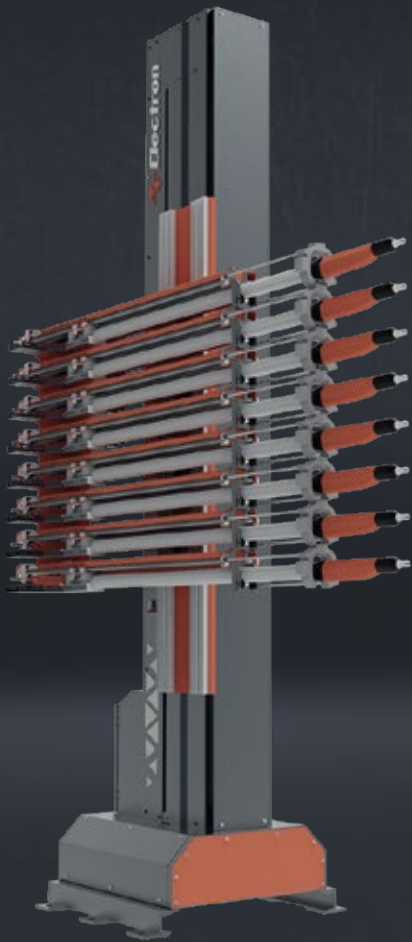




POWDER COATING EQUIPMENT USER'S MANUAL

# E-ROBOT+3

SERIES



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product  
online

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 **Electron**

+3

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## 1. Safety Regulations

This section sets out the fundamental safety regulations that must be followed by the user and third parties using the E-ROBOT+3 Z

These safety regulations must be read and understood before the E-ROBOT+3 Z is used.

### 1.1. Safety Symbols

The following warnings with their meanings can be found in the Sistem Teknik Makina operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.



#### **DANGER!**

Live electricity or moving parts are dangerous.  
Possible Consequences: Death or serious injury.



#### **WARNING!**

Improper use of the equipment could damage the machine or cause it to malfunction.  
Possible consequences: Minor injuries or damage to equipment

### 1.2. Conformity Of Use

E-ROBOT+3 Z-Axis Reciprocator is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the regular application of powder coating.

- Any other use is considered as non-conform. The manufacturer is not responsible for damage resulting from improper use of this equipment; the end-user alone is responsible. If the E-ROBOT+3 Z is to be used for other purposes or other substances outside of our guidelines then Sistem Teknik Makina A.Ş. should be consulted.
- Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The E-ROBOT+3 Z should only be used, maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.
- Start-up is forbidden until it has been established that the E-ROBOT+3 Z has been set up and wired according to the guidelines for machinery EN 60204-1 (machine safety) must also be observed.
- Unauthorized modifications to E-ROBOT+3 Z exempt the manufacturer from any liability of resulting damage.
- Relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
- In addition to above, country-specific safety regulations must be observed.

### Explosion Protection Class of E-ROBOT+3 Z

Explosion Protection	Protection Type	Temp Class
  II 3 D	IP54	T135 °C

*Note: EN 60204-1 standard includes the non-mobile machines electronic machines and programmable electronic hardware and systems.*

### 1.3. Technical Safety Regulations for Stationary Electrostatic Powder Spraying Equipment

#### 1.3.1. General Information

The powder spraying equipment of Sistem Teknik Makina (Electron) is designed for safe use and to the latest technological specs. Electrostatic powder equipment could create dangerous situations unless it's used properly. In addition to that, there might be a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery that belongs to the user and hazards to the proper operation of equipment.

- The powder spraying equipment should only be started up and used once the operating instructions have been carefully read. Apart from any usage from the user manual, there lies a danger of damaging the equipment and loss of control of the equipment.
- Operational safety has to be observed before every start-up. Regular Servicing is the essence of working safely.
- Local legislation should be considered for the safety.
- The plug has to be disconnected before the machine is opened for repair.
- The plug and socket connections between spraying equipment should only be taken out when the power is off.
- The connection cables have to be installed in a manner that they wouldn't interfere or damage the normal machine operation. Also the local legislation should be observed for the installation.
- Only original Electron spare parts should be used, because only the original products will guarantee the equipment's explosion protection. Any damage caused by other used parts is not covered by the guarantee.
- If Electron powder coating equipment is going to be used with other devices/machinery from other manufacturers, their safety regulations should be also considered.
- Be cautious while working in a powder/air mixture area. In the right concentration the mixture would be flammable, thus smoking is forbidden in the entire plant area.
- Rule of thumb says that any person who uses a pacemaker should NEVER enter a high voltage area or places with electromagnetic fields. Note that people with pacemakers ALSO SHOULDN'T work in powder spraying installations.



#### WARNING!

Only the customer itself is responsible for the safe usage of the equipment  
Sistem Teknik is not responsible for any damage resulted from the usage.

#### 1.3.2. Consciously Working Safe

Every other individual who will be working for the assembly, start-up, operation, service and repair of powder spraying equipment must have read and understood the operating instructions and the "Safety Regulations". Operators have to be appropriately trained via Sistem Teknik assembly personnel and made aware of the possible danger of powder spraying equipment and the environment.

The E-ROBOT+3 Z must only be set up and used in zone 22. The spray guns are permitted in the zone 21 which is created by them but only them.

Powder spraying equipment must only be used by trained and authorized personnel. This also applies for any kind of modification to the electrical equipment, which only should be carried out by a specialist.

It is essential that the operating instructions are understood before any kind of work is done with the equipment. All the procedures have to be done according to the instructions.

Powder spraying equipment can be turned off via the main power switch or the emergency shut down procedure.

#### 1.3.3. Safety Regulations for the Operating Firm and/or Personnel

- First of all, anything which would influence the equipment negatively should be avoided for the technical safety.
- The machine user should be well informed about no other people than trained personnel would use the machine.
- The employer has to provide an operating instruction manual for specifying the dangers for humans and the environment by handling dangerous materials, as well as all preventive measures and workplace behaviors. This "document" must be well written in an understandable form in the language that the person employed for the equipment.
- The operator is obliged to check the equipment for external damage once every shift changed at the very least. The operation characteristic changes should also be reported.
- Users should conform the satisfactory working conditions else the equipment should not be used.
- The operating firm must ensure that the users wear protective clothing like facemasks and working suits.
- The firm also guarantees the cleanliness of the workplace and proper checks for the powder spraying equipment.
- Safety devices should be always on the equipment at all costs unless the equipment is going to be maintained or cleaned. After the maintenance all the devices should be put on the equipment. The users must be trained well for this purpose.
- Powder fluidization or high voltage spray gun checks have to be done when the equipment is switched on.

#### 1.3.4. Special Types of Hazard

- **Power:** All the high voltage equipment should be unplugged before opened. This is a huge life risk thus it has to be taken under great care.
- **Powder:** Powder/air mixtures could be ignited by sparks. Sufficient ventilation is a must while using powder spraying equipment. Powder, which is not swept from the floor creates risky environment.
- **Static Charges:** These could result in the following: Charges to people, electric shocks, sparks. Charging of objects has to be avoided.
- **Grounding:** All electricity conducting parts and machinery in the workplace must be grounded 1.5 m on either side and 2.5 m around each booth opening. The grounding resistance must amount to a maximum of 1 MOhm resistance has to be tested regularly. The appropriate devices must be kept in the workplace for regular grounding checks.
- **Compressed Air:** Compressed air could be created after long pauses of the equipment and this creates risk of pneumatic hose damage or uncontrolled release and improper use of compressed air. Compressed air should be drained properly.
- **Crushing and Cutting:** There might be moving parts while operation (e.g. Conveyor Belt, Reciprocator). The operator must be trained to maintain the area safety and local security regulations.
- **Exceptional Circumstances:** Local conditions must be met at all costs. Additional measures such as barriers can be used to prevent unauthorized access.
- **Conversions and Modifications to the Equipment:** All conversions and modifications must be asked to Sistem Teknik prior to the process and no process should be done without Sistem Teknik's permission. This is essential for the equipment safety and conformity. Powder coating equipment should never be used if damaged; these parts should be changed immediately with the original Sistem Teknik replacement. Other replacements than Sistem Teknik original equipment does not conform the guarantee, thus the guarantee will no longer be valid. Equipment repairs must be done only by specialist or at Sistem Teknik verified shops.

#### 1.3.5. Safety Requirements for Electrostatic Powder Coating

- All the equipment used for powder coating is dangerous unless the instructions are not conformed.
- Every electrostatic conductive part must be grounded within the 5 meter radius from the equipment.
- The floor of the coating area should conduct electricity (Concrete is generally a conductive surface, check with your building project for more info)
- The users should wear electricity conducting footwear.
- Grounding cable must be connected to the grounding screw of the electrostatic powderpowder pump. It should have a good connection with the powder center, hopper and conveyor chain (if used).
- E-DRIVE ZX02-EX must be switched off while the it is being cleaned.
- The grounding must be checked every week. Remember that the grounding resistance must be 1 MOhm at a maximum.
- Only use spare parts / attachments and accessories from Sistem Teknik's original parts page. This ensures the safety of the equipment and conformity of use.
- Cleaning agents creates the risk of hazardous fumes. Please check the manufacturer's manual about more information about the cleaning agents if they are used in the site.
- Especially make sure that the environmental regulations and the manufacturer's instructions are being conformed while disposing the powder lacquer and cleaning agents.
- Repairs have to be carried out via specialists of Sistem Teknik trained personnel and never to be done in the operating area under any circumstance.
- Dangerous dust concentration levels should be avoided in powder spraying areas. There must be sufficient technical ventilation available (e.g. booth ventilation) to prevent a dust concentration of more than %50 of the lower explosion limit (UEG = max. permissible powder/air concentration). If the UEG is not known then a value of 10 g/m<sup>3</sup> should be used.

## EN European Standarts

2014/34/EU	The approximation of the laws of the Member States relating to apparatus and safety systems for their intended use in potentially explosive atmospheres
EN 12100-1 EN 12100-2	Machine safety
EN IEC 60079-0	Electrical equipment for locations where there is danger of explosion
EN ISO 80079-36	Non-electrical equipment for explosive atmospheres - Basic method and requirements
EN ISO 80079-37	Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"
EN 60529	IP-Type protection: contact, foreign bodies and water protection for electrical equipment
EN 60204	VDE regulations for the setting up of high voltage electrical machine tools and processing machines with mains voltages up to 1000 V

### 1.3.6 Product Specific Safety

This product is a constituent part of the equipment and is therefore integrated in the system's safety concept. If it is to be used in a manner outside the scope of the safety concept, then corresponding measures must be taken. The installation work to be done by the customer must be carried out according to local regulations. It must be ensured, that all components are earthed according to the local regulations before start-up.



**NOT:**

*For further information, see the more detailed Electron safety regulations!*

### 1.3.7 Moving Axes

- Operator has to read the user manual before starting the moving axes.
- Reciprocator has to be controlled before start up.
- Safety regulations for the country have to be considered aswell.
- Electricity has to be cut off for maintenance and cleaning.
- Before start up, the connections between the gun (s) and control unit have to be checked.
- Spare parts have to be the approved SISTEM TEKNIK spare parts for the explosion protection.
- Dust and air mixture is flammable. It is forbidden to smoke where the reciprocator is working.
- As a general rule, the people who are using pacemaker is strictly forbidden to enter electrostaticly charged areas for their own protection.



### 1.3.8 Special safety regulations for E-ROBOT ZX02-EX Reciprocator

- The E-ROBOT+3 Z Reciprocator may only be switched on and operated after a careful reading of this manual and E-DRIVE ZX02-E's manual. Incorrect operation of the axes control unit can lead to accidents, malfunctions or damage to the plant.
- Attention, the power of the reciprocator is very much stronger than that of a human being!  
All axes must be secured against access during operation (see local regulations).  
Never stand under the Z carriage when the vertical axis is not operating!
- The plugs and sockets of the axes control unit and E-ROBOT+3 Z should only be unplugged when the power supply is disconnected.
- The connecting cables between the control unit and the reciprocator must be laid in such a way, that they cannot be damaged during axes operation. Please observe the local safety regulations!
- The maximum upper stroke limit of the reciprocator must always be set with reference to the maximum height of the booth gun slots. If an incorrect (too high) stroke limit is set, this can lead to damage to the reciprocator and/or the booth!



**WARNING:**

During a test run, it must be guaranteed that the unit is not damaged by the test! In particular, the limitations of the stroke range have to be observed (for further information, see chapter "Setting the upper mechanical stop")!

- When repairing the reciprocator, both the reciprocator control unit and the reciprocator must be disconnected from the mains according to the local safety regulations!
- Repairs may be done only by authorized Electron service. Unauthorized conversions and modifications can lead to injuries and damage to the equipment. The Sistem Teknik Makina A.Ş. guarantee would no longer be valid.
- Only original Gema spare parts should be used! The use of spare parts from other manufacturers will invalidate the Electron guarantee conditions!
- We point out that the customer himself is responsible for the safe operation of the equipment. Sistem Teknik Makina A.Ş. is in no way responsible for any resulting damage.

### 1.4. About this manual

This operating manual contains all the important information you require for the working with the ZX02-D Reciprocator. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system. Information about the function mode of the individual system components - booth, gun control unit, manual gun or powder injector - should be referenced to their corresponding documents.



**DANGER:**

Working without operating instructions

*Working without operating instructions or with individual pages from the operating instructions may result in damage to property and personal injury if relevant safety information is not observed.*

\*\* Before working with the device, organize the required documents and read the section "Safety regulations".

\*\* Work should only be carried out in accordance with the instructions of the relevant documents.

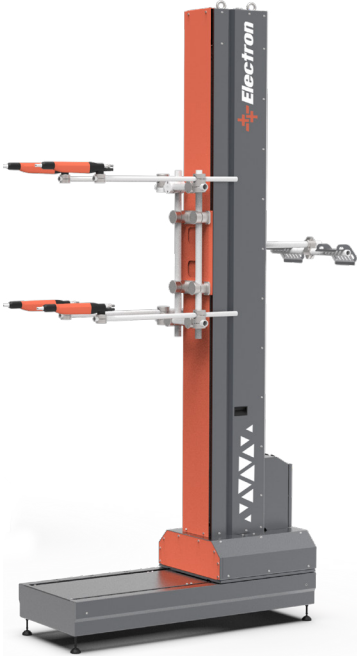
\*\* Always work with the complete original document.

## 2. Function description

### 2.1. E-ROBOT+3 Z - Double Axis Reciprocator System

E-ROBOT+3 Z is the general name of a system. It is not a single product, but a combination of several products.

E-ROBOT+3 Z;



E-ROBOT+3 Z

E-DRIVE Z02-EX



POWER & SIGNAL CABLES



E-ROBOT+3 X



**NOTE:**

Each product is ordered separately in order to order a reciprocator system. For ordering steps, check the "Order" section on page 38.

## 2. Function description

### 2.1. Field of application

The E-ROBOT+3 Z Reciprocator was designed for automatic coating with powder applicators. It is used as the basis for all stages of automation, from a simple vertical stroke to complex, multi-dimensional processes. Depending on the design of the applicators, this unit may be used with all types of powder coating. Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions.

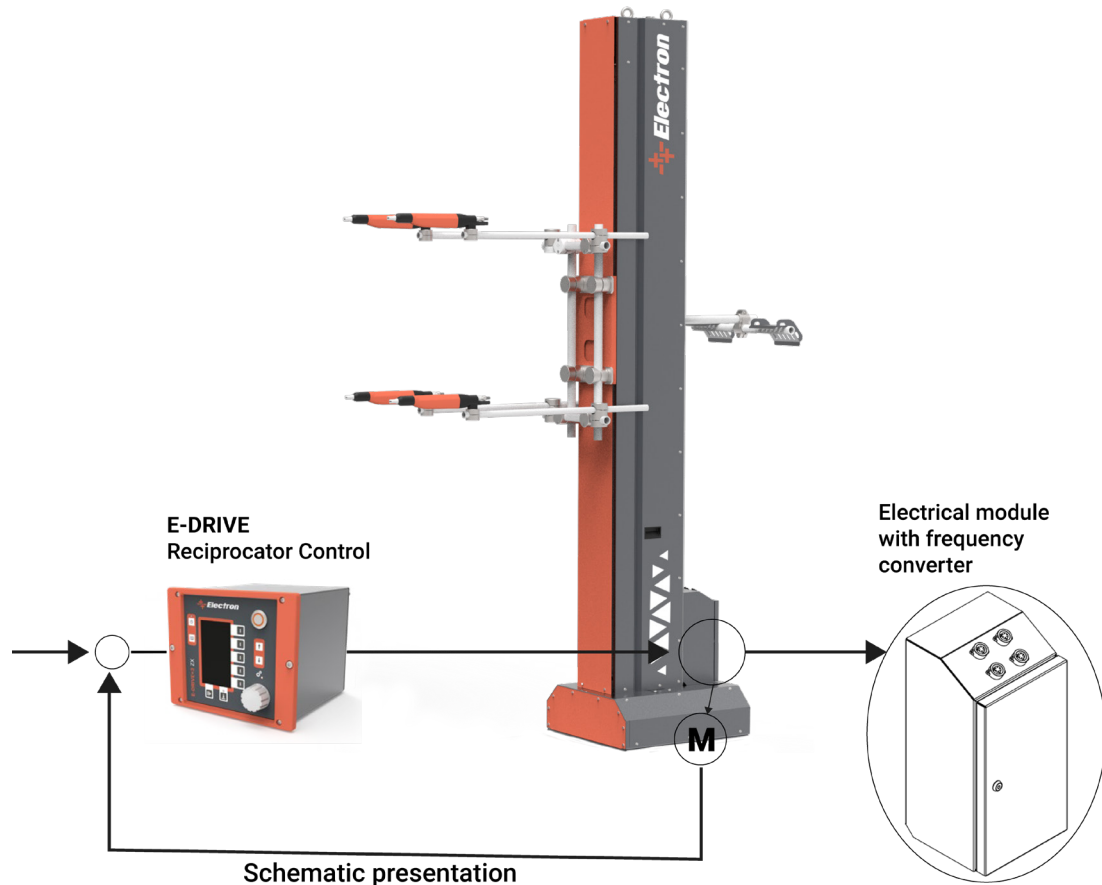
### 2.1. Field of application

The reciprocator carries out a linear, oscillating up-and-down motion in the vertical direction (called Z motion). The movement sequences (stroke and stroke speed) are controlled by the reciprocator control unit.

The gun holders are fitted on the gun holder plate of the Z carriage. The Z carriage is moved up and down on the central column by a drive belt inside the reciprocator. This vertical column serves also as a runway for the rollers. The drive unit and the electrical connection are installed in the vertical axis base. A pulse generator, which is installed in the motor case, enables the exact positioning of the Z carriage.

The power unit, as well as the corresponding wiring, are housed in an electronics module, which is plugged into the axis. One module is needed for each axis. Empty space is available for additional axes (e.g. X axis).

If the power is interrupted, the movement of the Z-carrier according to the design is stopped by the logic of mutual weight, ie the torque relationship.



## 2.4. Special Characteristics

The E-ROBOT+3 Z Reciprocator is conspicuous because of its rugged construction, a new drive system and an improved Z axis carriage design.

Further characteristics:

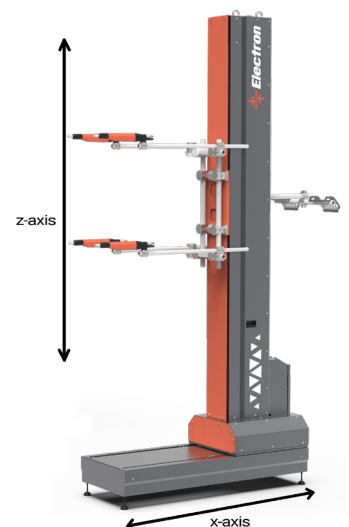
- 50 kg load capacity for automatic gun and gun holders
- Quiet running
- High speed, maximum acceleration and braking action
- Safe operation and simple maintenance
- High efficiency due to low energy consumption
- Designed for continuous operation
- TMobile version available
- IP54 protection type
- 6 standard stroke heights available: 1.2 m/1.5 m/1.8 m/2.1 m/2.4 m/2.7 m
- Intermediate and larger sizes available in steps of 300 mm

## 2.5. Expansion with additional axes of motion

The E-ROBOT+3 Z Reciprocator is available, depending on operational area, in six versions with different standard stroke heights.

## 2.6. Reasonably foreseeable misuse

- Operation in rooms with gases (depends on the properties of the powder coating used.)
- Incorrect setting of the mechanical stroke limiters
- Incorrect programming of the upper and lower turning points
- Use in connection with not permissible control units
- Loading the Z carriage with more than 50 kg
- Operation without the proper training
- Operating the reciprocator without the protective fence



### 3. Technical Data

The E-ROBOT+3 Z Reciprocator is available, depending on operational area, in six versions with different standard stroke heights.

