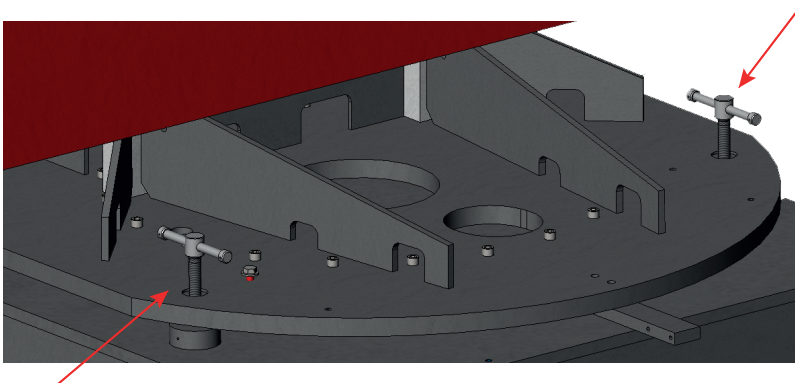
Step	Operation	OK	NOK
F	<u>Limit switch</u>	✓	✗
	Test the upper and lower limit switches of the lifting mechanism. The triggering of a limit switch must stop the movement. 		

4 - Maintenance of safety gear

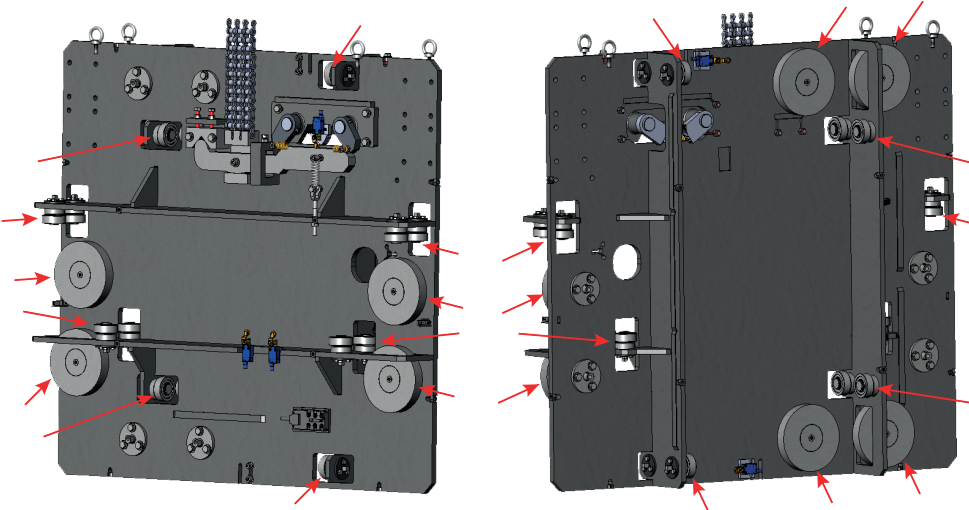
Step	Operation	OK	NOK
G	<u>Safety gear</u>	✓	✗
	<u>Half-yearly safety gear inspection</u> This inspection consists in making sure that the safety gear mechanism is operating correctly, by placing the slide block on a batten before it reaches the lower limit. <u>Yearly safety gear inspection</u> • This operation may be carried out at any sliding block height. Preferably select a low position for more safety • Move the arm forward or back to balance the loads in relation to the column (P1=P2) • Lift the boom arm over approximately 20 cm using lifting equipment and webbing (placed as close to the column as possible) • Release the webbing. The arm must descend by a few cm and then be locked in place. • Check that the descent movement is blocked. • If it is not blocked, the safety gear is not working. Contact the After-Sales Service department of Lincoln Electric • To release the block, lift the arm again over approximately 10 cm using the webbing • Raise the arm using the control buttons till the strap tension is released. • Remove the webbing.  While adjusting the tension of the spring (ref C6), do not exceed elongation above 12 mm in relation to the initial length. The operation may result in some marks of the eccentric jaws on the rail. These marks do not affect the proper working or safety of the machine. <u>Never grind them off</u>  		

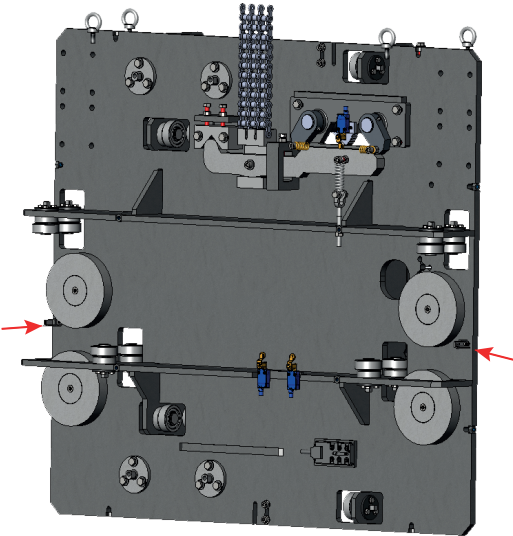
5 - Column maintenance

Step	Operation	OK	NOK
H	<u>Rail</u>	✓	✗
	Check the condition of the rails (=> clean, with no foreign body). To avoid oxidation, you may apply sliding varnish of the type: ✓ Adermos 800 (Molydal)		

Step	Operation	OK	NOK
I	<u>Rotation brake</u>	✓	✗
	Inspect operation. 		

6 - Sliding block maintenance

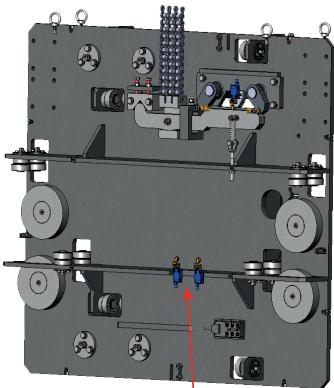
Step	Operation	OK	NOK
J	<u>Wheel</u>	✓	✗
	After removing the covers of the sliding block, check the condition of the wheels (=> clean, with no damage). 		

Step	Operation	OK	NOK
K	<u>Scraper</u>	✓	✗
	Check the condition of the scrapers (=> clean, with no damage). Change them if damaged or worn. 		

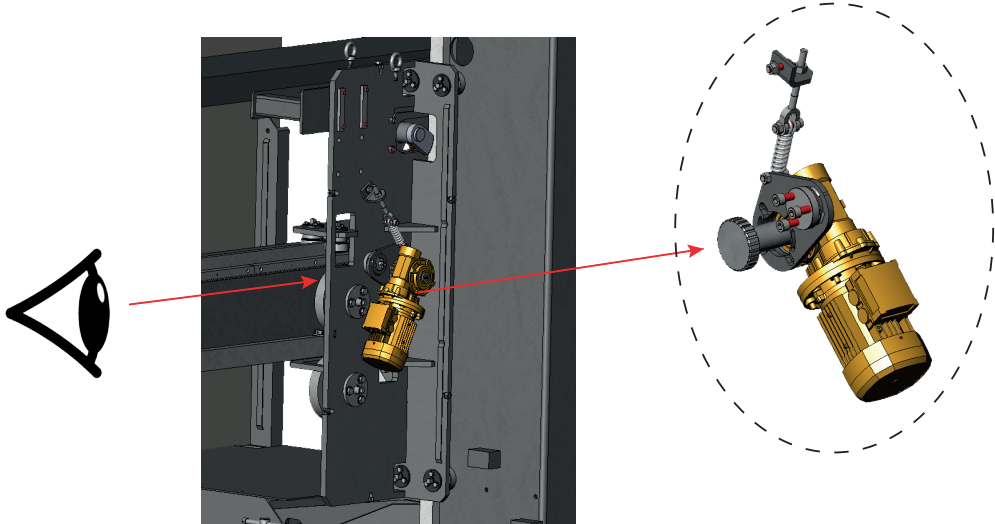
7 - Arm maintenance

Step	Operation	OK	NOK
L	<u>Rack</u>	✓	✗
	Brush the toothed side without adding grease. To avoid oxidation, you may apply sliding varnish of the type: ✓ Adermos 800 (Molydal)		

Step	Operation	OK	NOK
M	<u>Rail</u>	✓	✗
	Check the condition of the rails (=> clean, with no foreign body). To avoid oxidation, you may apply sliding varnish of the type: ✓ Adermos 800 (Molydal)		

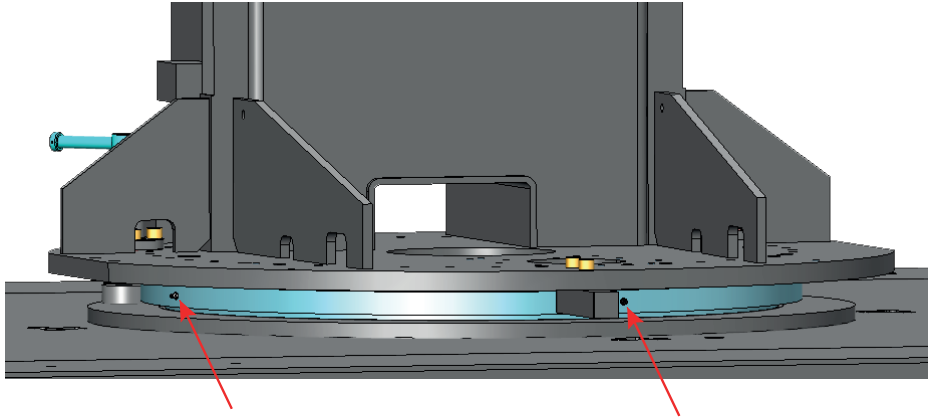
Step	Operation	OK	NOK
N	<u>Limit switch</u>	✓	✗
	Test the left and right limit switches of the arm movement mechanism. The triggering of a limit switch must stop the movement. 		

8 - Arm motor maintenance

Step	Operation	OK	NOK
O	<u>Pinion</u>	✓	✗
	After removing the covers of the sliding block, check the condition of the pinion (=> clean, with no foreign body). To avoid oxidation, you may apply sliding varnish of the type: ✓ Adermos 800 (Molydal) 		

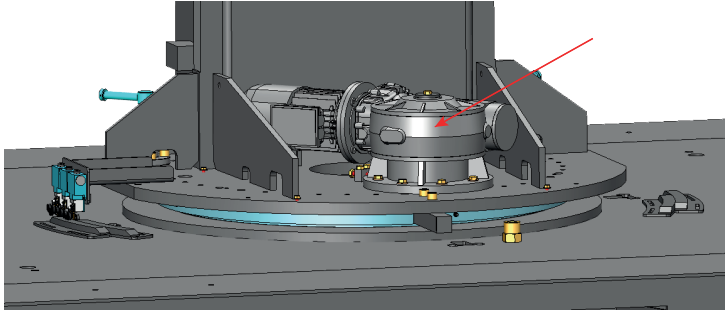
Step	Operation	OK	NOK
P	<u>Reduction gear</u>	✓	✗
	After taking off the covers of the sliding block, carry out the following checks: • visually for leaks. • visually check the overall condition of the reduction gear		