#### 3.1. Technical Data

##### \*Vertical Axis

E-ROBOT+3 Z	1200	1500	1800	2100	2400	2700
Height	2,524 m	2,824 m	3,124 m	3,424 m	3,724 m	4,024 m
Stroke length	1,2 m	1,5 m	1,8 m	2,1 m	2,4 m	2,7 m
Belt	4,7 m	5,3 m	5,9 m	6,5 m	7.1 m	7.7 m
Order Code	A05RD01200+3-X	A05RD01500+3-X	A05RD01800+3-X	A05RD02100+3-X	A05RD02400+3-X	A05RD02700+3-X
Stroke Speed	0.1 up to 0.6 m/s (6.0 up to 36.0 m/min.)					
Acceleration	0.5-2.5 m/s <sup>2</sup>					
Position detection	with incremental pulse generator					

##### \*Horizontal Axis

E-ROBOT+3 X	Technical Values	
Stroke length	1000 mm	1500 mm
Product Code	A05X031000	A05X031500
Stroke Speed	0.06 up to 0.15 m/s (4.0 up to 8.0 m/min.)	
Position	Zero point selectable in both end positions	
Position detection	with incremental pulse generator	

##### \*Control Unit

E-DRIVE ZX02-E	
Height	182 mm
Width	220 mm
Depth	250 mm
Weight	3.34 kg
Product Code	B08ZX02CM-E

#### 3.2. Electrical Data

E-ROBOT+3 Z-Axis Reciprocator	
Power supply	230 VAC (from control unit)
Tolerance	± 10%
Frequency	50/60 Hz
Protection Type	IP54
Operating Temperature Range	-10°C - +40°C
Max. Protection Surface Temperature	135°C

#### 3.3. Sound Pressure Level

E-ROBOT+3 Z-Axis Reciprocator	
Normal operation	< 60 dB(A)

The sound pressure level was measured while the unit was in operation; measurements were taken at the most frequent operator positions and at a height of 1.7 m from the ground. The specified value is applicable only for this product itself and does not take into account external noise sources or cleaning impulses. The sound pressure level may vary, depending on the product configuration and space constraints.

## 4. Set-up, assembly and commissioning



### WARNING:

If a free-standing reciprocator is not anchored firmly to the floor, uncontrolled movement of the machine or insufficient stability can cause injuries.

**\*\* Firmly anchor the reciprocator to the floor if it is not mounted to another axis of motion.**



### WARNING:

The movement of the reciprocator can cause injuries.

**\*\* Erect a protective fence around the reciprocator so that there is no danger of injury during normal operation.**



### DANGER:

Injuries can occur inside the protective fence due to the movement of the reciprocator!

**\*\* In order to enter the inner area, the door interlocks must be released by the control unit. This release signal may only be activated by technical personnel.**

Except for normal operation, all other operating modes must be set up by an authorized technical representative.

### 4.1.1 Preparation for start-up



### WARNING:

Before connecting or switching on the reciprocator, read carefully these operating instructions!

### 4.1.2 Setup and assembly



### WARNING:

If a free-standing reciprocator is not anchored firmly to the floor, uncontrolled movement of the machine or insufficient stability can cause injuries.

**\*\* Firmly anchor the reciprocator to the floor if it is not mounted to another axis of motion.**



### WARNING:

The movement of the reciprocator can cause injuries.

**\*\* Erect a protective fence around the reciprocator so that there is no danger of injury during normal operation.**



### DANGER:

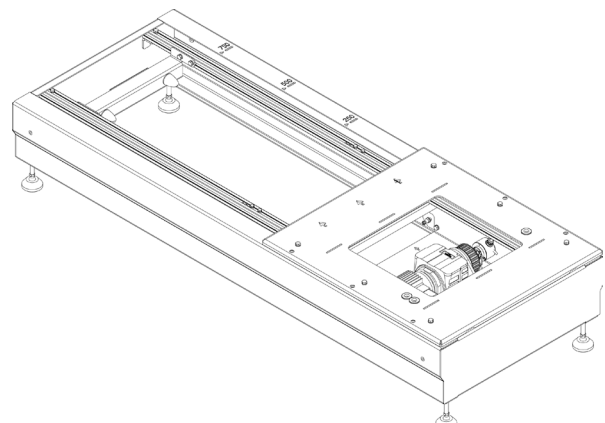
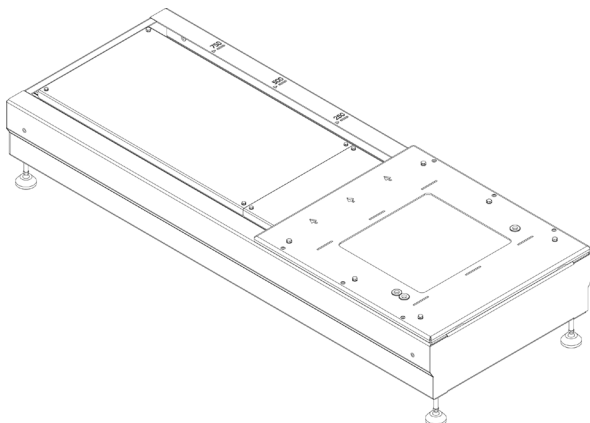
Injuries can occur inside the protective fence due to the movement of the reciprocator!

**\*\* In order to enter the inner area, the door interlocks must be released by the control unit. This release signal may only be activated by technical personnel.**

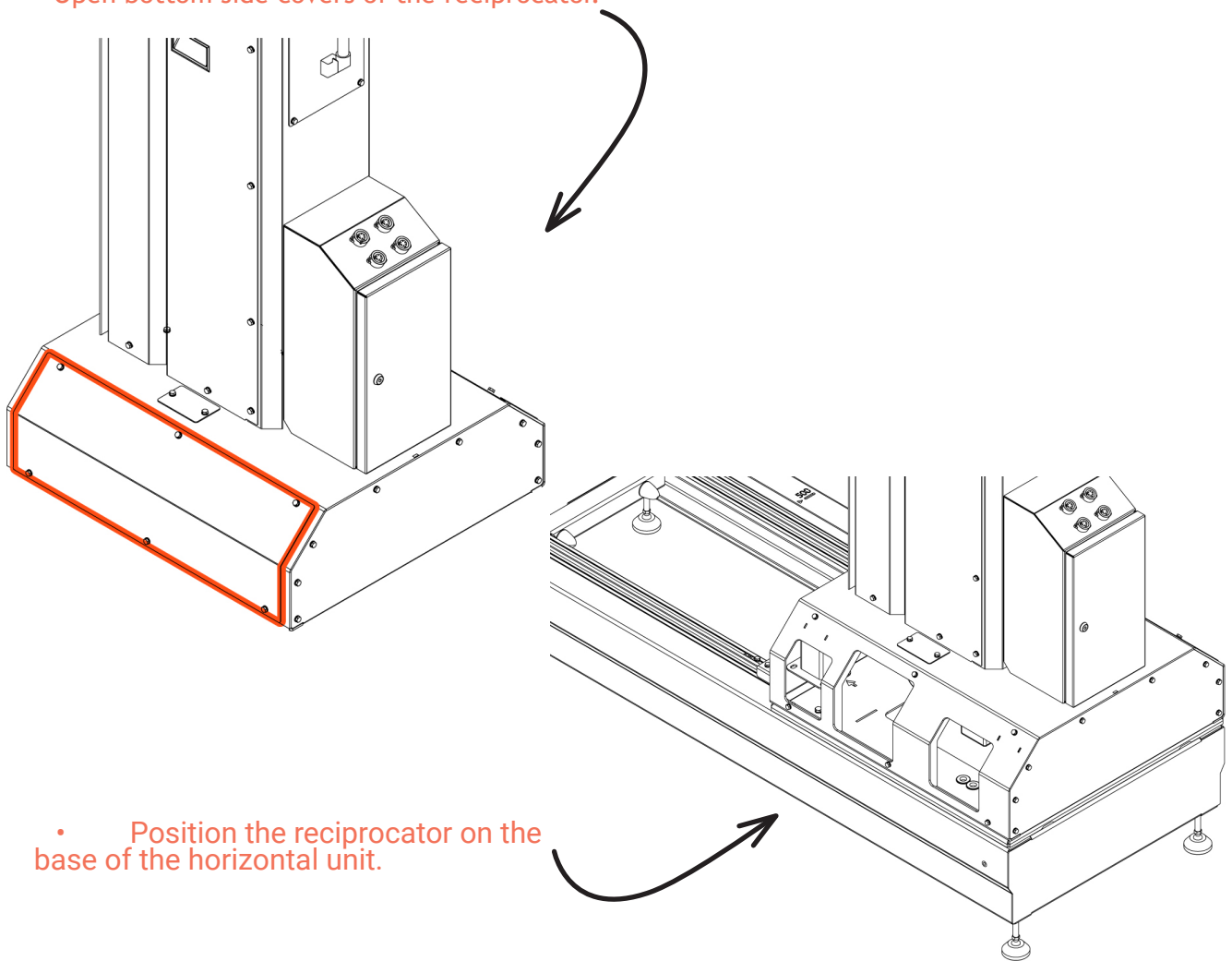
Except for normal operation, all other operating modes must be set up by an authorized technical representative.

- **Open The Base Top Covers**

Consists of 2 parts. There are 2 bolts on the middle point of each cover. Use an 4 mm allen key.



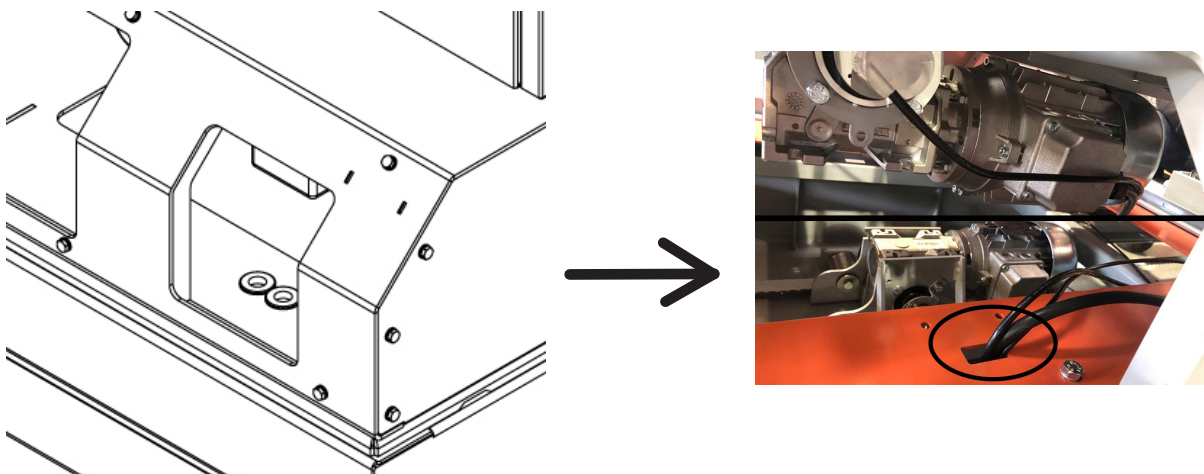
- Place Horizontal Unit According To The Project Values.  
Make sure the base is on a flat floor. Use M16 fixing plug.
- Open bottom side covers of the reciprocator.



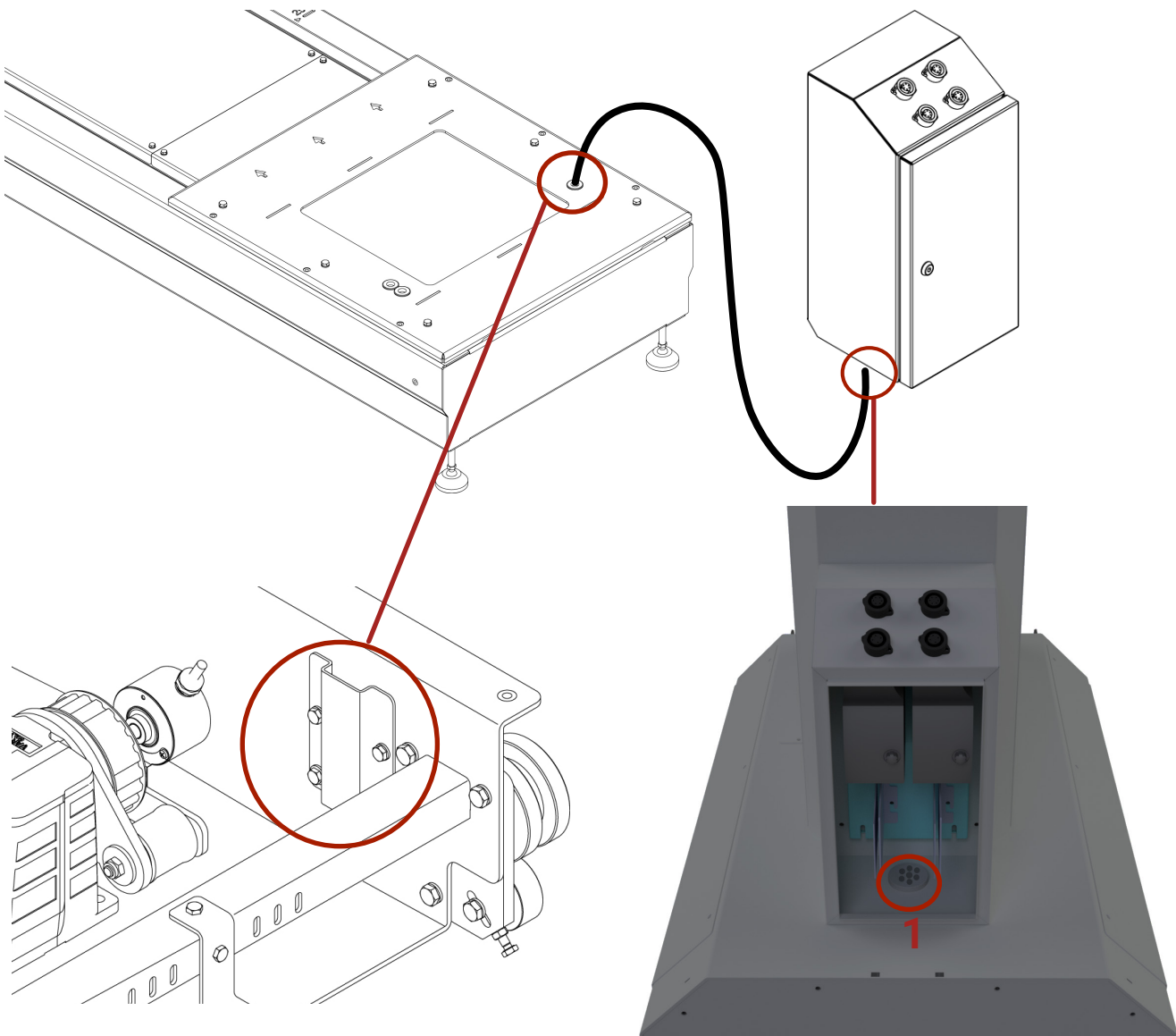
- Position the reciprocator on the base of the horizontal unit.

#### 4.1.3. Connecting the E-ROBOT+3 X Horizontal Motion Unit to the Z Reciprocator

1. Ensure that the cables are routed at the specified points to avoid crushing the cables. (Motor, encoder and sensor cables)



2. Remove the back cover of the reciprocator (vertical axis). Route the cables through the cable holes (1) of the junction box mounted on the cover. (as shown in the picture)



3. Connect the cable (according to the enclosed wiring diagram)



**NOTE:**

After positioning, the E-ROBOT+3 X Horizontal Motion Unit must be firmly fixed on the floor.



**DANGER:**

Never stand on the horizontal axis or under the carriage of the vertical axis when it is in operation!



**WARNING:**

- The power of the horizontal axis is much stronger than that of a human!
- All axes must be secured against admittance during operation (see local regulations).

Before start-up the horizontal axis, the following points must be observed:

- The frame and the drive carriage of the axis must be grounded! The grounding of the frame must be done by the customer.
- Adjust the system parameters in the E-Drive control unit.

## 5. Commissioning

### 5.1. Preparation for start-up



**WARNING:**

Before connecting or switching on the reciprocator, read carefully these operating instructions!

Before the reciprocator is put into operation, the upper stroke limit must be set on the reciprocator control unit!

#### 5.1.1. General information



**WARNING:**

Before start-up works are done, make certain that nobody can switch on the reciprocator! Switch off and lock the mains switch!

*Before starting up, the following checks should be done:*

- Check the gun holder and hose holder if they are firmly fitted.  
Mount the gun holder in such a way that they do not hit the bottom of the booth slots on start-up and cause damage
- Lay out the cables and hoses in such a way that even at the highest stroke no strain can arise
- Check the grounding of the guns and hose carriers
- Check if the upper and the lower reversing point of the Z carriage are set correctly. The stroke length of the reciprocator must be in the range of the booth opening (collision danger!)
- Make sure that the automatic guns cannot collide with the work pieces (incorrectly adjusted stroke parameters on the reciprocator control unit)

#### 5.1.2. Reference point

At every start-up after the mains have been interrupted, the reference point of the reciprocator must be referred again (see "Reference point and mechanical stops"). After the reference point is reached, the reciprocator begins to carry out the movements set on the reciprocator control unit.

Before the reciprocator is put into operation, the upper stroke limit must be set on the reciprocator control unit!



**WARNING:**

Incorrect setting of the upper and lower stroke limits can cause damages to the reciprocator, to the booth and/or to the applicators!

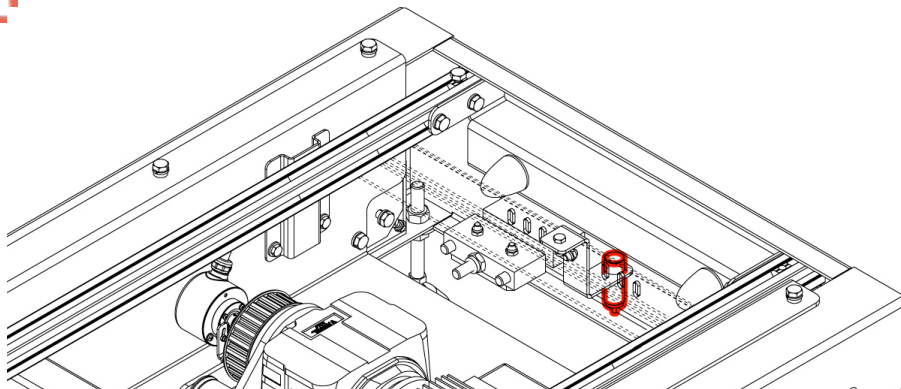
#### 5.1.3. Horizontal Axis Reference point

The reference point of the horizontal axis is selected when the sensor passes mechanical stop bumper by 2 mm. This is a factory setting. It will be set and sent. Unless necessary, do not pull by manually adjusting the movement mechanism of the horizontal axis.



**WARNING:**

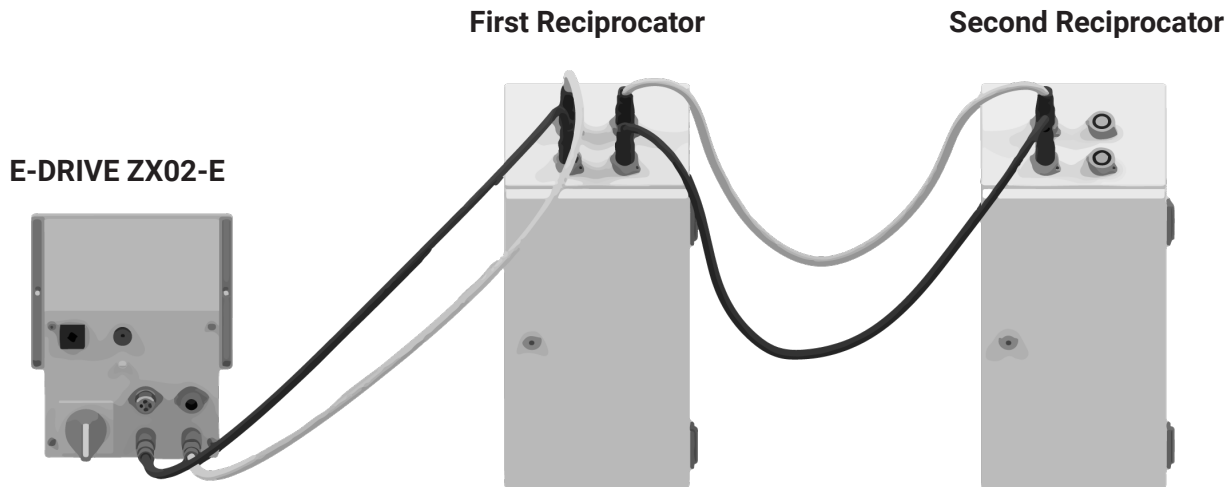
In order to avoid damages to the booth or the gun holder etc. the reference point must be set by Electron authorized person before the first start-up!





## 5.2. Connections

### Electrical connections / cable connection



Electrical connections of E-ROBOT+3 Z;

Power supply cable (black) and signal cable (white) are connected between the E-DRIVE control unit and the control unit on the reciprocator. For each reciprocator to be added from now on, power and signal connections are made from the empty slots of the previous reciprocator with the same type of cables.



#### NOTE:

To order different lengths of cable, see "Ordering" on page 38.

## 5.3. Checkpoints before switching on

Before switching on, the following checks should be done:

- Check if the cables and hoses are laid out correctly
- Check if the guns have a clear run and do not touch the booth slots
- Check the distance between the work pieces and the guns



#### WARNING:

Before connecting or switching on the reciprocator, read carefully these operating instructions!

## 5.4. Grounding / protection type

All metal parts of the reciprocator must be grounded according to the local safety regulations. The gun holders must be connected to the grounding screw on the reciprocator base by the grounding strip.

All electrical installations are implemented in accordance to IP54 protection type regulations!

- See the section 12) Grounding Diagram.

## 5.5. Hoses and cables

All movable hoses and cables must be laid out in such a way that they are neither subjected to any loads nor can hang on other parts. The electric cables of the reciprocators must be protected from mechanical damage.

Order Code	Part Name	Order Code	Part Name
B08ZX02SC-E10	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE - 10 MT	B08ZX02PC-E10	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE - 10 MT
B08ZX02SC-E15	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE - 15 MT	B08ZX02PC-E15	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE - 15 MT
B08ZX02SC-E20	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE - 20 MT	B08ZX02PC-E20	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE - 20 MT
B08ZX02SC-E25	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE - 25 MT	B08ZX02PC-E25	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE - 25 MT

## 5.6. Reference point and mechanical stops

The reference point serves as starting point for the reciprocator control unit for calculating the upper and lower reversing point and the maximum stroke.