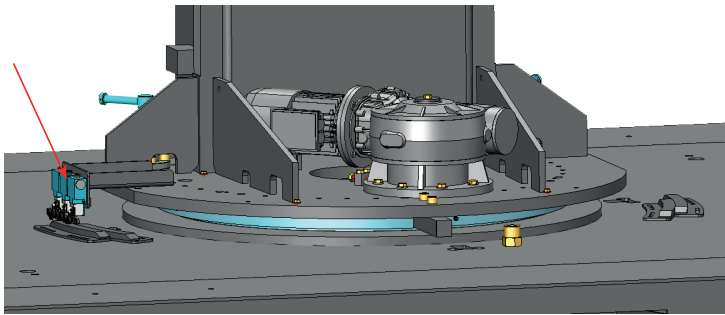
9 - Column rotation maintenance

Step	Operation	OK	NOK
Q	<u>Ring</u>	✓	✗
	Lubricate the ring. It is important to turn the ring after lubrication, and to top up after rotation. ✓ ESSO BEACON EP2 (Molydal) 		

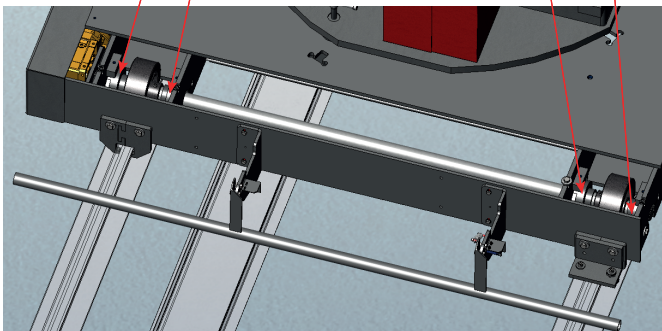
10 - Maintenance of optional column rotation

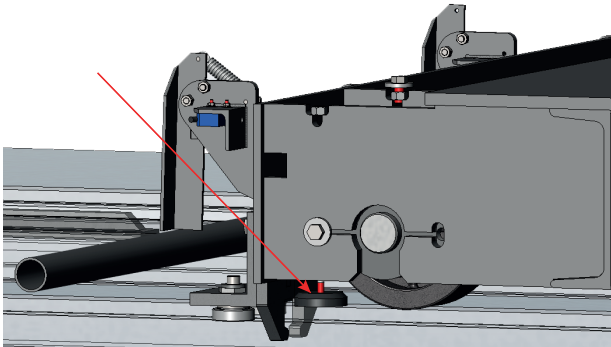
Step	Operation	OK	NOK
R	<u>Pinion</u>	✓	✗
	After removing the guard covers, check the condition of the pinion (=> clean, with no foreign body). To avoid oxidation, you may apply sliding varnish of the type: ✓ Adermos 800 (Molydal)		

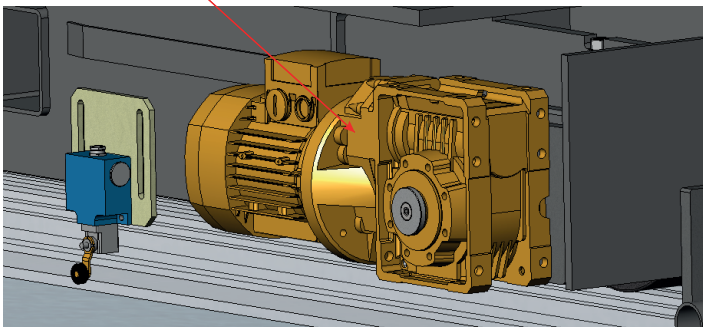
Step	Operation	OK	NOK
S	<u>Reduction gear</u>	✓	✗
	After taking off the guard cover, verify: - visually for leaks. - visually check the overall condition of the reduction gear		
			

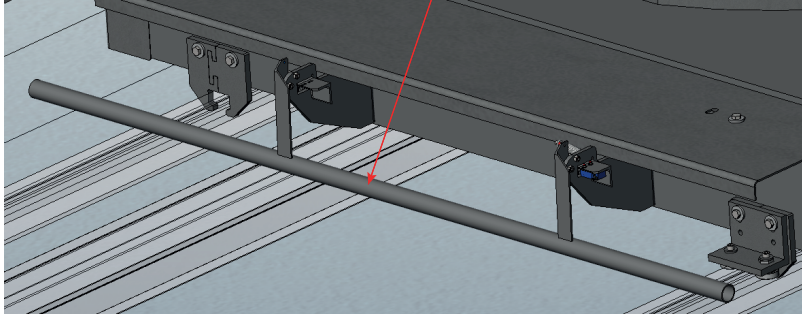
Step	Operation	OK	NOK
T	<u>Limit switch</u>	✓	✗
	Test the left and right limit switches of the arm movement mechanism. The triggering of a limit switch must stop the movement.		
			