By switching on the axis control unit, the reciprocator travels automatically to the reference point (proximity switch). The reciprocator control units are programmed in such a way that the reference point is always located 50 mm above the reversing point.

For transport reasons, the E-ROBOT+3 Z Reciprocator is delivered with the rubber buffer and the carriage in lowest position.



### **WARNING:**

Incorrect setting of the upper and lower stroke limits can cause damages to the reciprocator, to the booth and/or to the applicators!

#### 5.6.1. Setting the reference point

1. Move the stop plate with rubber buffer and proximity switch to the desired position and fasten it
2. Set the response gap of the proximity switch to approx. 2 mm
3. Consider the lower edge of the gun slot!

### **WARNING:**

In order to avoid damages to the booth or the gun holders, the reference point must be checked before the first start-up and if necessary, reset!

It must be noted that the axes in reference travel moves up to 25 mm below the control's zero point, therefore the mechanical stop must be set in accordance to the gun slots!

*The position of the upper and the lower stop plate is set by a Electron service engineer when the reciprocator is assembled.*



### **WARNING:**

The reference point must be referenced before each start-up (at each switching on, after an interruption of the power supply etc.)!

#### 5.6.2. Setting the lower mechanical stop



### **WARNING:**

The setting of the lower mechanical stop must take place without load and the reciprocator must be disconnected from mains!

*Procedure:*

1. Let the Z carriage sink down until the powder gun holder is approximately 50 mm above edge of the gun slot
2. Remove the boarding/side panels
3. Loosen the screws and move the lower stop plate up to the Z carriage
4. Tighten the screws
5. Refit the boarding/side panels

#### 5.6.3. Setting the upper mechanical stop



### **WARNING:**

The setting of the upper mechanical stop must take place without load and the reciprocator must be disconnected from mains!

*In order to set the upper mechanical stop, the stop position has to be measured - for this reason, consider the maximum height of the booth gun slots!*



### **WARNING:**

An incorrect (too high) set stroke limit can lead to damage to the reciprocator and/or the booth!

*Procedure:*

1. Remove the boarding/side panels
2. Loosen the screws and move the upper stop plate up to the measured position
3. Tighten the screws
4. Refit the boarding/side panels



### **WARNING:**

After the adjustment of the mechanical stops, the system parameter for the upper stop must be checked on the reciprocator control unit!

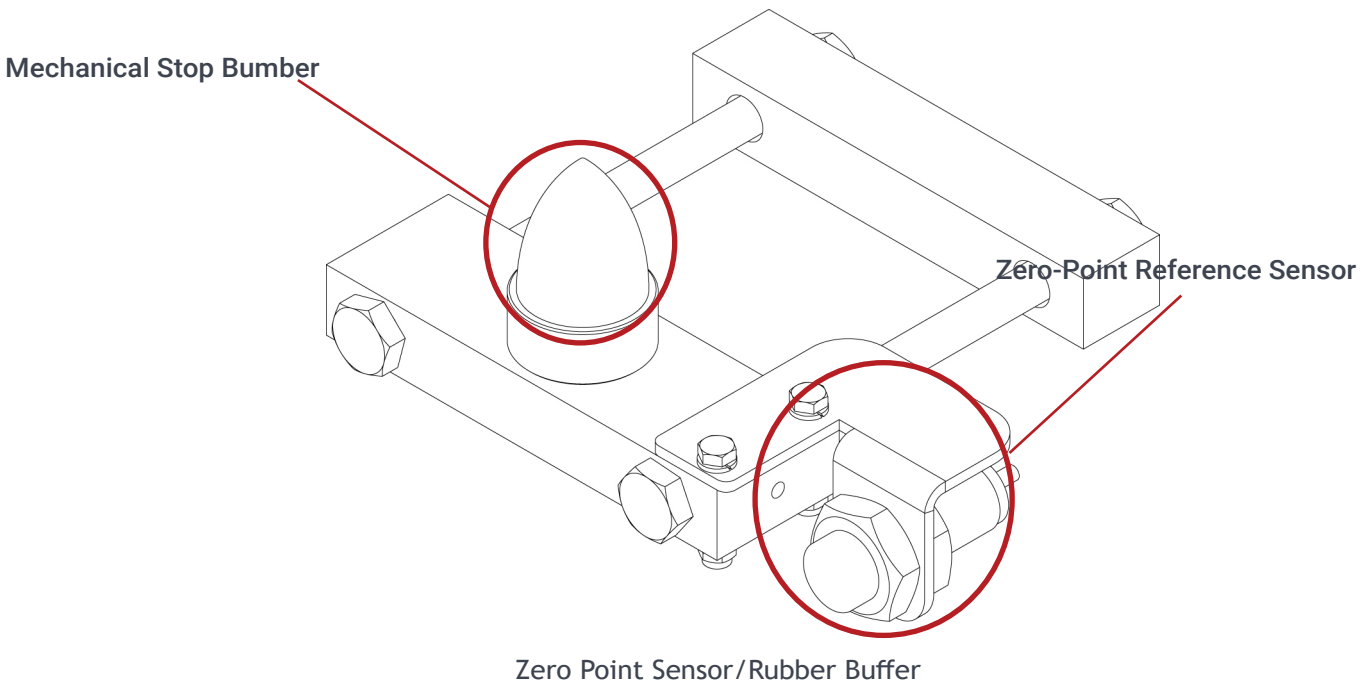
The value must not be larger than the maximum stroke possible between the stops!

## 6. Start up preferences

After the power button on the back end of the control unit is turned on, pressing the power button on the front screen turns on the system. When there is an error in the Reciprocator, it writes the error code on the left side of the page and warns the operator. Please refer to the “Error Codes Section” for error scenarios.

After the start up procedure, the “Main Menu” page will be seen on the screen. When the “Main Menu” appears on the display the operator can start using the reciprocator.

At the end of the start up procedure, the mechanical unit drives down to the reference point (zero point). The Z carriage travels to the mechanical stop, hitting the rubber buffer and then saves the point as reference for the operation.



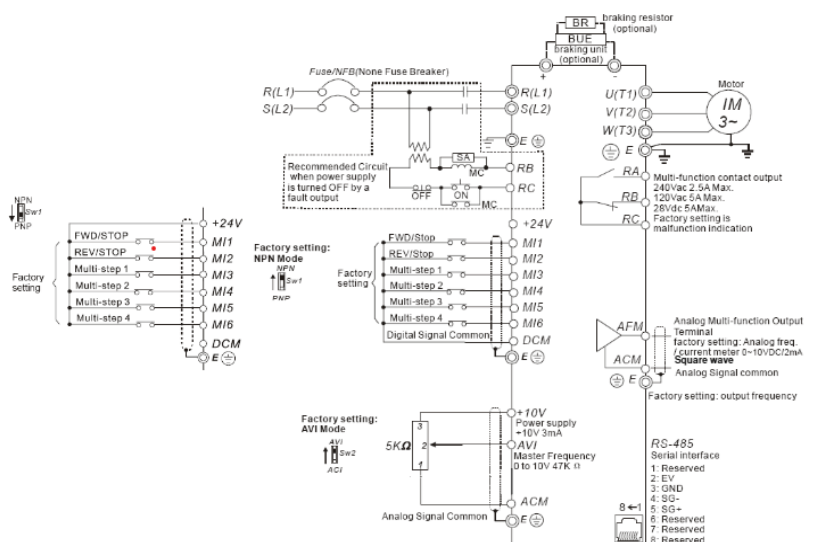
### 6.1. Electrical Connections

Make connections according to Section 11 Electrical Schematic Diagram.

### 6.2. Simple General Purpose AC Drive Settings











#### Basic wiring diagram



### 6.2.1. Basic Parameters


In order for the robot to work properly, you should make the adjustments given in the table below in the motor driver located on the panel behind the robot. Here are the steps you need to follow to make the adjustments:

- 1) Press the  "prog/data" button. "1-" will appear on the screen.
- 2) Press the  "prog/data" button once again. "1-00" will appear on the screen.
- 3) Press the  "prog/data" button once again. We do this process to get into the parameter.
- 4) Press  until you reach your desired value without raising your hand. (For example, do not lift our finger until you see "75.0" for parameter 1-00.)
- 5) Press the  "prog/data" button once. "END" appears momentarily on the display. You will have saved the parameter value. And the number of parameters will appear on the screen again.
- 6) Press the  button once to go to the next parameter.
- 7) Press the  "prog/data" button. We do this process to get into the parameter.
- 8) Apply all operations for each parameter as from item 4.
- 9) After saving all the parameter values, press the  "mode/reset" button twice and return to the main menu.

E-DRIVE ZX02-E (ROBOT 220 V)					
VERTICAL SPEED CONTROL			HORIZONTAL SPEED CONTROL		
PARAMETERS	FACTORY SETTINGS	Settings For E-ROBOT+3 Z	PARAMETRELER	FACTORY SETTINGS	Settings For E-ROBOT+3 X
1.00	60.00 Hz	75	1.00	60.00 Hz	75
1.01	60.00 Hz	75	1.01	60.00 Hz	75
1.02	220.0 V	230	1.02	220.0 V	230
1.03	1.50 Hz	50	1.03	1.50 Hz	50
1.04	10 V	230	1.04	10 V	230
1.19	00	1	1.19	00	1
2.00	00	3	2.00	00	3
2.01	00	2	2.01	00	2
2.05	01	0	2.05	01	0
4.05	01	5	4.05	01	5
6.03	00	2	6.03	00	2
6.04	% 150	90	6.04	% 150	90
6.05	0.1 Sec	1	6.05	0.1 Sec	1
7.00	4.2	1.8	7.00	4.2	1.2
7.01	1.7	1.7	7.01	1.7	1.1
7.02	0.0	9	7.02	0.0	9
8.00	% 0	35	8.00	% 0	35
8.02	0.0 Sec	0.5	8.02	0.0 Sec	0.5
9.02	03	1	9.02	03	1
9.04	00	3	9.04	00	3



**WARNING:**

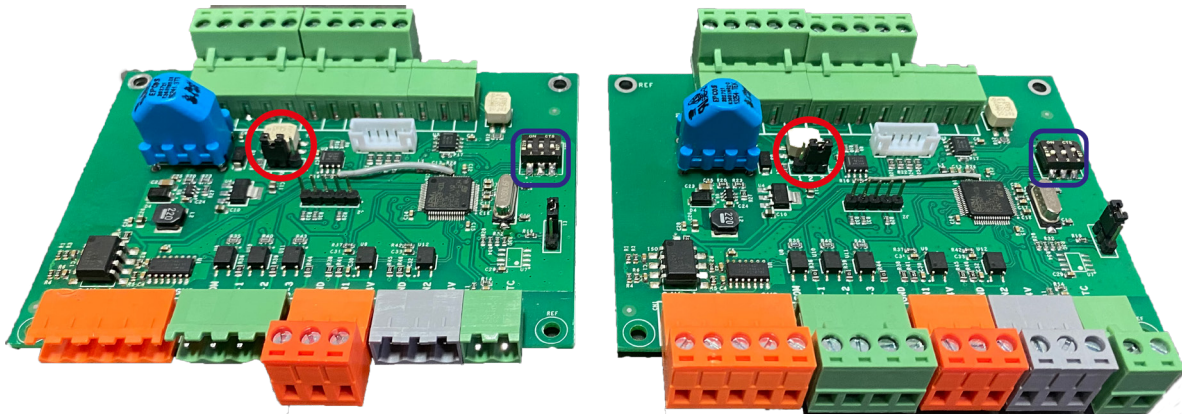
Ground the AC DRIVE using the ground terminal . The grounding method must comply with the laws of the country where the AC drive is to be installed.



**NOTE:**

The same parameters are set for all driver.

### 6.3. Axis Control Card Settings



**WARNING:**

Do not apply this process while the robots have energy.

Make sure that the jumper marked with a red ring is attached correctly. Depending on how many robots you have in your facility, the last one should be attached to pins 1 and 2. The last axis must be attached to pins 2 and 3.

For example; You have 2 biaxial robots. It consists of 2 vertical and 2 horizontal axes. In this case, you must place this jumper on pins 1 and 2 on the axis boards of the 1st vertical axis, 1st horizontal axis and 2nd vertical axis.

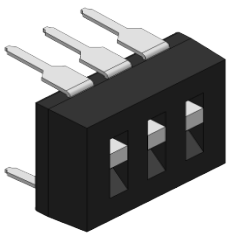
The 2nd horizontal axis must be attached to pins 2 and 3.



**WARNING:**

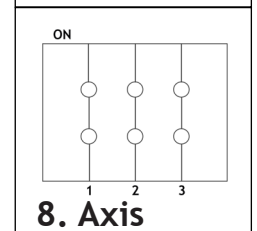
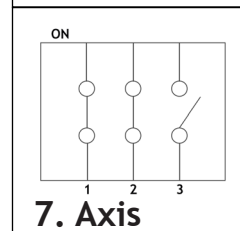
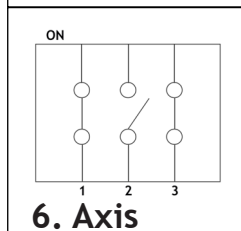
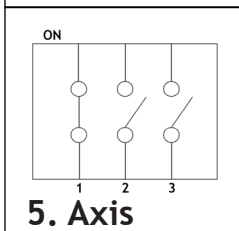
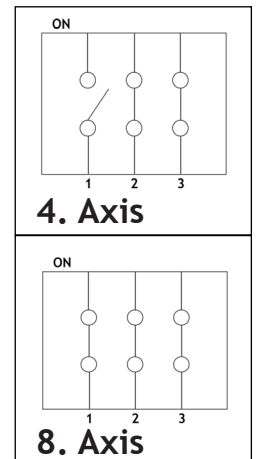
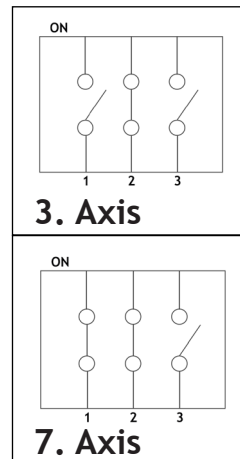
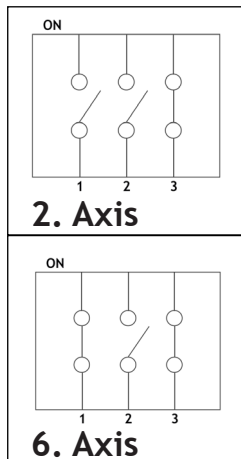
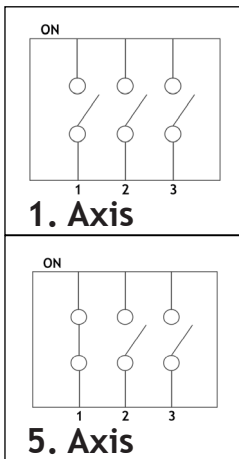
It is delivered to you with this operation in the factory setting. Do not change unless necessary.

The axis settings of the dip switch marked with a blue box on the axis card are given below. Set the axis cards according to the axis order you are using. The reason for giving 8 axes information is due to the ability of one E-Drive ZX02-E robot control unit to control up to 8 axes.



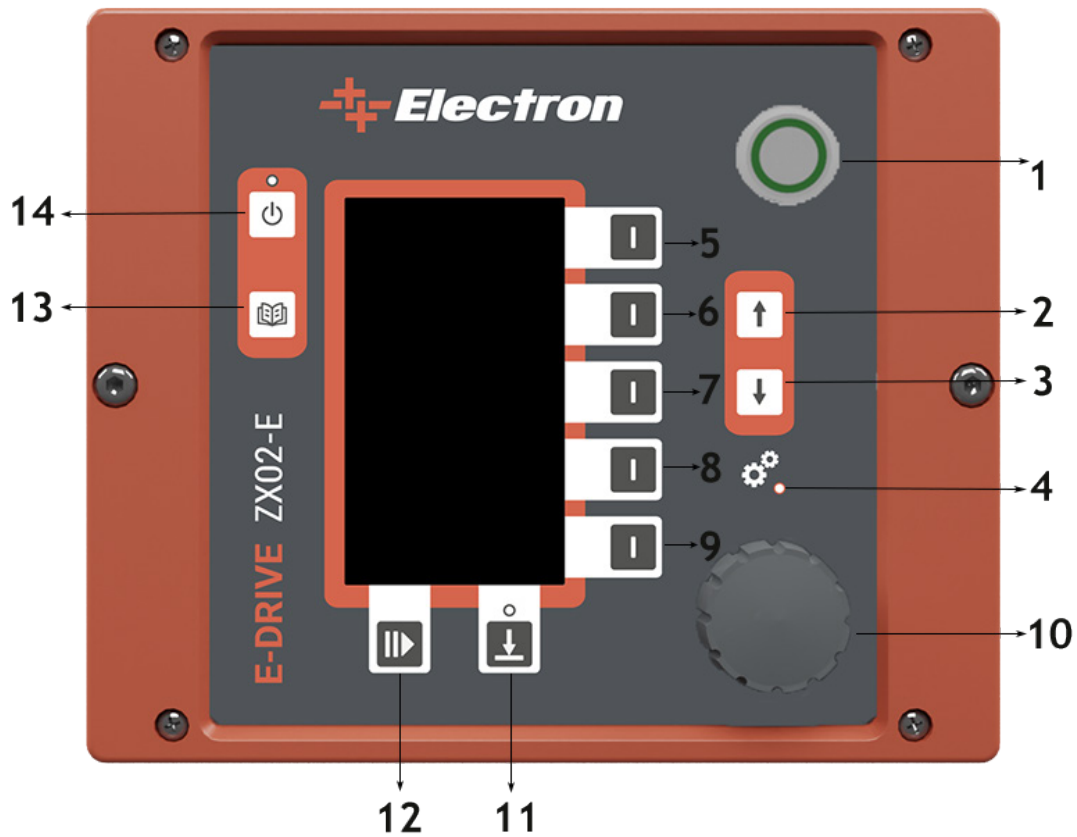
**WARNING:**

It is delivered to you with this operation in the factory setting. Do not change unless necessary.



## 7.E-DRIVE ZX02-E Reciprocator Control Unit and Setting

### 7.1. Front Panel and Input Buttons



Display No	Display Name
B1	Main Switch (ON-OFF)
B2	Up Key
B3	Down Key
B4	Adjustment Led
B5,B6,B7,B8,B9	Segment Buttons
K10	Rotary Adjustment Knob
B11	Reset Button
B12	Axis Start/Stop Button
B13	Menu Button
B14	Axes Active/Passive Button

## 7.2. Start up preferences

After the power button on the back end of the control unit is turned on, pressing the power button on the front screen turns on the system. When there is an error in the Reciprocator, it writes the error code on the left side of the page and warns the operator. Please refer to the “Error Codes Section” for error scenarios.

After the start up procedure, the “Main Menu” page will be seen on the screen. When the “Main Menu” appears on the display the operator can start using the reciprocator.

At the end of the start up procedure, the mechanical unit drives down to the reference point (zero point). The Z carriage travels to the mechanical stop, hitting the rubber buffer and then saves the point as reference for the operation.

## 7.3. Setup Pages

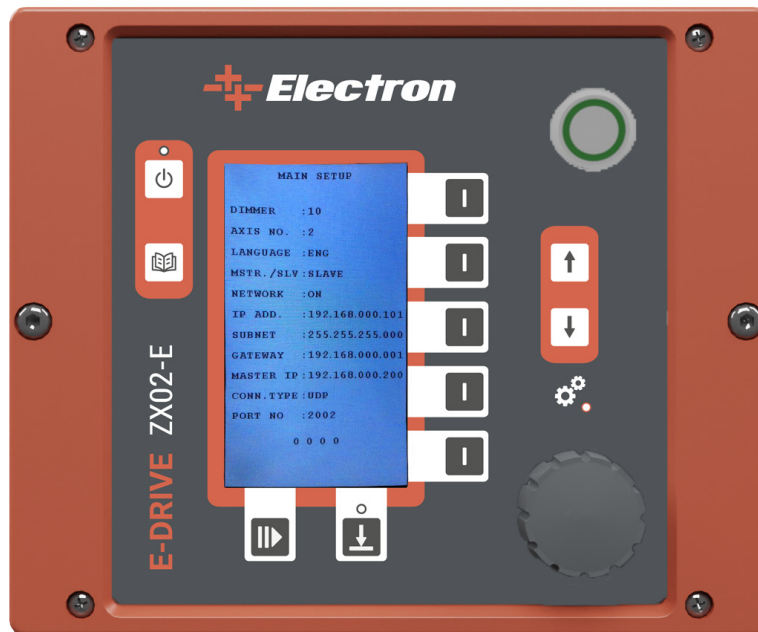
### 7.3.1. Main Setup Page

When you press the ‘Main Switch’, switch to the “Main Setup” page by holding the “Axes Active/Passive Button” (B14) for 2 seconds without making any changes on the screen.



**NOTE:**

You can move up and down between rows with the ‘Segment Buttons’(B5 and B6). Turn the “Rotary Adjustment Knob”(K10) to change the value in any row.



Line Name	Limits	Explanation
Dimmer	0/10	Screen Brightness Adjustment
Axis No.	0/8	Maximum number of axes that can be controlled
Language	ENG-TR-RU	Language Options
MSTR./SLV.	Master/Slave Modes	<p><b>Master</b> = The device is set as a commander in a network where the operational parameters of this device is sent to other devices.</p> <p><b>Slave</b> = The device is set as a listener in a network where the operational parameters of the device is copied from a desired master device.</p>



**WARNING:**

If you want to increase the number of axes later, do not forget to select your total axis number in the “axis no.” Section. (For example, if you have 2 axes, when you order 2 more, you need to edit the number here as 4.)