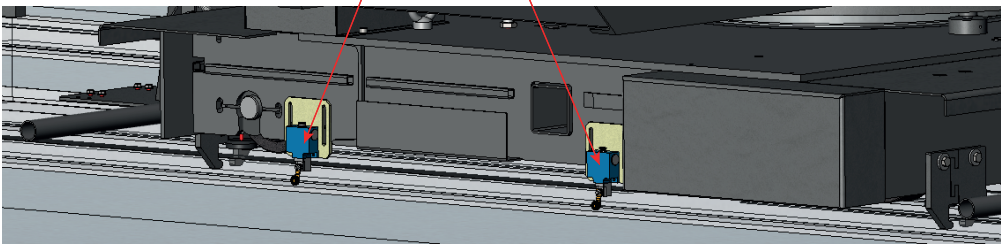
11 - Carriage maintenance

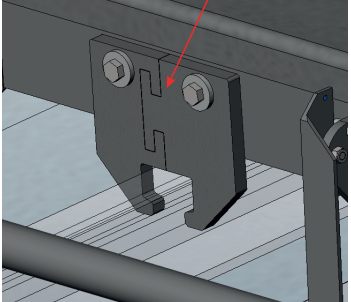
Step	Operation	OK	NOK
U	<u>Bearing housing</u>	✓	✗
	After taking off the guard covers, lubricate the bearings. ✓ ESSO BEACON EP2 		

Step	Operation	OK	NOK
V	<u>Scraper</u>	✓	✗
	Check the condition of the scrapers (=> clean, with no damage). Change them if damaged or worn. 		

Step	Operation	OK	NOK
W	<u>Reduction gear</u>	✓	✗
	After taking off the guard cover, verify: - visually for leaks. - visually check the overall condition of the reduction gear 		

Step	Operation	OK	NOK
X	<u>Full stop</u>	✓	✗
	Test the full stop limit switches. The triggering of a limit switch must stop the movement. 		

Step	Operation	OK	NOK
Y	<u>Limit switch</u>	✓	✗
	Test the carriage limit switches. The triggering of a limit switch must stop the movement. 		

Step	Operation	OK	NOK
Z	<u>Clamp</u>	✓	✗
	Check the fastening of the clamps. The clamps must not rub against the rails. 		

12 - Troubleshooting

Refer to the following:

- Electrical diagram
- Instructions of the **Pilot Advance**
- Instructions of the **Pilot Pro**

13 - Spare parts

Ordering procedure:

Almost all the parts of a machine or installation are referenced in the photographs and sketches.

The descriptive tables contain three types of item:

- items normally held in stock: ✓
- items not held in stock: ✕
- articles upon request: no reference

(For such parts, please complete the list of parts page and send us a copy. In the Order column, state the number of parts required and indicate the type and number of your equipment.)

For items referenced in the photographs or sketches but not included in the tables, please send us a copy of the relevant page and highlight the relevant reference.

Example:

✓	normally held in stock.
✕	not in stock
	upon request.

Ref	Part no	Stock	Order	Description
E1	W000XXXXXX	✓		Machine interface board
G2	W000XXXXXX	✕		Flow meter
A3	P9357XXXX			Printed front plates

- While ordering parts, please indicate the quantity and note the number of your machine in the box above.

CE Type Matricule	TYPE:
	Number:

Electrical cabinet

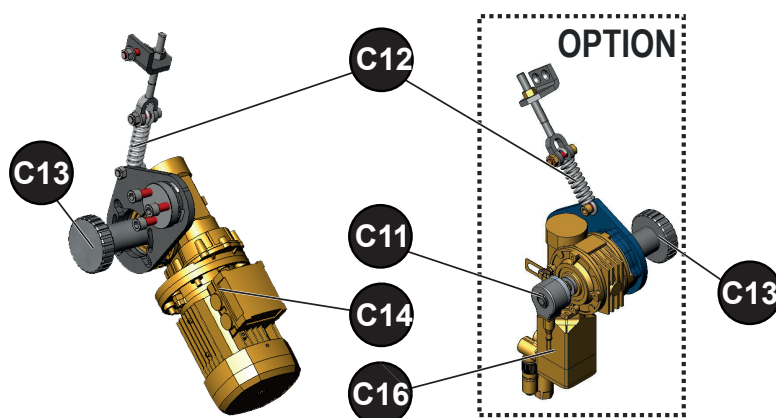
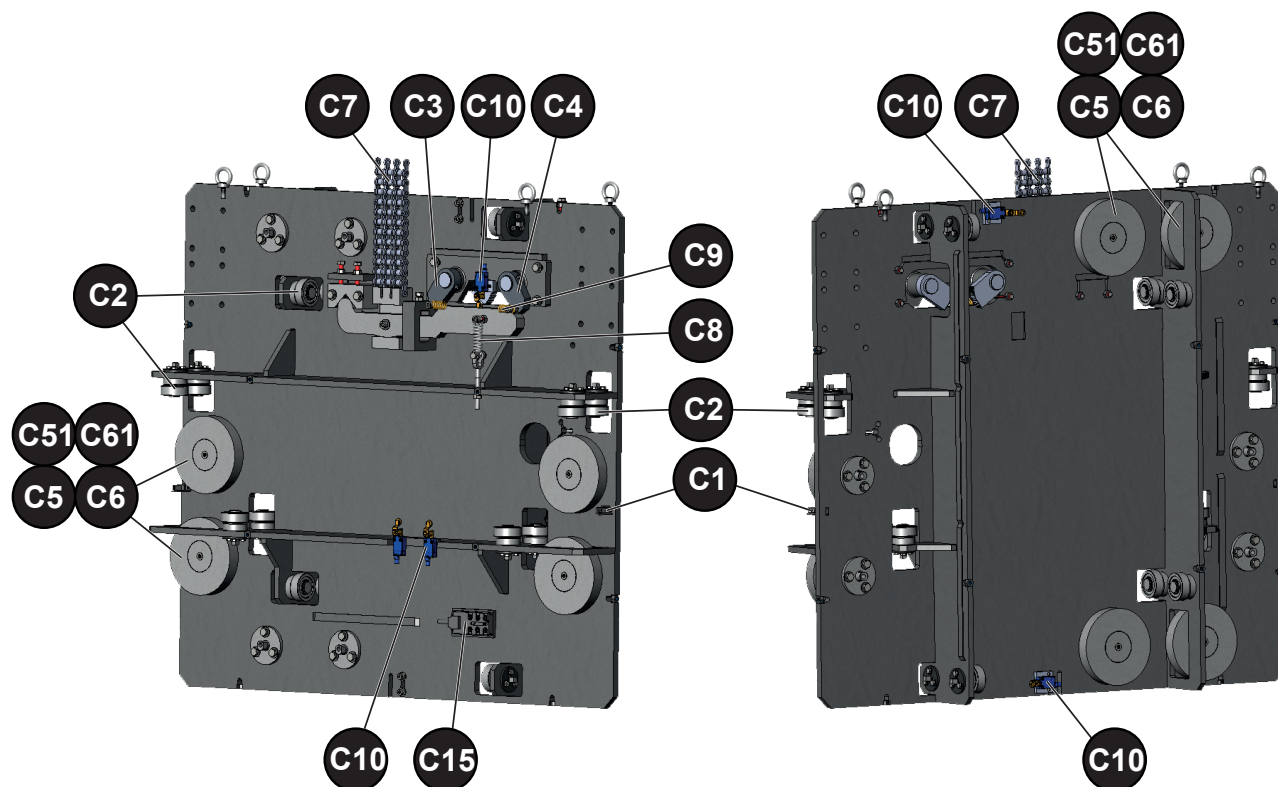
✓	normally held in stock.
✗	not in stock
	upon request.