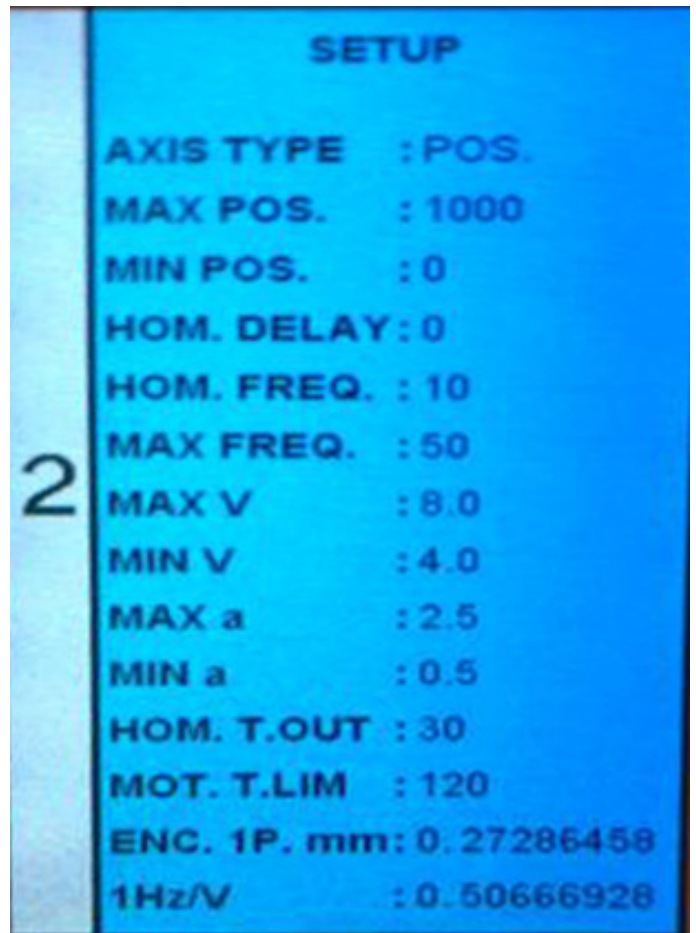
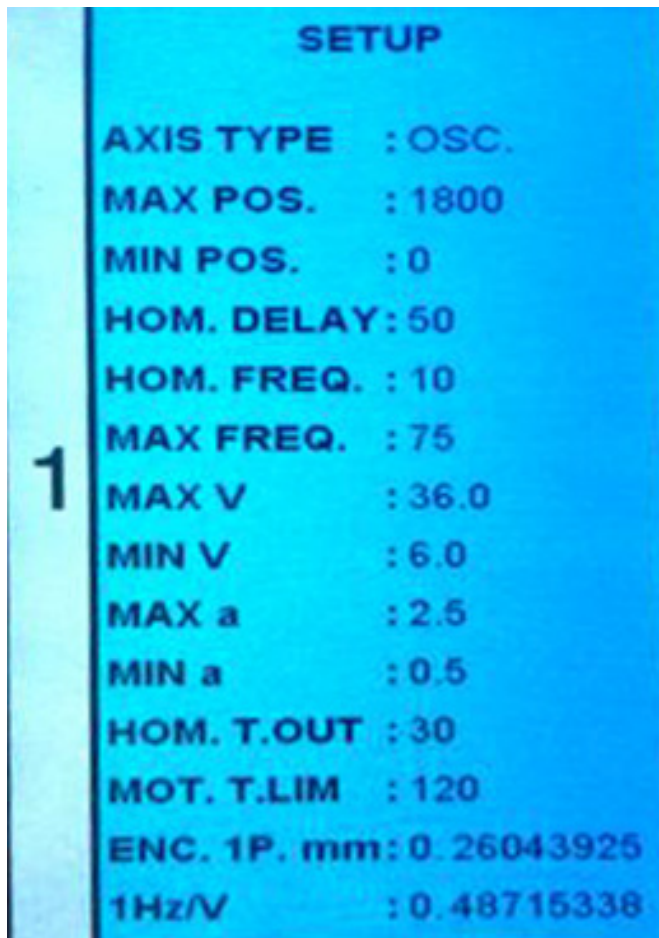
**Serial Communication:**

E-DRIVE ZX02-E controller unit has an optional connection to an automation system. In this case, the parameters of the controller can be controlled by any TCP/IP based automation system or by any other DRIVE ZX02-E device which is set as a “Master” in its network settings. Similarly, E-DRIVE ZX02-E controller unit can be set as “Master” in order to control the parameters of other devices where other devices are set to “Slave” in the network settings.

Code Info	Preferences	Factory Preset
IP Address	IP Address of the device itself.	192.168.000.101
Subnet Mask	Subnet Mask of the Network which the device is connected.	255.255.255.000
Gateway	Gateway of the Network which the device is connected	192.168.000.001
Master IP	Valid only when the device is set as a “Slave” in the Networks. Defines Master Device’s IP Address in the network. The operational parameters of the device is copied from the Master device of which the IP parameters is pointed in this setting.	192.168.000.200

**7.3.2. Axes Setup Pages**

After the “Main Setup” page, switch to the “Setup” page where you can adjust the properties of the axes by pressing the ‘Menu Button’ (B13). Then you can go to the settings of other axes with the help of the ‘Menu Button’ (B13).



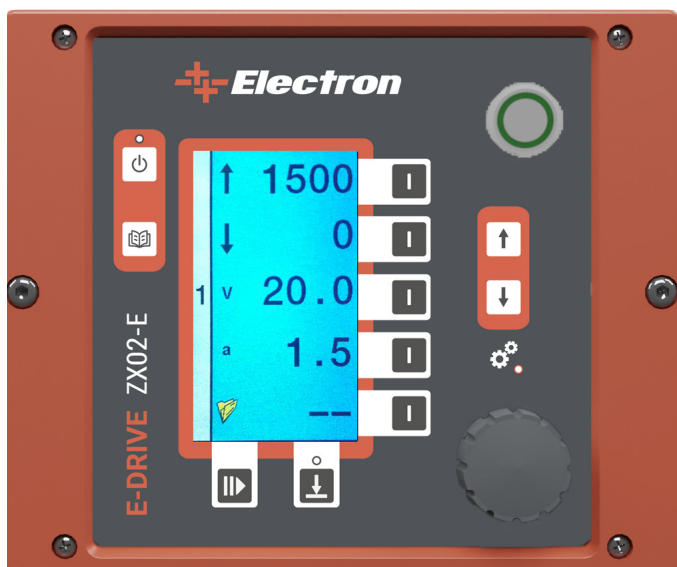


Code Info	For Vertical Axis	For Horizontal Axis
Axis Type	OSC.	POS.
Max POS.	1500/1800/2100/2400/2700/3000	1000
Min POS.	0	0
HOM. Delay	50 ms	0
HOM. Freq.	10 Hz	10 Hz
Max Freq.	75 Hz	50 Hz
Max V (Velocity)	36.0 m/min.	8.0 m/min.
Min V	6.0 m/min.	4.0 m/min.
Recommended V	20.0 m/min.	5.0 m/min.
Max a (acceleration)	2.5 m/s <sup>2</sup>	2.5 m/s <sup>2</sup>
Min a	0,5 m/s <sup>2</sup>	0,5 m/s <sup>2</sup>
Recommended a	1.5 m/s <sup>2</sup>	1.5 m/s <sup>2</sup>
HOM. T. Out	30	30
MOT. T. Lim	120	120
ENC. 1P. mm	Default	Default
1Hz/V	Default	Default

#### 7.4. Main Menu Page

After making the main settings and axis settings, press the ‘Axes Active / Passive Button’ (B14) to switch to the “Main Menu” page. Here you need to edit the reciprocator’s operating settings, that is, create a recipe.

You can select the setting of each line with the buttons (B5,B6,B7,B8,B9) on the right sides and change their values with the ‘Rotary Adjustment Knob’ (B10).



1st Line: It is the upper working height adjustment of your reciprocator stroke. The maximum can be up to the value you set on the setup page.

2nd Line: It is the bottom working height adjustment of your reciprocator stroke. The minimum value is zero. This value is referenced as the location of the mechanical stop bumper.

3th Line: It is velocity adjustment.

4th Line: It is acceleration adjustment.

5th Line: It shows the prescription.

*Note: Prescribing will be explained in the next section.*

Press the ‘Menu Button’ (B13) to adjust the other axes settings.

## 7.5. Recipe Creation & Operating with Recipes

As mentioned in the above sections of this manual, E-DRIVE ZX02 can store up to 50 recipes in memory. Operator can change the preferences of the reciprocator but changing the recipe is most of the time the easier thing to do.

### For Recipe Creation;

1. In the “Main Menu” page, after adjusting the axis working settings, press and hold the B9 button for 2 seconds.
2. To set the recipe number you want to save, turn ‘Rotary Adjustment Knob’ (K10) and come to the number you want.
3. To complete saving to this recipe number, long press ‘Rotary Adjustment Knob’ (K10) again.
4. When you long press it, the recipe number will start flashing. Do not raise your hand until it starts flashing at rapid intervals.

### For Operating with Recipes;

1. To call the registered recipe, press the B9 button once.
2. Turn the ‘Rotary Adjustment Knob’ (K10) to come to the recipe number you want to operate.
3. You can follow the reciprocator start-up procedure.



#### NOTE:

*There is no option to delete a recipe. However, you can save new recipe settings by following the same steps on the recipe page you want to delete.*

## 8. Operating Reciprocator

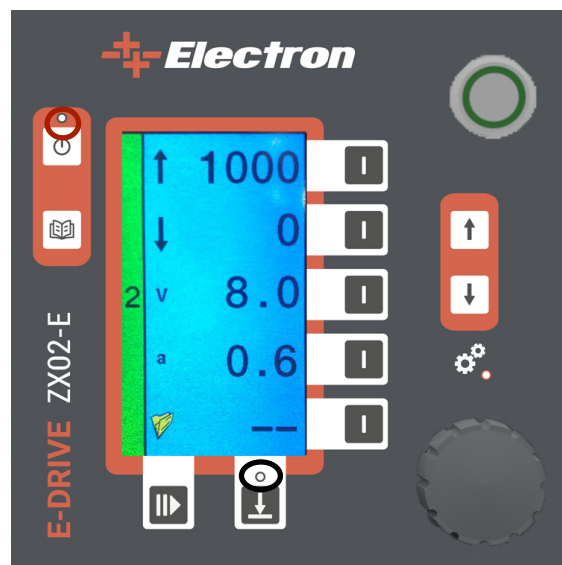
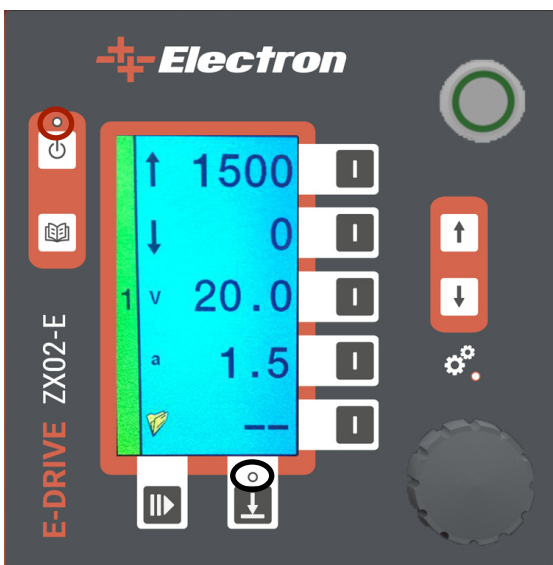
### 8.1. Start-Up Procedure



#### WARNING:

Before starting-up the reciprocator, read carefully these operating instructions!

1. After making the recipe settings, press the Axis Start / Stop Button (B12) on recipe page 1 to operate the 1st axis. The left side of the screens will be green as shown below. However, Robot will not work yet.
2. You should repeat this process for all axes you want to run. Use the Menu button (B13) to switch between recipes.



3. When you press the “Axes Active/Passive Button” (B14), all the axes you select (green) will work.

## 6.2. Error Codes

Error Codes	Explanation	Solution
E0001	Home Position Error	<ul style="list-style-type: none"> <li>- Check the connections of the sensor and whether it is defective.</li> <li>-Check the connections of the axis card and if it is defective</li> </ul>
E0002	Short Stroke Error	<ul style="list-style-type: none"> <li>- Control the stroke settings from the recipes through the interface. The distance between the upper and lower limits of the stroke is too short according to the adjusted speed. Increase upper stroke or lower stroke/reduce speed/increase acceleration.</li> </ul>
E0004	Speed Control Communication Error Speed Control OL2 Error	<ul style="list-style-type: none"> <li>- Use the ON/OFF key of the module control box</li> </ul>
E0008	Motor Over Temperature Error	<ul style="list-style-type: none"> <li>- Examine the engine visually. Check whether there is any dust, paint, foreign substance etc. on the motor.</li> <li>- Check whether the cooling fan is working or has any damage.</li> </ul>
E0016	Encoder Error	<ul style="list-style-type: none"> <li>- Check the encoder connections.</li> <li>- Encoder is connected to the motor shaft with 2 set-screws. Check whether these screws are loosened or not.</li> <li>- If it is loose, tighten it well.</li> <li>- If you still get an error, replace the encoder.</li> </ul>
E1000	Axis Communication Error	<ul style="list-style-type: none"> <li>- Check the connection of the communication cables and if there are any breaks in the cable.</li> <li>-Check the connections of the axis card and if it is defective</li> <li>-Check the communication cable connection from the RS485 communication port to the axis card on the driver.</li> <li>- Check the correctness of the settings such as communication protocol, address, communication speed.</li> </ul>
E220V	Remote Trigger Error	<ul style="list-style-type: none"> <li>AC230 V should be provided to the trigger pin (Axis active / passive)</li> <li>-Related group switch of the device cabinet (if exists) must be in "On" position in order to supply necessary "AC230V" to the "Trigger" pin of the E-Drive control unit.</li> </ul>
E0032	High Speed Low Stroke Operation Error	<ul style="list-style-type: none"> <li>-The speed should be reduced.</li> <li>-The stroke should be lowered.</li> </ul>

**NOTE:**

All errors, except E220V, refer to the axis number which is indicated on the left side of the E-Drive control unit during operation. An Error Code, for instance, E1000 that has been observed during operating in axis page-2 does not mean that there is an E1000 error in all of the axes. It means that the controller defines an error E1000 for axis.

**NOTE:**

Main Page must be switched over to other active axis pages to observe the condition of each axis.

## 9. Maintenance

**DANGER:**

Injuries can occur inside the protective fence due to the movement of the reciprocator!

**\*\*In order to enter the inner area, the door interlocks must be released by the control unit. This release signal may only be activated by technical personnel.**

### 9.1. General information

**WARNING:**

Before maintenance work can be carried out on the reciprocator, it must be ensured that the reciprocator cannot be turned on by third parties!

**\*\*The reciprocator has to be free of load and disconnected from mains!**

The E-ROBOT+3 Z Reciprocator was designed to operate with a minimum of maintenance. The motor gear box is self-lubricating and maintenance-free.

Regular maintenance and inspection of the reciprocator increases the working reliability and avoids damages, repair downtimes etc.!

### 9.2. Maintenance schedule

**NOTE:**

The following maintenance schedule is based on operation of 8 hours per day.

#### 9.2.1 Weekly

- Blow off the outside of the reciprocator with compressed air or clean it with a soft cloth from top to bottom at least once a week.

#### 9.2.2 Monthly

- Check the drive unit gearbox for oil loss
- Check the motor case in the reciprocator base for deposits of powder dust and if present, clean it

#### 9.2.3 Every 6 months

- Check the drive unit gearbox for oil loss
- Check the motor case in the reciprocator base for deposits of powder dust and if present, clean it

**NOTE:**

The parts, which are to be replaced during maintenance work, are available as spare parts. Please refer to the spare parts list too!

### 9.3. Drive unit

**DANGER:**

During assembly, cleaning, maintenance and commissioning when close to energized components, an electrical shock can cause serious injury or death.

**\*\* All work must be carried out only by technical personnel and when no power is applied!**

**\*\* The reciprocator has to be free of load!**

The motor gear box is self-lubricating and maintenance-free.

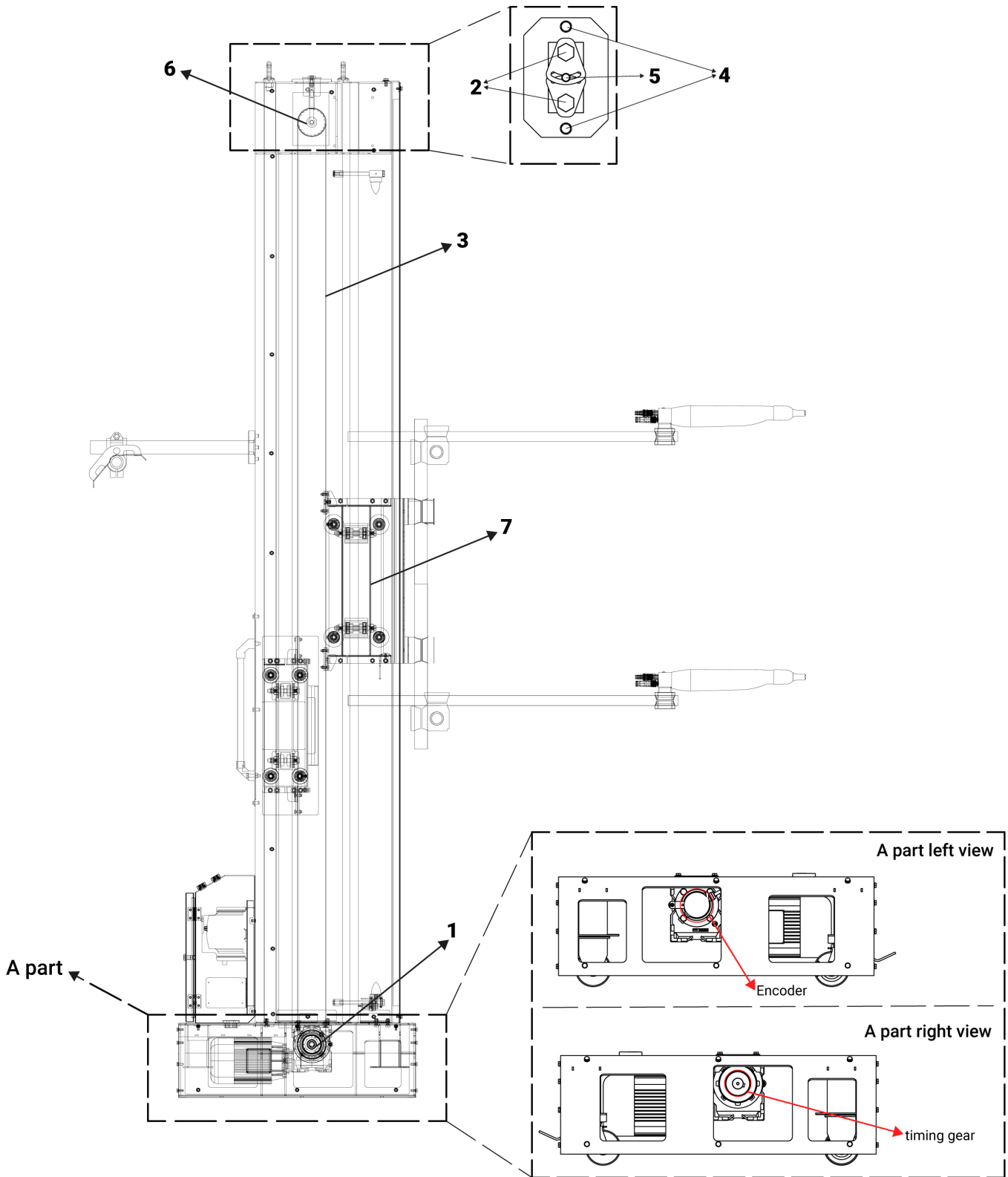
Observe the contamination of the enclosure - strong contamination on the outside can increase the operating temperature of the drive unit!

Therefore, clean the drive unit from time to time (with a vacuum cleaner etc.). Check the drive unit gearbox monthly for oil loss. If the drive unit gearbox has to be changed for any reason, the complete unit has to be replaced!

**WARNING:**

For safety reasons, two people should always carry out the following maintenance work!

**\*\*The installation takes place exactly in the reverse order!**



## E-ROBOT+3 Z

### 9.3.1 Replacing the drive unit

**WARNING:**

There is the risk of burns if contact is made with electrical components that have become overheated!

*\*\*All work must be carried out only by technical personnel and when no power is applied!*

If it is necessary to replace a drive unit gearbox, the complete motor unit must be dismantled from the reciprocator base. Therefore, the reciprocator has to be free of load and disconnected from mains.

Procedure:

1. Let the Z carriage (7) move down onto the lower stop.
2. Remove all cover plates from the reciprocator.
3. Remove the locking plate (5) and loosen the tensioning screws (2), so that the drive belt (3) is slack.
4. Uncouple the cable to the incremental pulse generator (encoder) from connection X8 (see the schematic diagram) and pull the plug through the cable gland into the motor case.
5. After loosening the belt, loosen the 4 screws (1) at the point where the motor is attached to the robot.
6. Its engine is outside through the openings on both sides of the robot.
7. To remove the timing gear on the engine; loosen the 2 setscrews attached to the gear unit and remove one completely. Insert the screw you removed into the 3.setskur blank, which is normally empty, and tighten it securely. The gear will come off and disengage on the engine.
8. To remove the encoder, simply unscrew the 2 screws where it is attached to the motor.

**WARNING:**

The screws (2) of the plate on the reciprocator must not be loosened and removed for any reason (factory setting) !!

### 8.4. Drive belt

**WARNING:**

Injuries can arise if fingers, hair or articles of clothing get caught between the drive belt and the drive wheel or toothed wheel.

*\*\* All work must be carried out only by technical personnel*

The drive belt (3) should be checked regularly because it is exposed to large loads when in operation:

Procedure:

- The drive belt (3) should be checked for wear and tension every 6 months. Powder deposits should be removed with a vacuum cleaner, because this can influence the quiet running and shorten the service life of the drive belt.
- Switch on the reciprocator and check the Z carriage (7) for quiet running. Check the drive belt (3) for elongation or wear (noisy running, strong vibration of the belt when reversing the direction of travel).

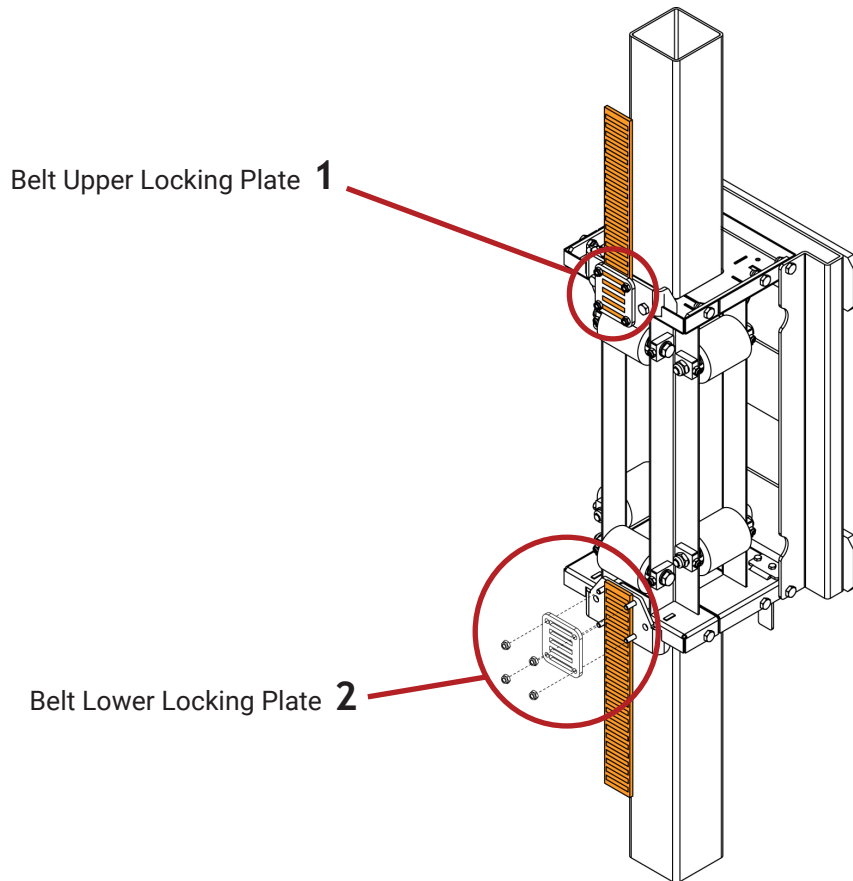
**WARNING:**

For safety reasons, two people should always carry out the following maintenance work!

#### 9.4.1 Replace the drive belt

Procedure:

1. Let the Z carriage (7) move down onto the lower stop.
2. Switch off the electric power.
3. Remove the boarding (side panels).
4. Remove the locking plates (5) and loosen the tensioning screws (2), so that the drive belt (3) is slack.
5. Loosen the lower locking plate 2 with the drive belt on the Z carriage (8) and set it down. Note the position of the locking plate on the drive belt holder, because it must be fitted in approximately the same position on the assembly.
6. Remove the damaged drive belt from under the reciprocator.
7. Loosen the screws on the upper locking plate 1 and remove the drive belt when it is completely outside of the reciprocator.
8. Screw on the new drive belt at the upper locking plate 1.
9. Pass the loose end of the drive belt over the upper toothed drive wheel from inside the reciprocator column.
10. Screw on the drive belt at the lower locking plate 2.
11. Tension the drive belt, but do not overstretch.



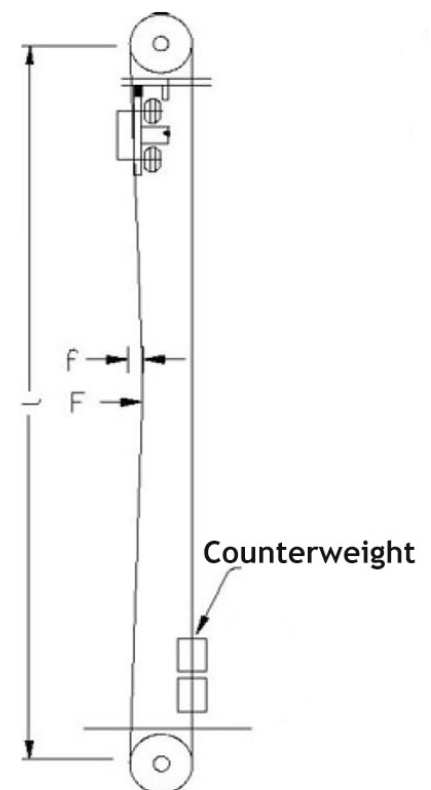
### 9.4.1.2 Belt Tension Setting

After the belt is installed, tighten the tension screws on the reciprocator to adjust its tension. You can adjust the belt tension according to the table below.



**NOTE:**  
It is assumed that a force of  $F = 50\text{ N}$  is applied.

Stroke Length [mm]	Distance Between Gears (l) [mm]	Tension Distance (f) [mm]
1200	2196	28,0
1500	2496	31,2
1800	2796	34,9
2100	3096	38,7
2400	3396	42,5
2700	3696	46,2



Belt Lower Locking Plate **2**

### 9.4.2 Replace the drive belt on the horizontal axis

Procedure:

1. Switch off the electric power.
2. Remove all plates on the horizontal reciprocator.
3. First loosen the tension screw on the tension plate (we do this so that the belt does not swing without control), then unscrew the tension plate (2 pcs) so that the drive belt can be pulled towards the locking plate.
4. Unscrew the screws (2 pcs) on the locking plate and you can completely remove the drive belt from the robot.
5. Screw on the new drive belt at the locking plate .
6. Pass the loose end of the drive belt from under the first roller and over the toothed drive wheel. And then pass it under the 2nd roller and pull it towards the adjustment plate.
7. Screw on the drive belt at the lower locking plate.
8. Tighten the drive belt by tightening the tensioning screw on the tension plate, but do not over-tighten.
9. When 50N force is applied, the distance to the upper plate will be 30 mm. Horizontal length is 1900 mm from end to end. Measure from the middle point (950 mm).

### 9.5. Drive wheel

#### 9.5.1 Replacing the upper toothed drive wheel



**WARNING:**

The following workings should only be carried out by trained personnel!

Procedure:

1. Let the Z carriage (7) move down onto the lower stop.
2. Switch off the electric power.
3. Remove the boarding (side panels).
4. Remove the locking plates (5) and loosen the tensioning screws (4), so that the drive belt (3) is slack
5. Completely remove the front tensioning screw



**WARNING:**

Danger of accident!

*\*\* The Z carriage must definitely rest on the mechanical stop bumper, before this tensioning screw is removed!*

6. Hold the toothed drive wheel (6) tight in one hand whilst the eye bolt is being removed from the spindle
7. Remove the drive belt (3) from the toothed wheel
8. Remove the toothed drive wheel (6) and replace it

The installation takes place exactly in the reverse order!

- If necessary, remove the service cover on the base (1), to check if the drive belt (3) is sitting correctly on the toothed drive wheel
- Let the Z carriage slowly run up and down the column a few times, to see if the drive belt must be tensioned more

### 9.6. Z carriage - rollers

If the Z carriage (7) starts to vibrate excessively during operation, especially at the reversing points, in most cases the cause lies in too much play in the carriage rollers, or even loose rollers!

In this case, proceed as follows:

1. Let the Z carriage (7) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (front and side panels)
4. Remove the plate to which the strap is attached and the counterweight plates.

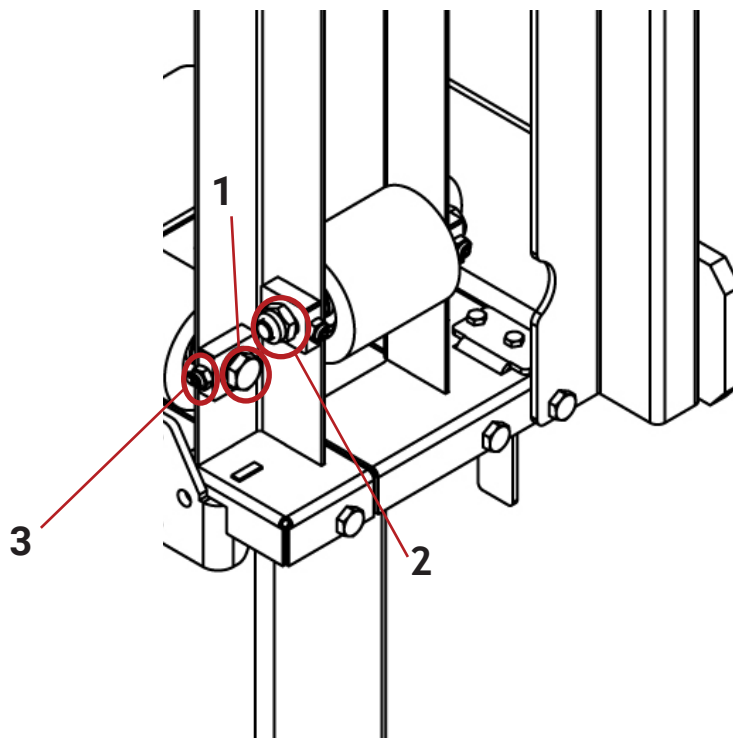


**WARNING:**

Be careful when removing the plate the strap is attached to. Since the belt is still attached, it can drop suddenly when removed.

5. Loosen the lock nut on the grub screw
6. Loosen the nut on the roller axle bolt





**WARNING:**

Never loosen more than one roller at the same time! Adjust only one roller after another!

7. Adjust the roller pressure with the grub screw (3) , in such a way that the roller can just be turned by hand
8. Tighten the roller axle bolt (1) and the nut(2)
9. Tighten the grub screw (3) and secure it
10. Fit the panels again and fasten them firmly

**The Z carriage should run evenly and quietly again!**

### 9.7. Counterweight Plates



**WARNING:**

The following workings should only be carried out by trained personnel!

#### 9.7.1 Replacing the counterweight plates on the vertical axis

**Procedure:**

1. Let the Z carriage (7) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (right side panel)
4. According to the number of guns specified in the table, insert the counterweights to the threaded rods through the holes drilled for 4 M8 threaded rods as shown in the picture.
5. After inserting the counterweights, insert the spring washers into the threaded rods. (4 qty)
6. Insert the M8 nuts and tighten. (4 qty)

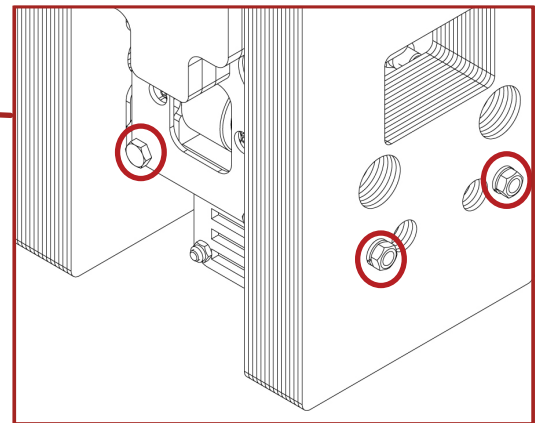
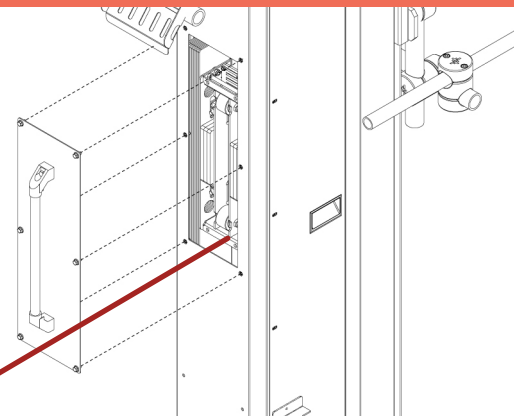
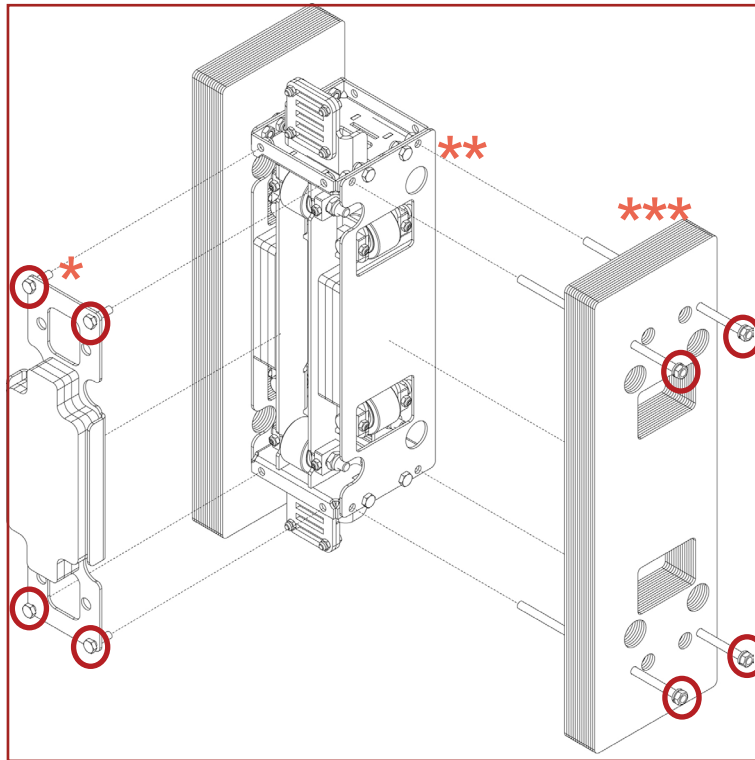


**WARNING:**

The counterweight quantities are given approximately. These given values may also vary depending on the gun mounting arrangement. (horizontal, vertical, double, etc.)

As you attach counterweight to the reciprocator, you should add more counterweight by examining it visually, if you think it is unbalanced.

Gun Qty	Counterweight Qty
2	4 x 1.87 kg
4	8 x 1.87 kg
6	10 x 1.87 kg
8	16 x 1.87 kg
10	20 x 1.87 kg
12	22 x 1.87 kg



## 9.8. Reference Sensor



### WARNING:

The following workings should only be carried out by trained personnel!

### 9.8.1 Replacing the zero point reference sensor on the vertical axis

#### Procedure:

1. Let the Z carriage (7) move down onto the lower stop
2. Switch off the electric power
3. Disconnect the sensor's electrical connections from the connections shown on the schematic diagram.
4. Remove the boarding (right side panel)
5. Loosen the 2 nuts attached on the sensor.
6. Remove the nut on the front completely.
7. Pull the sensor out of the reciprocator connector.

### 9.8.2 Replacing the reference sensor on the horizontal axis

#### Procedure:

1. Switch off the electric power
2. Disconnect the sensor's electrical connections from the connections shown on the schematic diagram.
3. Remove all plates on the horizontal reciprocator.
4. Loosen the 2 nuts attached on the sensor.
5. Remove the nut on the front completely.
6. Pull the sensor out of the reciprocator connector.

\* E-Robot+3 load trolley No.1 fixed counter balanced weight - 5.682 kg

\*\* E-Robot+3 load trolley No.2 fixed counter balanced weight - 5.381 kg

\*\*\* E-Robot+3 load trolley No.1 replaceable counter balanced weight - (optional) 1.87 kg

## 9.9. Incremental Pulse Generator (Encoder)

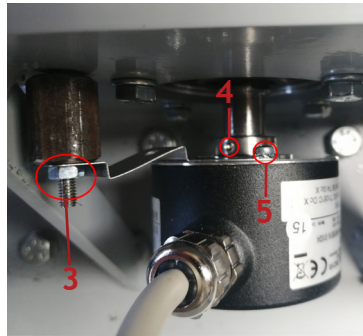


### WARNING:

The following workings should only be carried out by trained personnel!

#### Procedure:

1. Let the Z carriage (7) move down onto the lower stop
2. Switch off the electric power
3. Disconnect the encoder's electrical connections from the connections shown on the schematic diagram.
4. Remove terminal connections. (In order to be able to exit the cable channel inside the panel)
5. Remove the cover(1) at the bottom of the robot and the small plate(2) on it.



6. Pull the encoder cable from the bottom of the robot to the encoder.
7. Remove the nut(3) to which the encoder plate is attached.
8. Remove the shaft mounting setskur (4) of the encoder with a 1.5 mm allen wrench. The encoder will be separated from the robot.
9. Remove the 2 screws (5) of the connection plate on the encoder.

## 9.10. Carriage



### DANGER:

During assembly, cleaning, maintenance and commissioning when close to energized components, an electrical shock can cause serious injury or death.

**\*\* All work must be carried out only by technical personnel and when no power is applied!**

**\*\* The reciprocator has to be free of load!**

### 9.10.1 Replacing the carriage

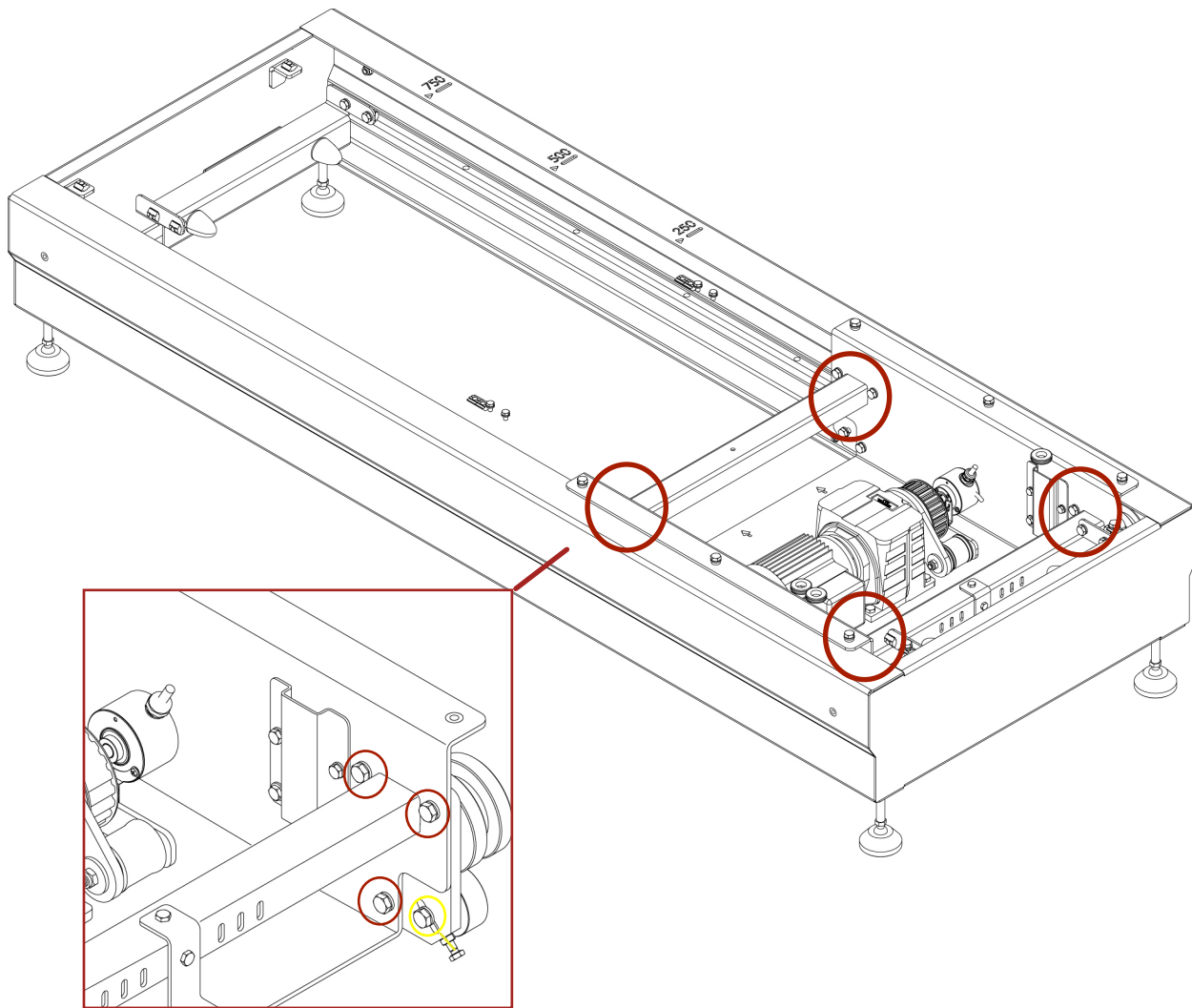
#### Procedure:

1. Switch off the electric power
2. Disconnect the connections of electrical equipments from the connections shown on the schematic diagram.
3. Remove terminal connections. (In order to be able to exit the cable channel inside the panel)
4. Remove all plates on the horizontal reciprocator.
5. There are 4 screws in 4 corners of the carriage. When you remove 3 of them (marked in red), the carriage will be separated from the rails.



### WARNING:

For security reasons, it is recommended that two people do this.



## 10. Shipment, storage

Reciprocator(s) is delivered on the desired date with a list of materials. All the materials are packaged accordingly for them to be fitted and fixed in the transport so that the risk of shipment damage is reduced.

### 10.1. Loading and Handling

The following rules are important for handling:

1. The environmental factors have to be considered for the possible negative effects to the Reciprocator while handling.
2. The reciprocator has to be handled with care.
3. To be able to avoid the risks of accidents, operators should not stay under the handling equipment at any time.
4. Slippage and crashes could end up damaging the reciprocator, be careful while putting it on the ground.