Ref	Part no	Stock	Order	Description
KMM KMD	PC5701026			Contactor, LC2D12BD
QF18	PC5705261			Motor circuit breaker, GV2ME07
Q0	PC5702566			Sectioning switch, 3P - 160A
U40	PC5706111			Power supply, 230+400V/24VDC - 5A
MS1	W000137797	✓		Safety module, XPSAC5121
KM1	PC5701707			Contactor, LC1D25BD
	PC5701626			LADN40 auxiliary contact
KADCY	P00111108			Relay, 24VDC - 3A - 4RT
	PC5701642			Base for 4RT relay
VHZ1	PC5700236			Fq variator, 0.55K 400TP AGL402 05F (arm)
	PC5700262			Fq variator, 1.1K 400TP AGL402 09F (carriage)
API1	PC5703671			PLC, SIMATIC 14E/10S / S7-1215c
API2	PC5703673			16I/16O On/Off / S7-120 module
	PC5701733			Contactor, CAD32BD
	PC5701726			Relay, 24VAC/DC - 1RT - 6A
	PC5700166			Variable drive keypad module
	PC5703674			PLC cord, 2M/S7-1200

- While ordering parts, please indicate the quantity and note the number of your machine in the box above.

 Type Matricule	TYPE:
	Number:

Slide block assembly

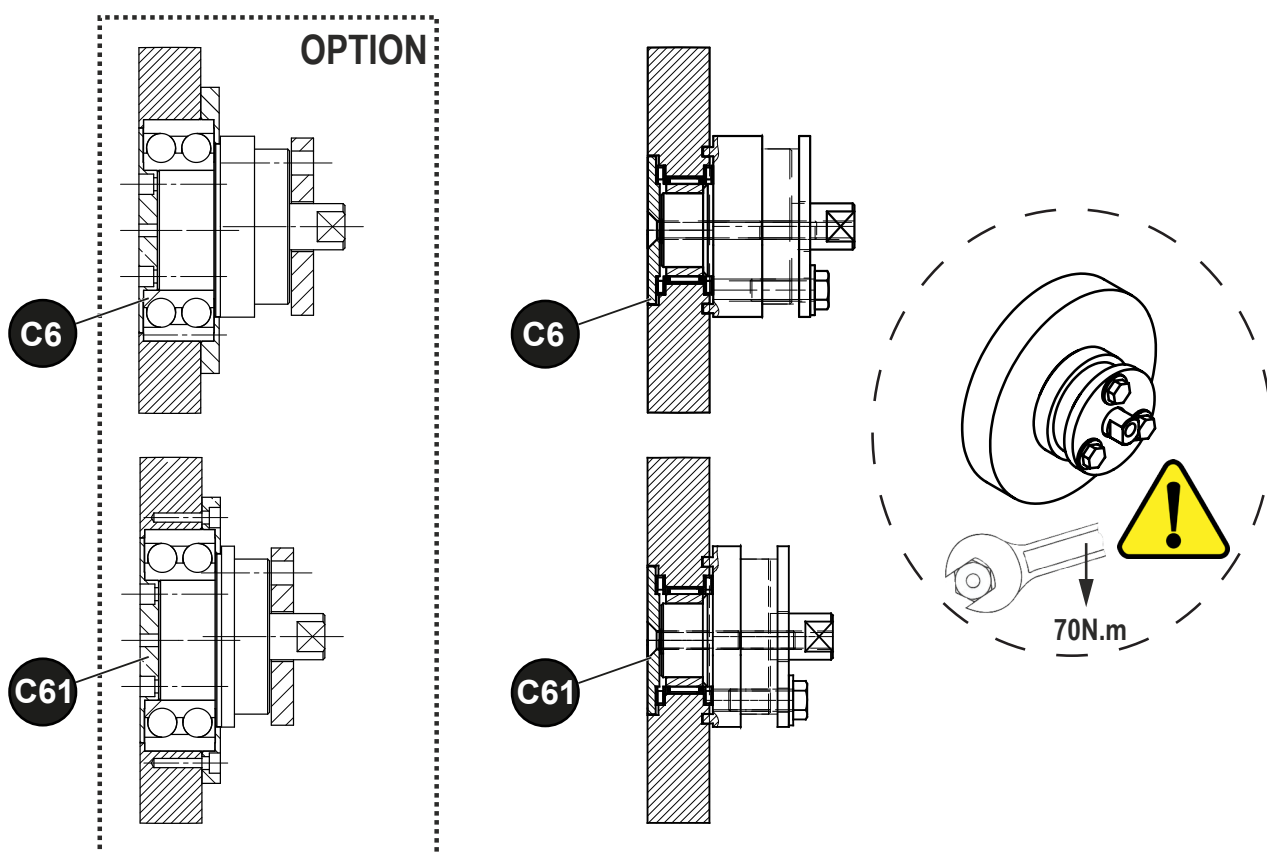


✓	normally held in stock.