Check these when receiving the product:

1. Is it the ordered equipment or not?
2. Was there any damage on the goods while in transport?
3. If there is any damage observed on the goods, SISTEM TEKNIK has to be notified immediately via mail or phone call.

### 10.3. Storage

1. All the goods have to be stored well until the installation.
2. For environmental protection, all goods have to be stored in the manner that has been sent. If there has to be more protection like extra lubrication, it has to be done in a similar manner.

#### 10.3.1. Maintenance during storage

##### 10.3.1.1 Maintenance schedule

No maintenance schedule is necessary.

##### 10.3.1.2 Maintenance works

During long-term storage, periodically perform a visual check for corrosion.

## 11. Packing, transport

### 11.1. Introduction

This chapter describes special precautions that must be taken during internal transport of the product if:

- the customer himself must pack, transport and ship the product, such as to have renovations or service work carried out by the manufacturer or
- the product must be shipped for disposal (recycling).

#### 11.1.1 Requirements on personnel carrying out the work

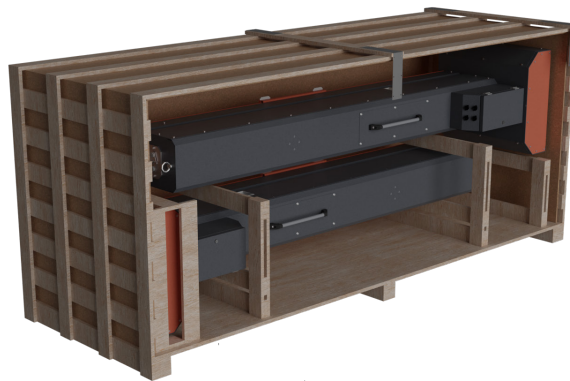
All work must be carried out by personnel trained in packing machines.

### 11.2. Packing material

#### 11.2.1 Selection of packing material

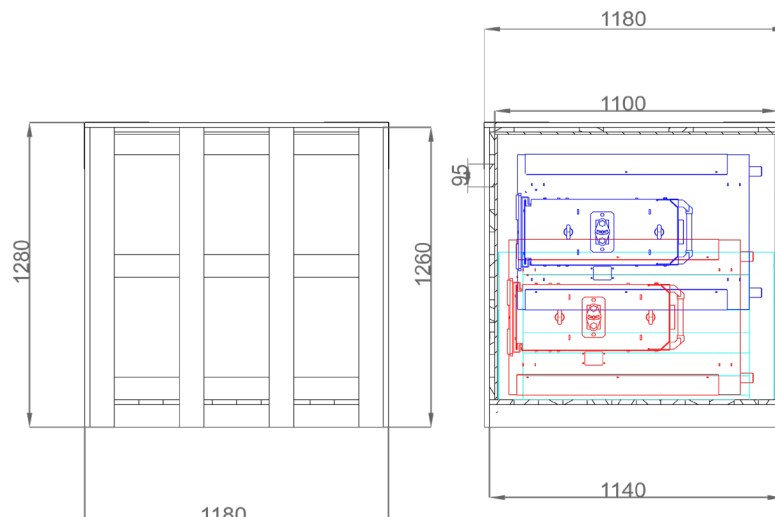
Suitably stable wood packing material must be used.

#### 11.2.2 Procedure when packing



11.2.2.1. Case Dimensions

#### A) Width and Height



### C) Weight

Stroke Length [mm]	Reciprocator (kg)	Case (kg)	2 reciprocators with case-SET (kg)
1200	154	225	533
1500	163	240	566
1800	173	255	601
2100	183	270	636
2400	193	285	671
2700	202	300	704
Horizontal Reciprocator	aprx. 250 (with palette)		



#### NOTE:

Reciprocator enclosing dimensions are given so that two single vertical axes fit in the same case.

### 11.3. Transport

#### 11.3.1 Data concerning goods to be transported

The space requirements correspond to the size of the axes of motion plus the packaging.

#### 11.3.2 Loading, transferring the load, unloading

At least one fork lift must be available.

## 12. Ordering

### 12.1 Ordering Reciprocator Systems

1) For a single Reciprocator system;				
Systems	Products	Types	Codes	Qty
Vertical Axis Reciprocator System	E-ROBOT+3 Z	1200 Stroke	B07RG0301	1
		1500 Stroke	B07RG0302	
		1800 Stroke	B07RG0303	
		2100 Stroke	B07RG0304	
		2400 Stroke	B07RG0305	
		2700 Stroke	B07RG0306	
	E-DRIVE ZX02-E	N/A	B08ZX02CM-E	1
	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE	10 MT	B08ZX02SC-E10	1
		15 MT	B08ZX02SC-E15	
		20 MT	B08ZX02SC-E20	
		25 MT	B08ZX02SC-E25	
	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE	10 MT	B08ZX02PC-E10	1
		15 MT	B08ZX02PC-E15	
		20 MT	B08ZX02PC-E20	
25 MT		B08ZX02PC-E25		

2) For a single Reciprocator system;				
Systems	Products	Types	Codes	Qty
Double Axis Reciprocator System	E-ROBOT+3 Z	1200 Stroke	B07RG0301	1
		1500 Stroke	B07RG0302	
		1800 Stroke	B07RG0303	
		2100 Stroke	B07RG0304	
		2400 Stroke	B07RG0305	
		2700 Stroke	B07RG0306	
	E-ROBOT+3 X	1000 Stroke / 1500 Stroke	A05X031000 / A05X031500	1
	E-DRIVE ZX02-E	N/A	B08ZX02CM-E	1
	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE	10 MT	B08ZX02SC-E10	1
		15 MT	B08ZX02SC-E15	
		20 MT	B08ZX02SC-E20	
		25 MT	B08ZX02SC-E25	
	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE	10 MT	B08ZX02PC-E10	1
		15 MT	B08ZX02PC-E15	
20 MT		B08ZX02PC-E20		
25 MT		B08ZX02PC-E25		

3) For dual Reciprocator systems;				
Systems	Products	Types	Codes	Qty
Vertical Axis Reciprocator Systems	E-ROBOT+3 Z	1200 Stroke	B07RG0301	2
		1500 Stroke	B07RG0302	
		1800 Stroke	B07RG0303	
		2100 Stroke	B07RG0304	
		2400 Stroke	B07RG0305	
		2700 Stroke	B07RG0306	
	E-DRIVE ZX02-E	N/A	B08ZX02CM-E	1
	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE	10 MT	B08ZX02SC-E10	2
		15 MT	B08ZX02SC-E15	
		20 MT	B08ZX02SC-E20	
		25 MT	B08ZX02SC-E25	
	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE	10 MT	B08ZX02PC-E10	2
		15 MT	B08ZX02PC-E15	
		20 MT	B08ZX02PC-E20	
25 MT		B08ZX02PC-E25		

4) For dual Reciprocator systems;

Systems	Products	Types	Codes	Qty
Double Axis Reciprocator System	E-ROBOT+3 Z	1200 Stroke	B07RG0301	2
		1500 Stroke	B07RG0302	
		1800 Stroke	B07RG0303	
		2100 Stroke	B07RG0304	
		2400 Stroke	B07RG0305	
		2700 Stroke	B07RG0306	
	E-ROBOT+3 X	1000 Stroke / 1500 Stroke	A05X031000 / A05X031500	2
	E-DRIVE ZX02-E	N/A	B08ZX02CM-E	1
	E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE	10 MT	B08ZX02SC-E10	2
		15 MT	B08ZX02SC-E15	
		20 MT	B08ZX02SC-E20	
		25 MT	B08ZX02SC-E25	
	E-DRIVE ZX02-E RECIPROCATOR POWER CABLE	10 MT	B08ZX02PC-E10	2
		15 MT	B08ZX02PC-E15	
20 MT		B08ZX02PC-E20		
25 MT		B08ZX02PC-E25		



**NOTE:**

Reciprocator enclosing dimensions are given so that two single vertical axes fit in the same case.

Ordering steps;

1. Select which of the tables marked 1, 2, 3 and 4 above fits the system you want to order.
2. All the products you need to order are described in the “Products” section.
3. Each product’s own options are selected from the “Types” column. Order can be placed with the Order code next to it.
4. When ordering, do not forget to specify the number of quantity in the table.

Example;

You want to order 2 pcs 1800 stroke vertical axis robot systems, standing opposite each other in the booth. In that case, we are looking at table number 3. You need to order 4 products in this table separately.

- Product: E-Robot+3 Z , Type: 1800 stroke , Code: B07RG0303 , 2 pcs
- +
- Product: E-DRIVE ZX02-E , Code: B08ZX02CM-E , 1 piece
- +
- Product: E-DRIVE ZX02-E RECIPROCATOR SIGNAL CABLE, Type: 20 MT , Code: B08ZX02SC-E20 , 2pcs
- +
- Product: E-DRIVE ZX02-E RECIPROCATOR POWER CABLE, Type: 20 MT , Code: B08ZX02PC-E20 , 2pcs



**NOTE:**

- 1) When you order an E-ROBOT+3 Z vertical axis reciprocator, 4 qty “ CLAMP ROBOT BODY Ø40 ” (Product Code: B07EH50907) is sent.
- 2) Other than that, other Clamps and poles must be ordered separately. (Page-48).
- 3) If you want to buy the E-ROBOT+3 X horizontal axis reciprocator separately from the system, we send you a set (Product Code: B08ZX02YM) so that you can integrate it into the E-ROBOT+3 Z vertical axis reciprocator system.



## 12.2 Ordering Spare Parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

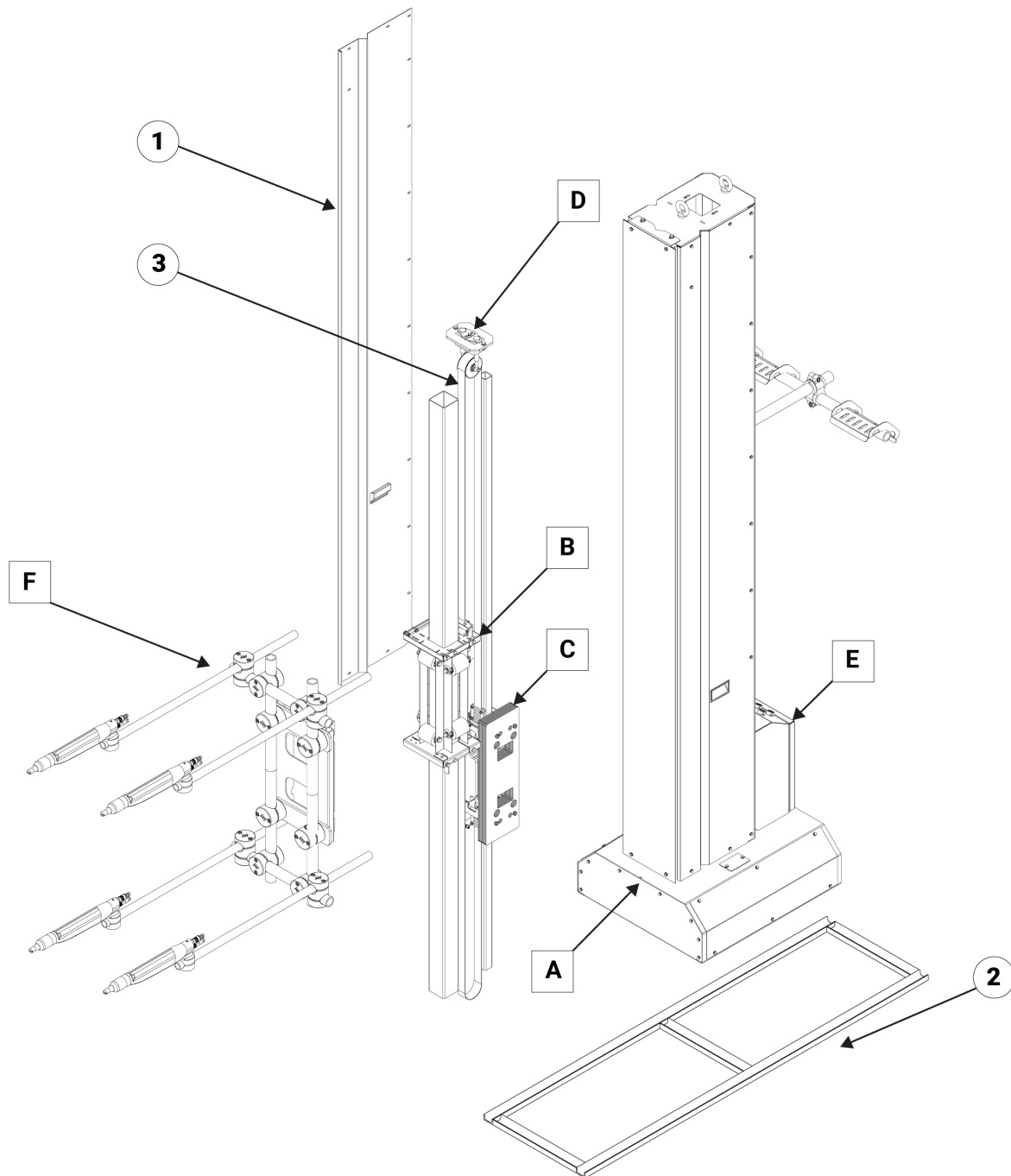
- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part



### WARNING:

Only original ELECTRON spare parts should be used, because the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the Electron guarantee conditions!

### 12.2.1 E-ROBOT Z02-EX Reciprocator - spare parts list



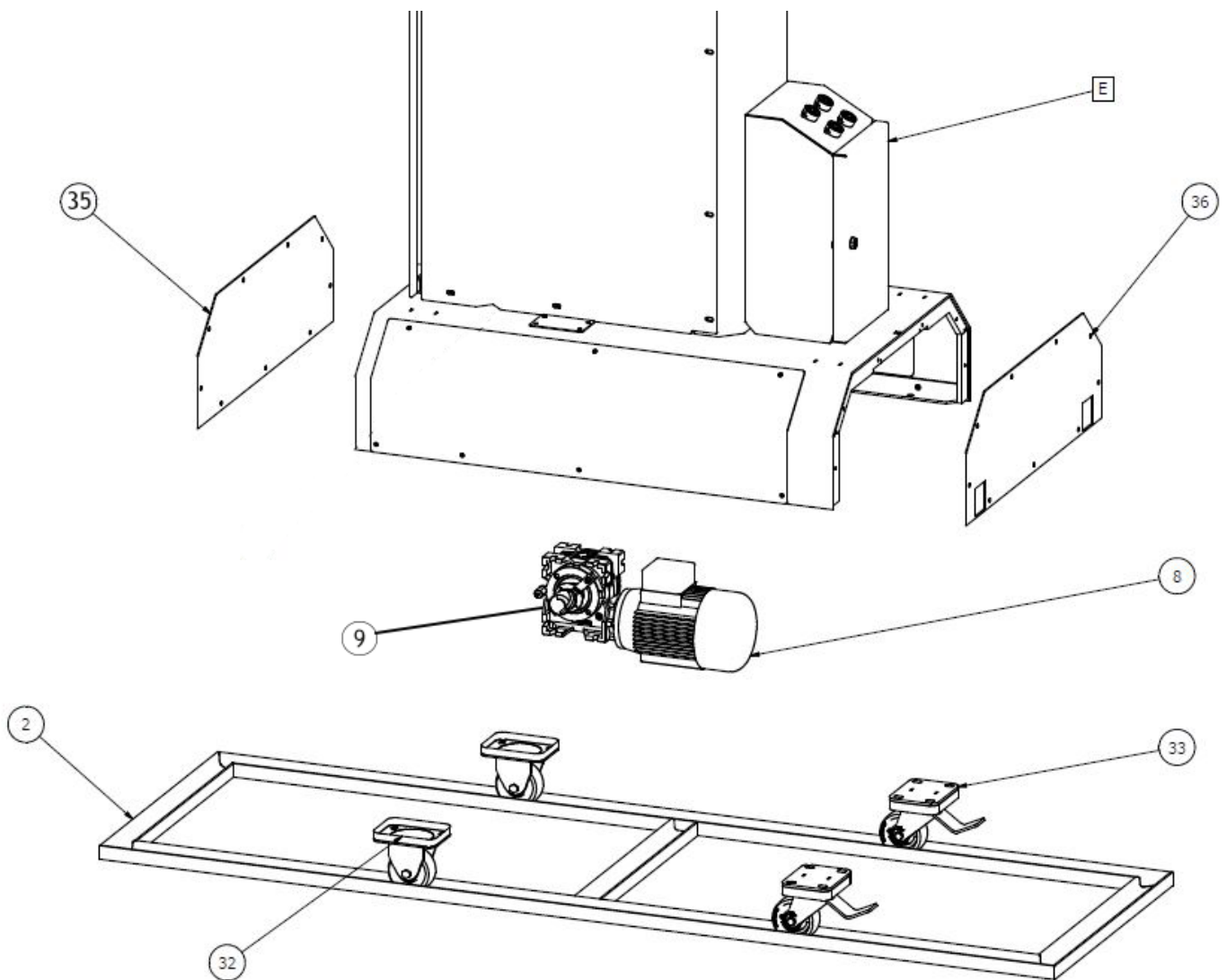
Part #	Order Code	Part Name	Qty
1	-	SIDE COVER OF THE RECIPROCATOR	2
1.1	B06RB03121	E-ROBOT V3 1200 STROKE FRONT COVER	-
1.2	B06RB03128	E-ROBOT V3 1500 STROKE FRONT COVER	-
1.3	B06RB03133	E-ROBOT V3 1800 STROKE FRONT COVER	-
1.4	B06RB03138	E-ROBOT V3 2100 STROKE FRONT COVER	-
1.5	B06RB03143	E-ROBOT V3 2400 STROKE FRONT COVER	-
1.6	B06RB03148	E-ROBOT V3 2700 STROKE FRONT COVER	-
2	B07RBM131	E-ROBOT VERTICAL AXIS RAIL-COMplete	1
3	GAAE04003	TRIGER BELT H150-38 MM BLACK CLOTHED-ANTISTATIC ELAT-ECH	1
A-PART	*		1
B-PART	*		1
C-PART	*		1
D-PART	*		1
E-PART	*		1



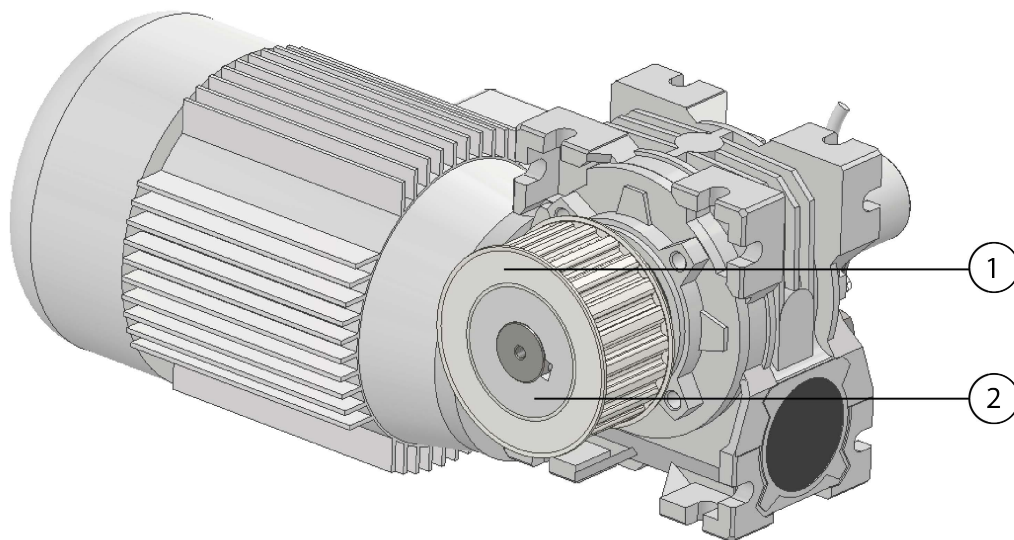
**NOTE:**

The sections marked with an asterisk will be detailed in the next step.