✗	not in stock
	upon request.

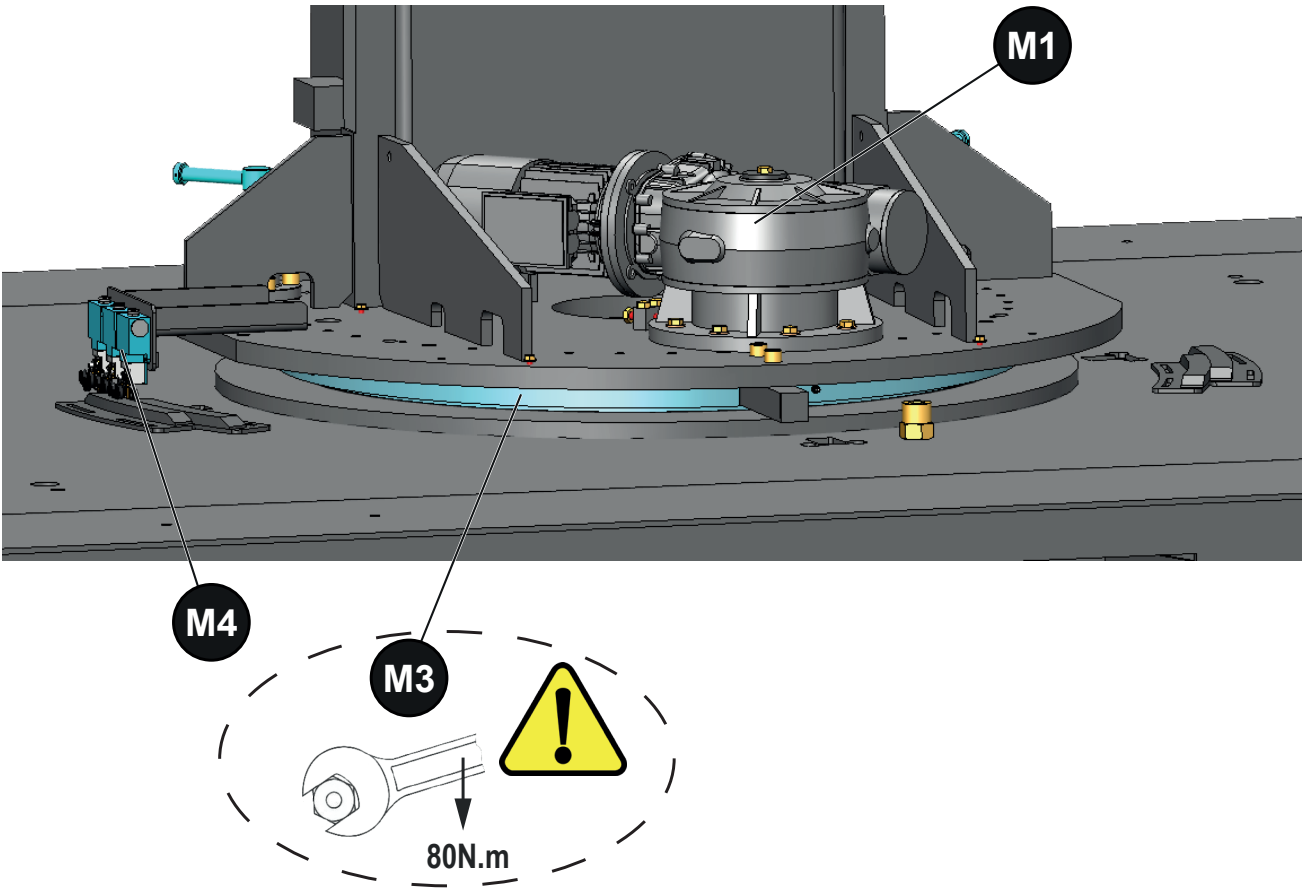
Ref	Part no	Stock	Order	Description
C1	P07020096			Arm scraper
C2	W000365802	✗		30X72X23 LR 5206-2Z wheel
C3	P91241489			Left-hand clamping jaw
C4	P91241490			Right-hand clamping jaw
C6	P95244270			Ø200 wheel assembly, long pin
C5	P95244280			Ø200 reinforced wheel assembly, long pin (optional)
C61	P95244265			Ø200 wheel assembly, short pin
C51	P95244275			Ø200 reinforced wheel assembly, short pin (optional)
C7	PC6205114			Triple-pitch chain, 25.4
C8 C12	PC6203142			25X5X79 extension spring
C9	PC6203141			25X3.5X222 extension spring
C10	PC5704377			XCM-D2115M12 limit switch
C11	P95248610			Optional encoder
C13	P95245615			25 DTS M3 D25 pinion with shaft
C14	P95245667			Asynchronous geared motor
C15	PC5513285			6xM12 distributor
C16	P95245669			5-500 cm/min brushless geared motor (optional)

- While ordering parts, please indicate the quantity and note the number of your machine in the box above.

CE Type Matricule	TYPE:
	Number:



Column rotation assembly



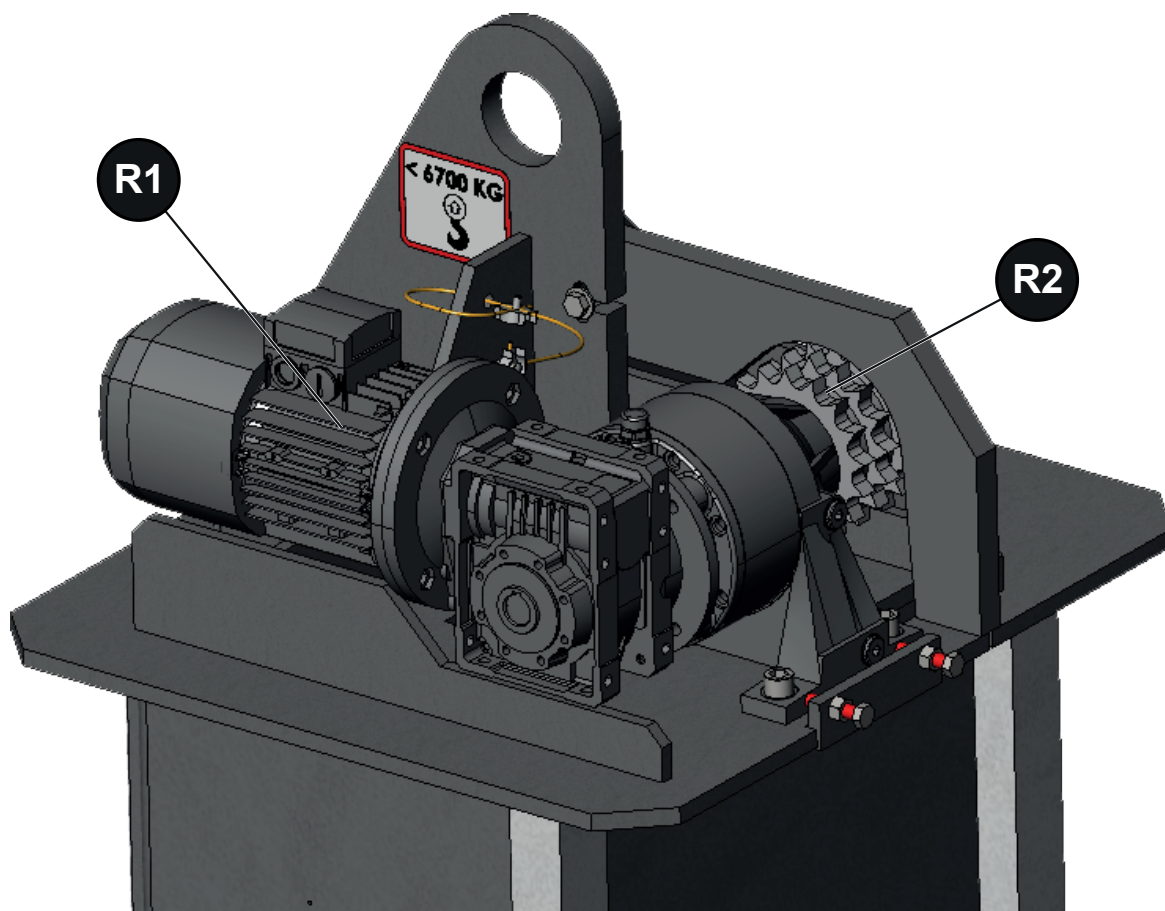
✓	normally held in stock.
✗	not in stock
	upon request.

Ref	Part no	Stock	Order	Description
M1	Z0004963			Geared motor (optional)
M2	Z0003877			Pinion (optional)
M3	PC6200677			Ball ring
M4	PC5702181			Limit switch body (optional)
	PC5702182			Limit switch head (optional)

- While ordering parts, please indicate the quantity and note the number of your machine in the box above.