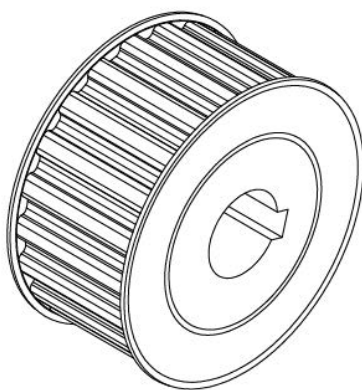
## A-PART



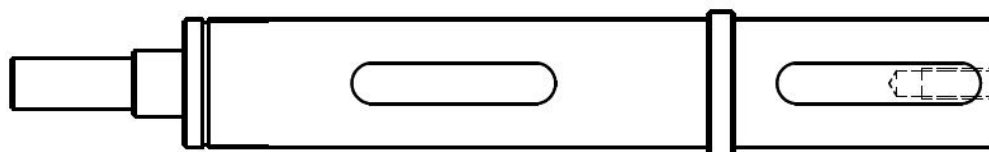
Part #	Order Code	Part Name	Qty
32	AKUA08007	WHEEL Ø80 POLTAMID FIXED (YELLOW IRON)	2
33	AKUA08003	WHEEL PLATE FITTING WITH BRAKE Ø80 POLTAMID FIXED (YELLOW IRON)	2
34	B06RB03100	E-ROBOT V3 LOWER BASE	1
35	B07RS0007	E-ROBOT+3 LOWER BASE FRONT - BACK COVER PLATE	1
36	B06RB03098	E-ROBOT+3 LOWER BASE FRONT - BACK COVER PLATE	1
2	B07RBM131	E-ROBOT VERTICAL AXIS RAIL-COMplete	1
8	MPMT05003	REDUCER MOTOR FRT 50 1:15 71 B14 AC25 AS ATEX VARVEL T71B 0,37 4P B14 X2 ZONE	1
9	B07500600	ENCODER ROTARY ATEX ZONE 22 PEPPERL FUCHS RSI58X-01AK1R61N-01024	1



Part #	Order Code	Part Name	Qty
32	GAAE02005	TRIGGER GEAR BUSHING TYPE (Ø25 12.7 STEP ACCORDING TO SHAFT)	1
33	GAAE06004	BUSHING PULLEY Ø25	1

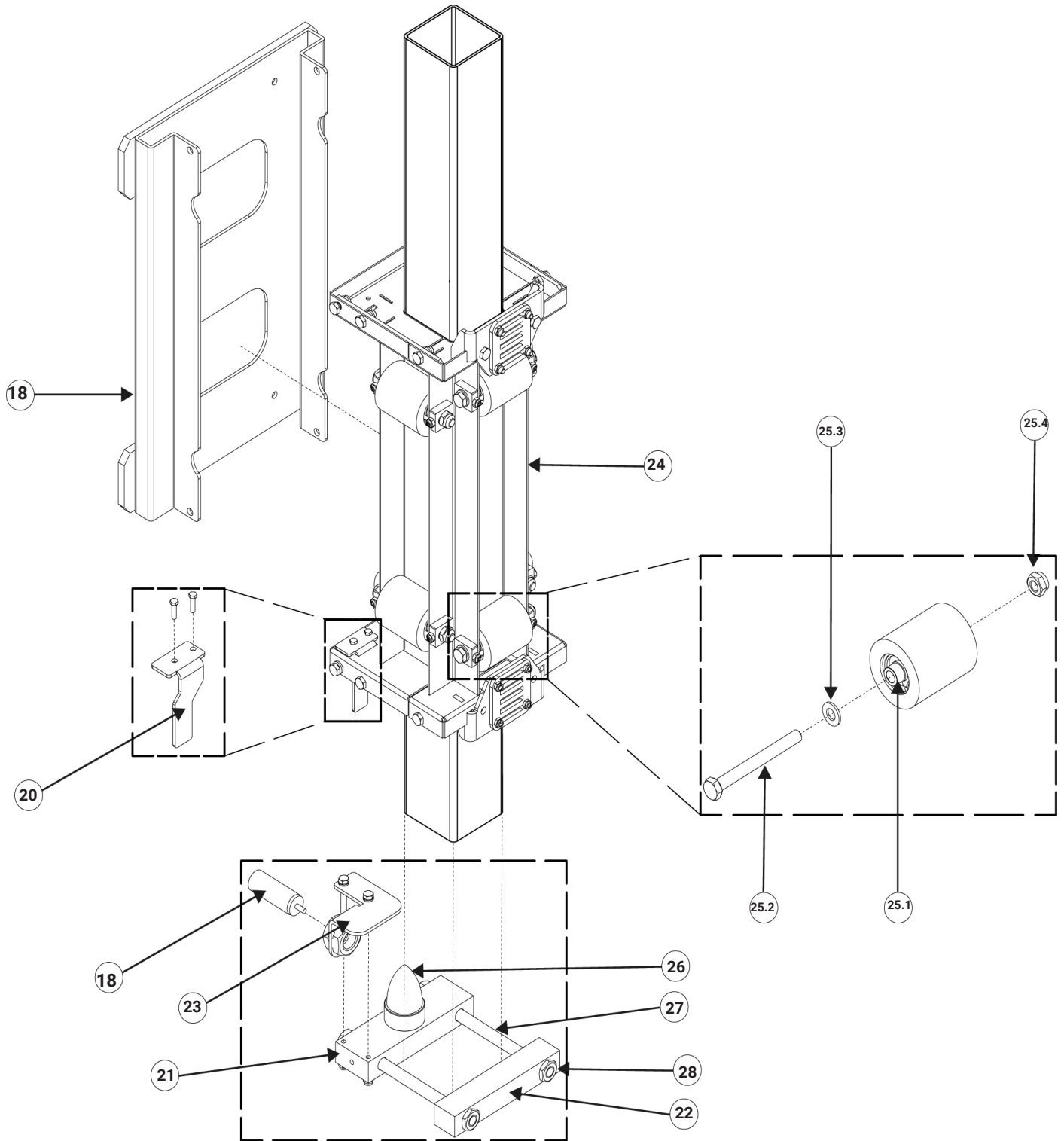


Part Name	Order Code	Qty
E-ROBOT+3 BOTTOM TENSION GEAR KIT	B07RS0009	1

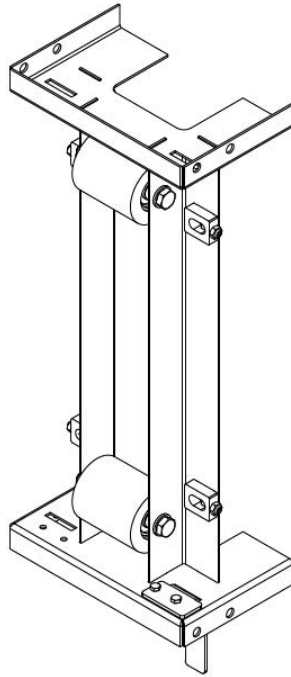


Part Name	Order Code	Qty
E-ROBOT+3 BOTTOM BASE VARVEL REDUCER OUTPUT SHAFT	TRTM03104	1

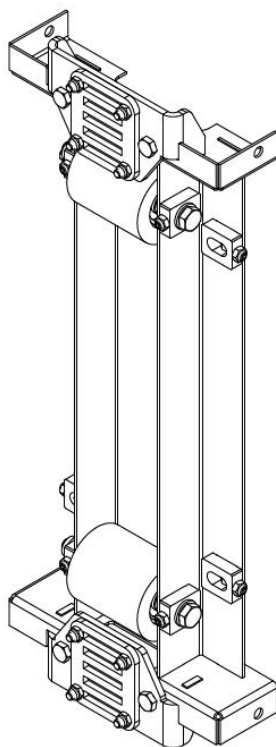
# B-PART



Part #	Order Code	Part Name	Qty	
18	ELSN02008	SENSOR INDUCTIVE ATEX NBB8-18GM50-E2-3G-3D PEPPERL FUCHS	1	
19	B06RB01035	E-ROBOT SENSOR BASE	1	
20	B06RB03088	E-ROBOT V3 ROBOT SENSOR BASE COUNTERPART	1	
21	TRTM06005	E-ROBOT+3 STOPPER WEDGE BASE 25X20X128	1	
22	TRTM06029	STOPPER WEDGE BASE LOWER PART Ø35X15	1	
23	BECV06001	COATED BOLT M5X10	1	
24	B06RB03085	E-ROBOT V3 BELT CONNECTION PLATE COUNTERPART	2	
25	B07RBM132	E-ROBOT LARGE WHEELSET - COMPLETE	8	
	25.1	TRTM06008	LATHE E-ROBOT+3 WHEEL DISTANCE BUSH Ø16XL9,4	1
	25.2	BECV06019	COATED BOLT M10X120	1
	25.3	BEPL03006	M10 DISTANCE RING-THIN(2mm)	1
	25.4	BESM01007	M10 NUT	1
	25.5	TRTM08015	CARRIAGE ROLLER -Ø60 X L70	1
26	AKUA03020	VIBRATION WEDGE M8X27 30x36 K TYPE	1	
27	BECV06021	COATED BOLTM10X150	2	
28	BESM01007	M10 NUT	2	

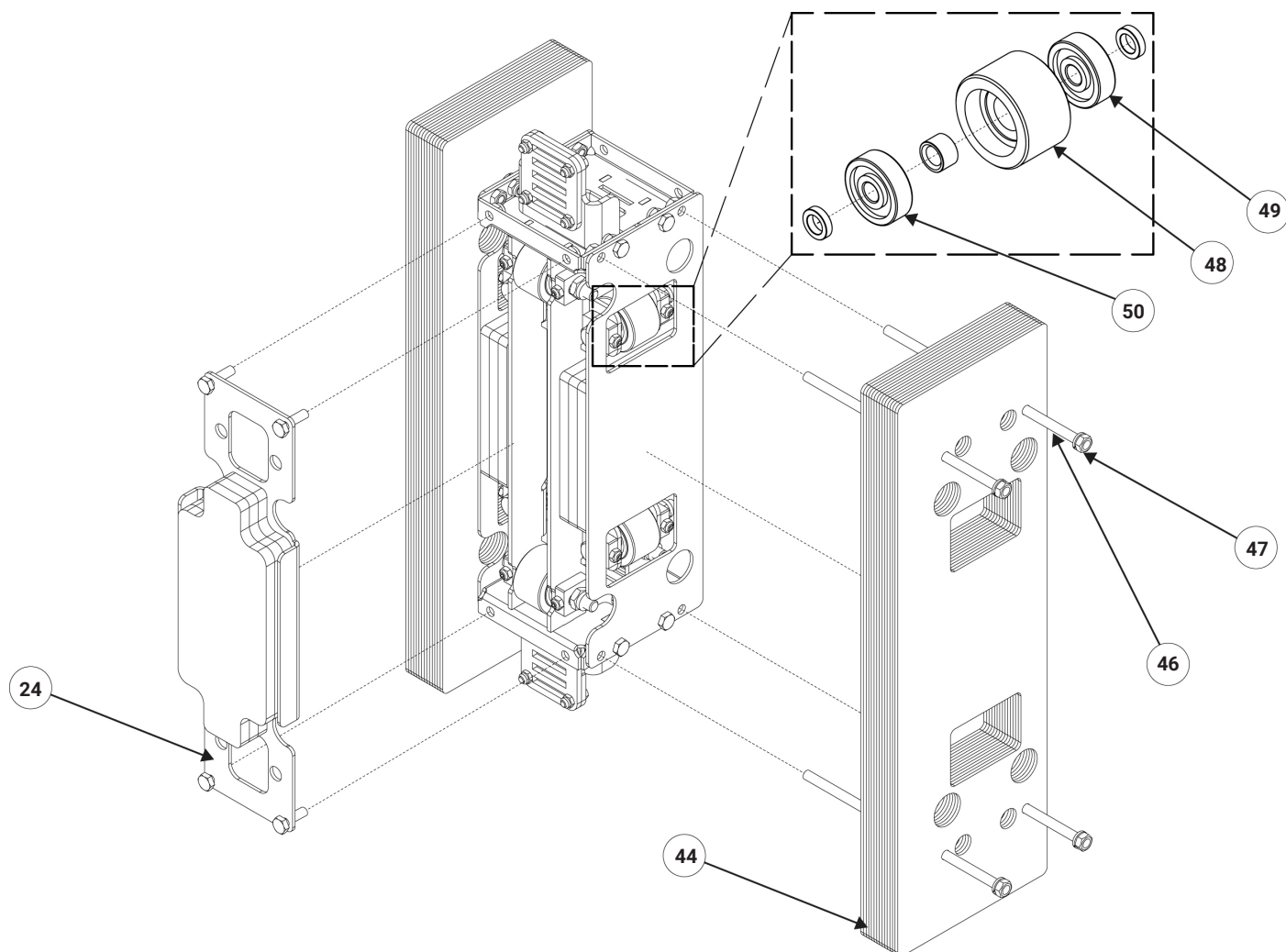


Part Name	Order Code	Qty
E-ROBOT+3 Z CARRIAGE FRONT KIT	B07RS0001	1



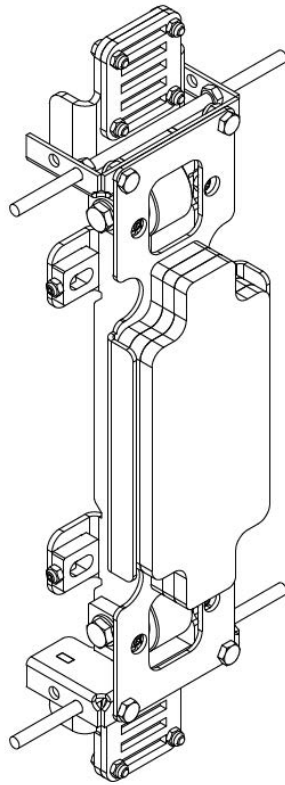
Part Name	Order Code	Qty
E-ROBOT+3 Z CARRIAGE BACK KIT	B07RS0002	1

## C-PART

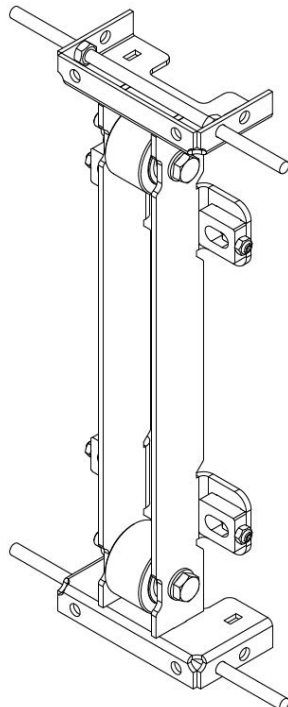


Part #	Order Code	Part Name	Qty
24	B06RB03071	E-ROBOT V3 BELT CONNECTION PLATE	1
44	B06RB03073	E-ROBOT+3 WELDED WEIGHT PLATE	2
46	BEDH06002	COATED - GIJON M8	8
47	BESM01006	COATED - NUT M8	8
48	TRTM08016	ROBOT SMALL REEL Ø56 L25	8
49	GAAE04019	BEARING 6300 ZZ	8
50	TRTM06032	DISTANCE BUSHING OF WEIGHT TROLLEY WHEEL Ø16 L23	8
51	TRTM03082	WEIGHT TROLLEY WHEEL OUTER BUSHING	8

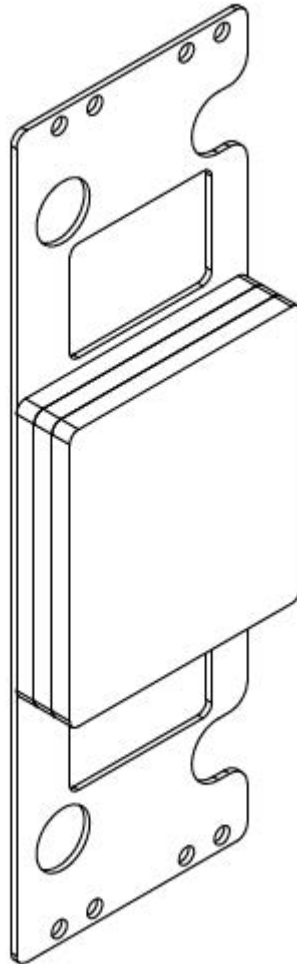




Part Name	Order Code	Qty
E-ROBOT+3 COUNTER CARRIAGE FRONT KIT	B07RS0003	1

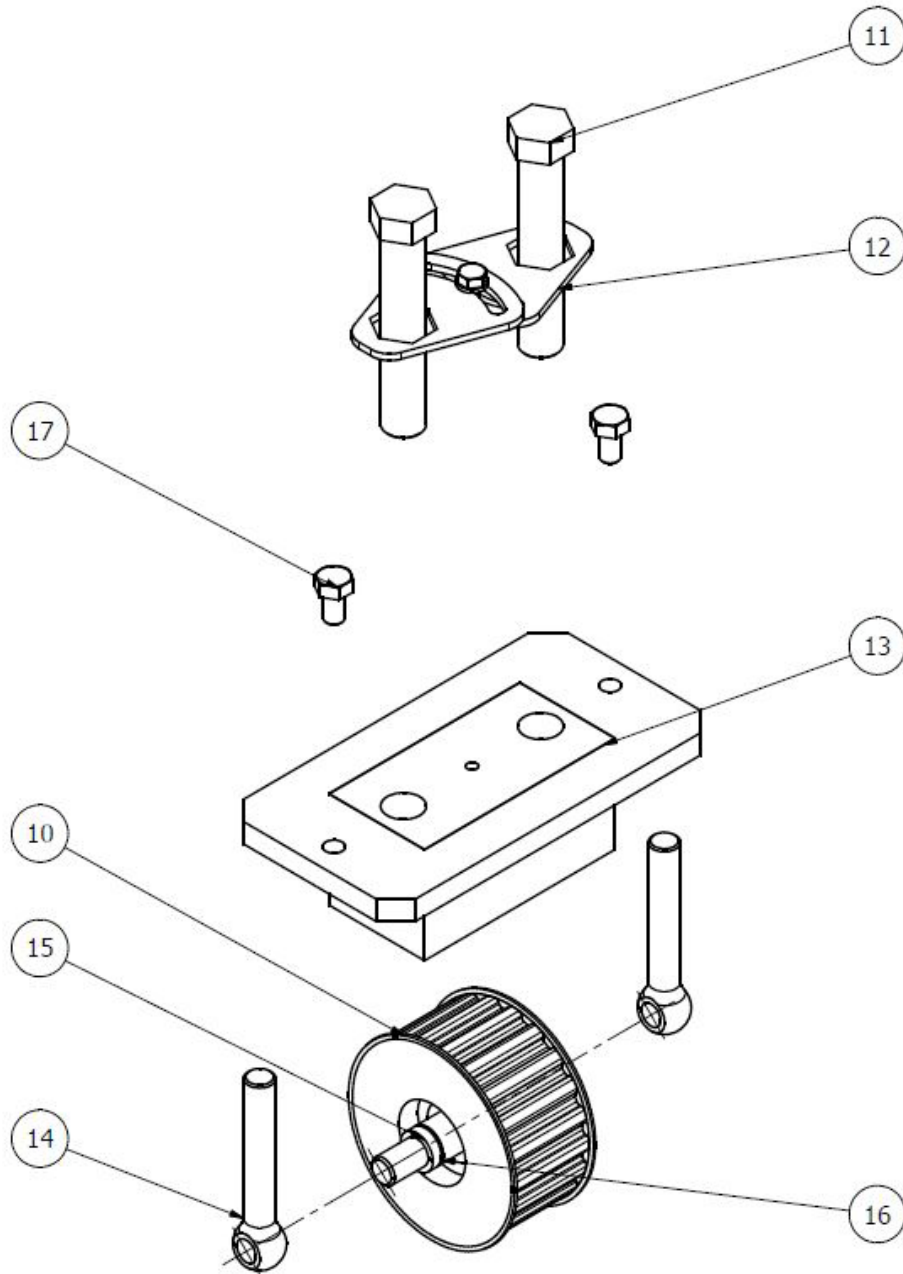


Part Name	Order Code	Qty
E-ROBOT+3 COUNTER CARRIAGE BACK KIT	B07RS0004	1

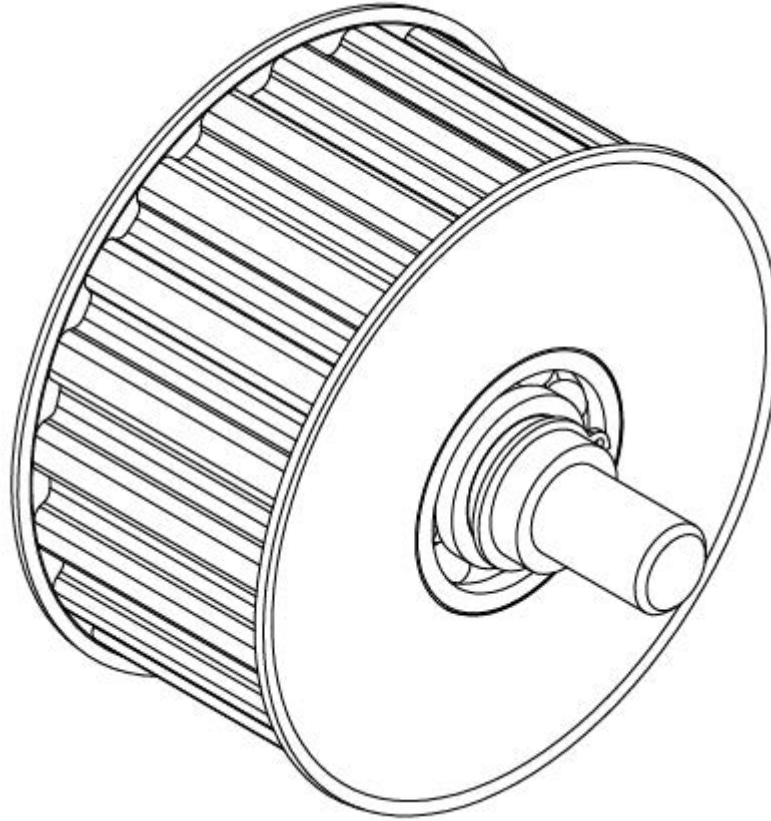


Part Name	Order Code	Qty
E-ROBOT+3 COUNTER WEIGHT FIXED SIDE PLATE	B07RS0006	1

## D-PART

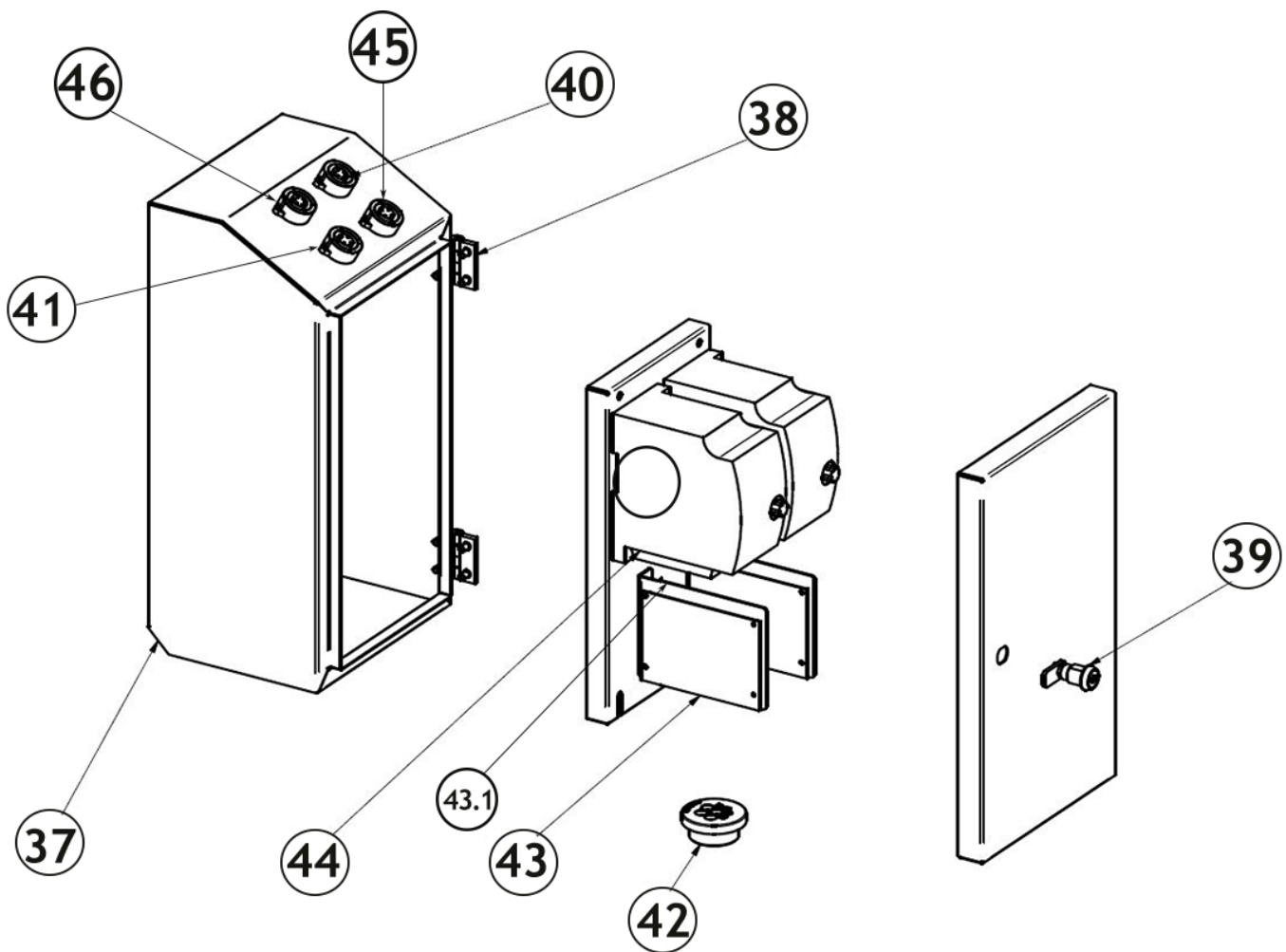


Part #	Order Code	Part Name	Qty
D-PART	B07RBM130	E-DRIVE RECIPROCATOR TOP GEAR SET - COMPLETE	1
10	GAAE02006	INSTALLED TRACTION GEAR	1
11	TRTM06009	TOP GEAR TRACTION PART	2
12	B06RB01034	TOP GEAR TRACTION LOCK PART	2
13	B07RS0005	WELDED TOP GEAR TRACTION SET	1
14	BECV06162	M12X75 EYEBOLT PASO DIN444	2
15	GAAE04019	TOP GEAR TRACTION SCREW	1
16	TRTM06010	Ø17 SCREW RING	1
17	BECV06014	M8X25 COATED BOLT	2



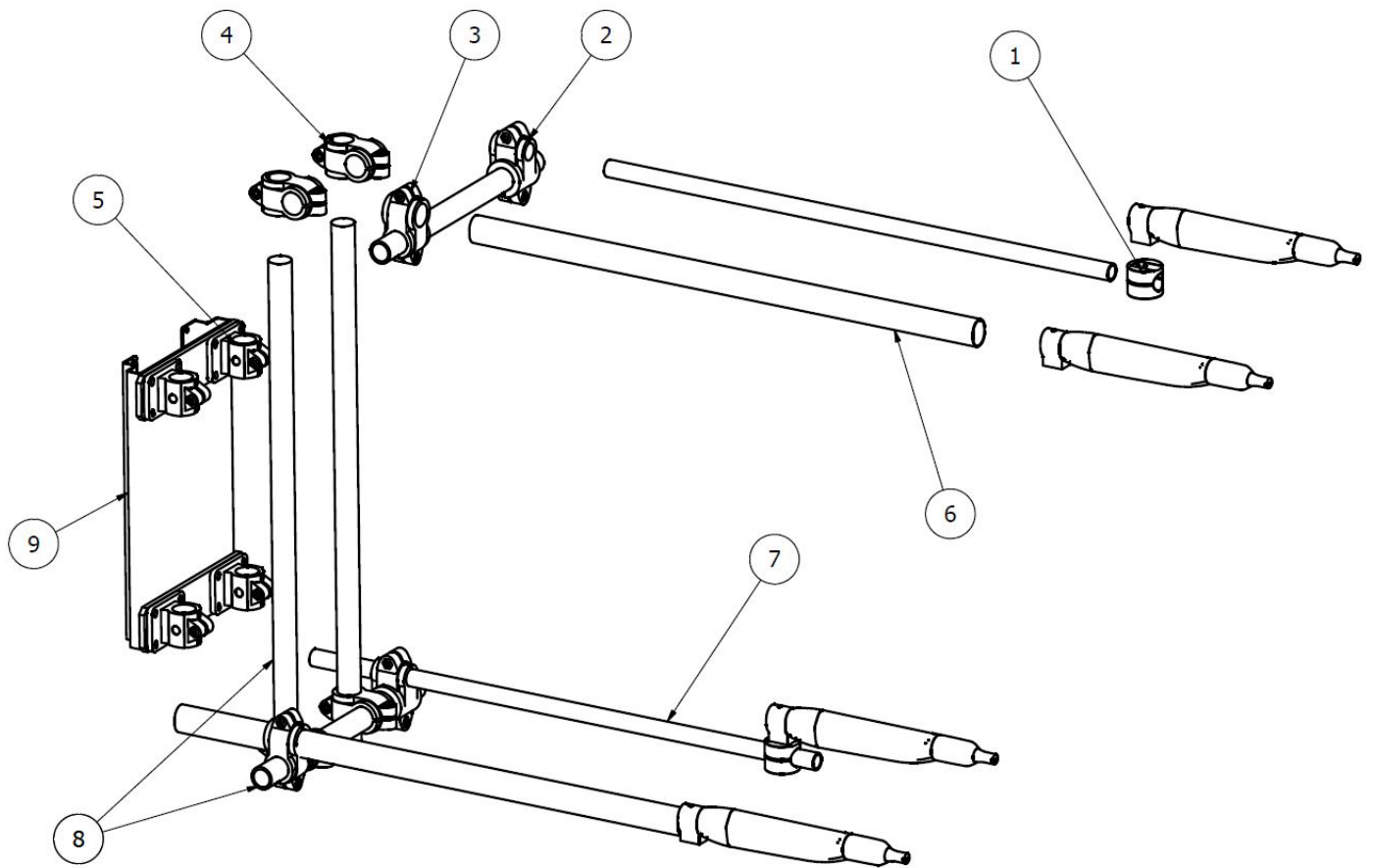
Part Name	Order Code	Qty
E-ROBOT+3 TOP TENSION GEAR SET	B07RS0008	1

## E-PART



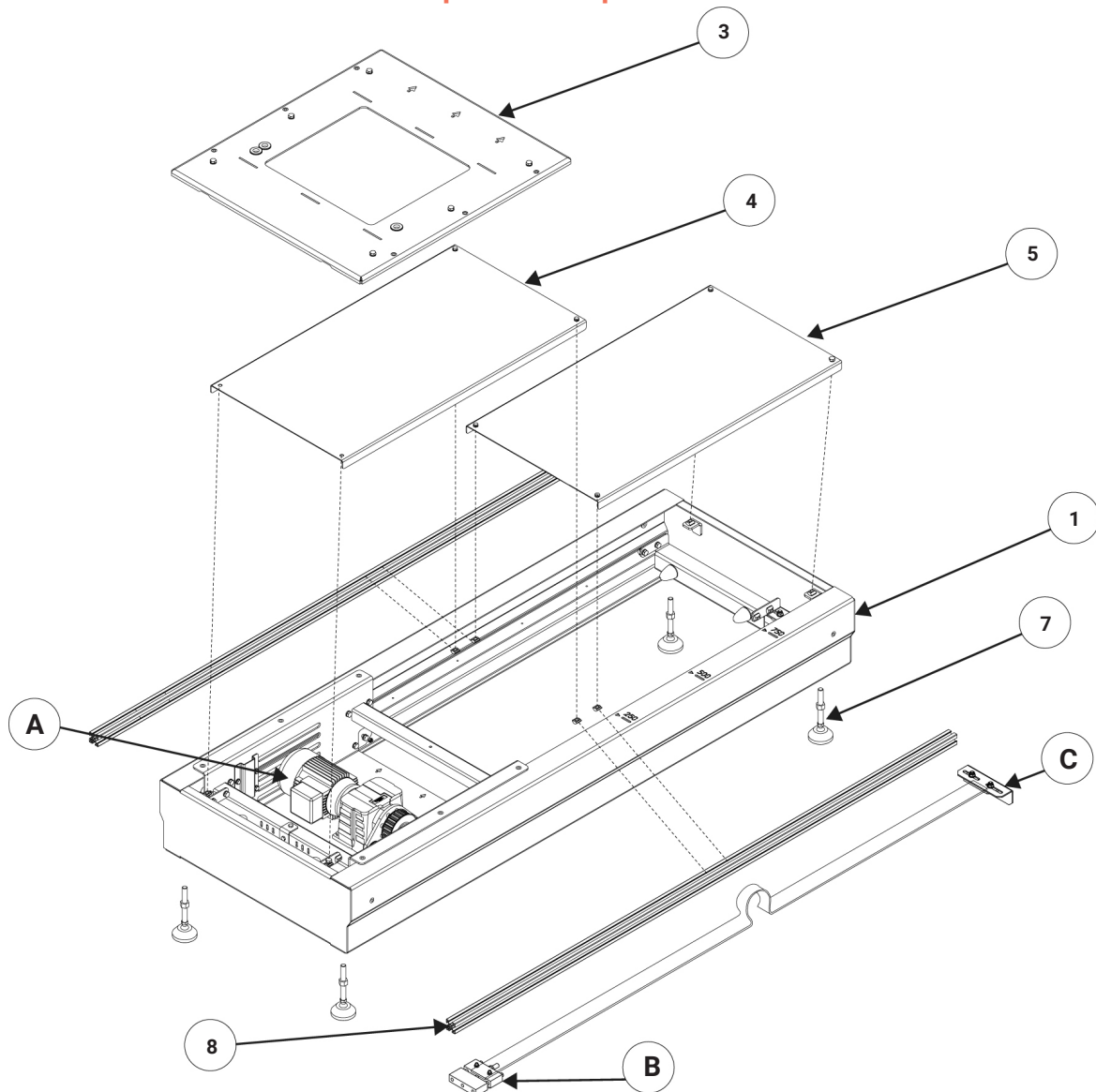
Part #	Order Code	Part Name	Qty
37	B08ZX02CP-E	E-DRIVE ZX02-E ROBOT MECHANICAL UNIT ELECTRICAL PANEL	1
38	AKUA01002	HINGE 299-1-2-1	2
39	ELPA04003	LOCK 140-1-2-64-01	2
40	ELKS03003	SOCKET BINDER SOLDERED TYPE 7 PIN FEMALE PANEL CONNECTOR	1
41	ELKS03006	SOCKET BINDER SCREW TYPE 4 PIN MALE PANEL TYPE CONNECTOR	1
42	ELKA15002	CABLE ENTRY PART	1
43	ELON09023	AXIS CONTROL CARD	Mutable
43.1	B07EC5012	PLATE OF AXIS CONTROL CARD	Mutable
44	ELSK01001	DRIVER DELTA 0,75 kW	Mutable
45	ELKS03001	SOCKET BINDER SCREW TYPE 4 PIN FEMALE PANEL TYPE CONNECTOR	1
46	ELKS03010	SOCKET BINDER SOLDERED TYPE 7 PIN MALE PANEL CONNECTOR	1

\* variable: varies according to the situation of the double axis.

**F-PART**


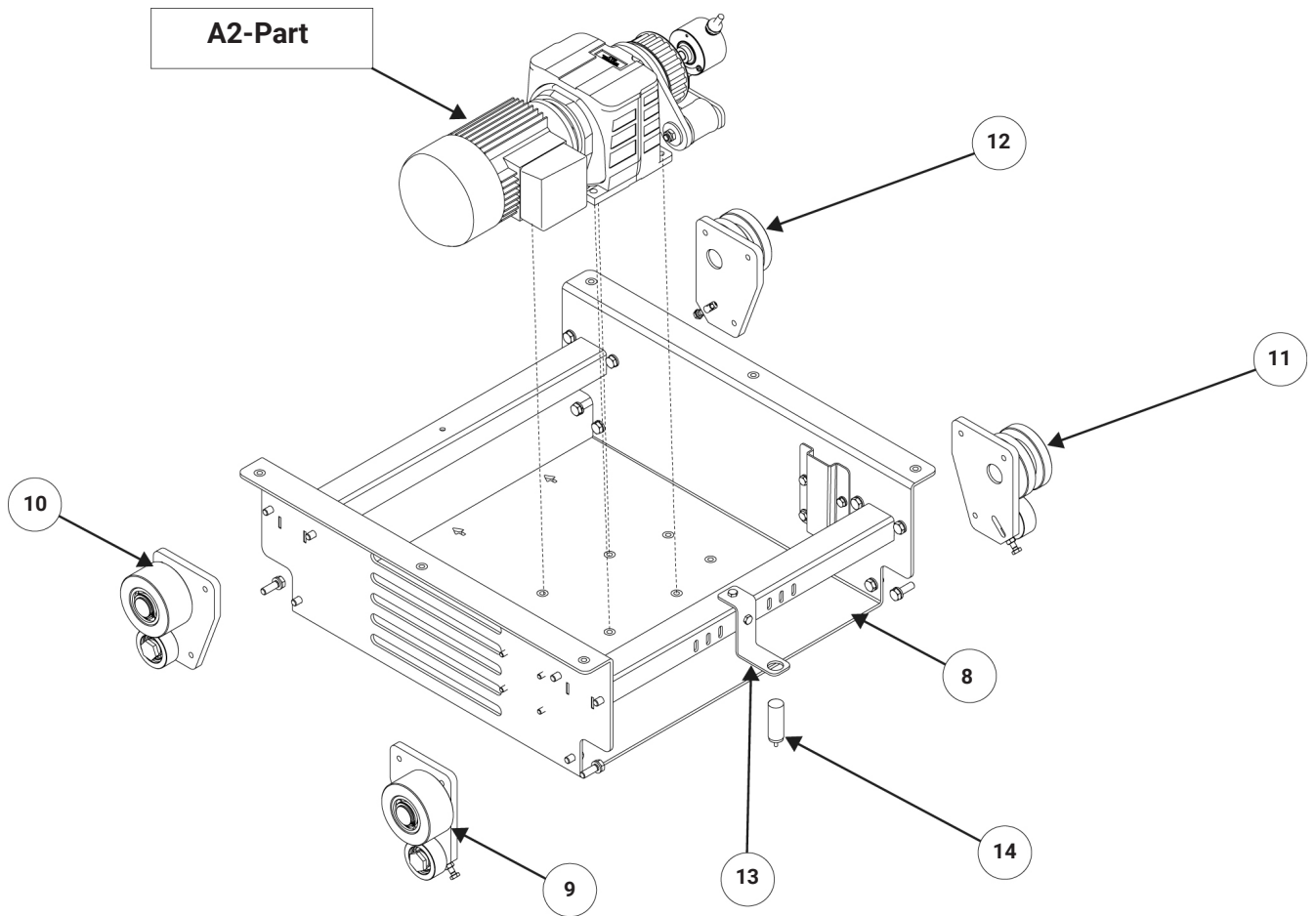
Part #	Order Code	Part Name
1	B07EH50908	Ø30 CLAMP FOR E-GUN C3 (AUTO. GUN)
2	B07EH50906	Ø40x30 CLAMP
3	B07EH50905	Ø40xOVAL CLAMP
4	B07EH50904	Ø40x40 CLAMP
5	B07EH50907	ROBOT BODY Ø40 CLAMP
6	B07RCA001	COMPOSITE TYPE RECIPROCATOR ARM - COMPLETE
7	SCBR03004	Ø30x3 ALUMINIUM PIPE
8	SCBR03005	Ø40x5 ALUMINIUM PIPE
9	KBKE01016	4X506X500 ALM - GUN CARRIER FRONT PLATE

## 12.2.2 E-ROBOT+3 X Horizontal Axis Reciprocator - Spare Parts List



Part #	Order Code	Part Name	
1	B07RBM133	E-DRIVE RECIPROCATOR HORIZONTAL AXIS FRAME	1
2	AKUA03020	SHOCK OBSERVER M8X27 30X36 K-TYPE	2
3	B06RB02018	E-ROBOT HORIZONTAL AXIS MOTION PLATE	1
4	B06RB02020	E-ROBOT HORIZONTAL AXIS TOP COVER-2	1
5	B06RB02019	E-ROBOT HORIZONTAL AXIS TOP COVER-1	1
6	GAAE03076	TRIGER BELT H100 BLACK-ANTISTATIC (12,7 STEP)	1
7	BEDH11001	ARTICULATED FEET M12X100 R60	4
8	SCPR10006	PROFILE STANDARD SIGMA ALUMINUM 30X30X2 8 CHANNELS L=1710 MM	2
A-part	*	E-ROBOT HORIZONTAL AXIS MOTO-REDUCER BOX - SET	1
B-part	*	BELT ADJUSTMENT SYSTEM	1
C-part	*	BELT FIXING SYSTEM	1

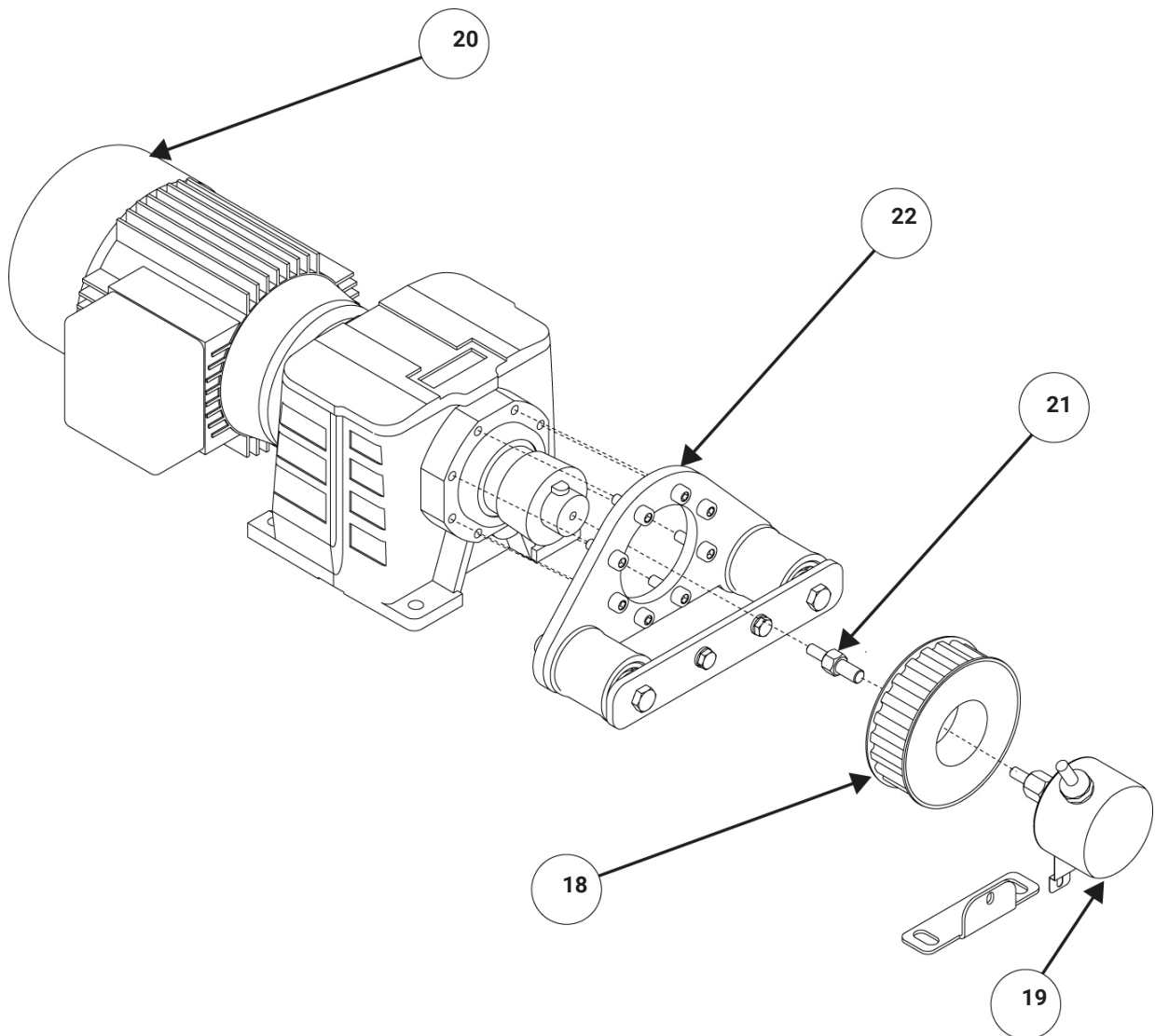
## A-PART