CE Type Matricule		TYPE:
		Number:

Lifting assembly



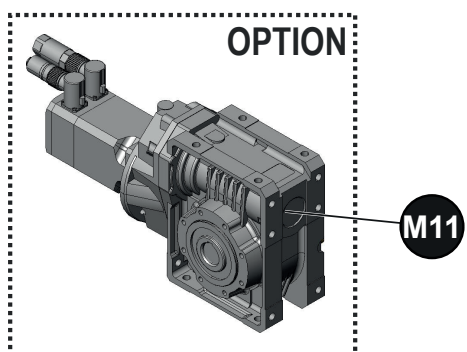
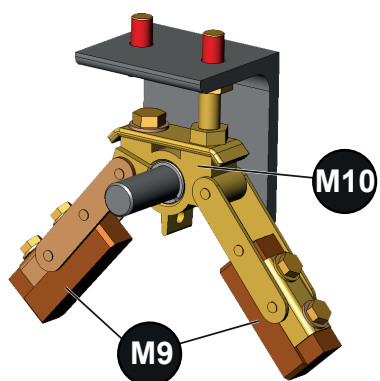
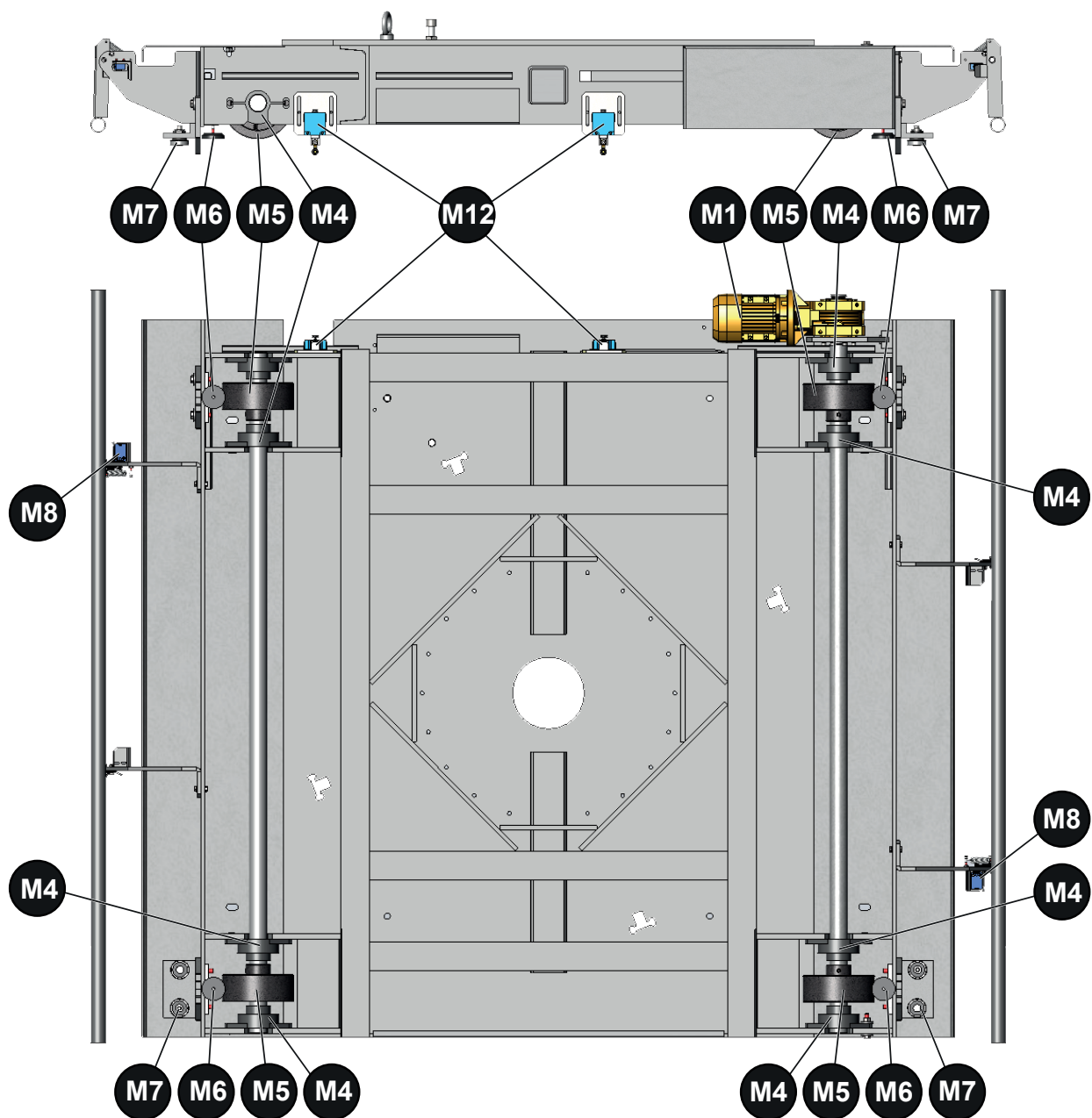
✓	normally held in stock.
✗	not in stock
	upon request.

Ref	Part no	Stock	Order	Description
R1	P91241427			Asynchronous geared motor
R2	P91241571			Pinion Z=17X3 P25.4 D50 CL
	PC5700243			5-160 cm/min brushless geared motor (optional)

- While ordering parts, please indicate the quantity and note the number of your machine in the box above.

CE Type Matricule	TYPE:
	Number:

Powered carriage assembly (Linc-Matic CB LM)



✓	normally held in stock.
✗	not in stock
	upon request.

Ref	Part no	Stock	Order	Description
M1	P95242372			Asynchronous geared motor
M2	P95242392			Drive shaft
M3	P91241310			Driven shaft
M4	PC6201338			PCJT 50 surface mounted bearing
M5	P91241682			Carriage wheel
M6	P91241684			Scraper
M7	P91241685			Guide wheel assembly
M8	W000140250	✗		Set of 2 position switches
M9	W000275302	✗		LG 60 brush
M10	W000365799	✗		Brush holder
M11	P95242375			5-500 cm/min brushless geared motor (optional)
M12	P95242276			position switches

- While ordering parts, please indicate the quantity and note the number of your machine in the box above.

CE Type Matricule	TYPE:
	Number:

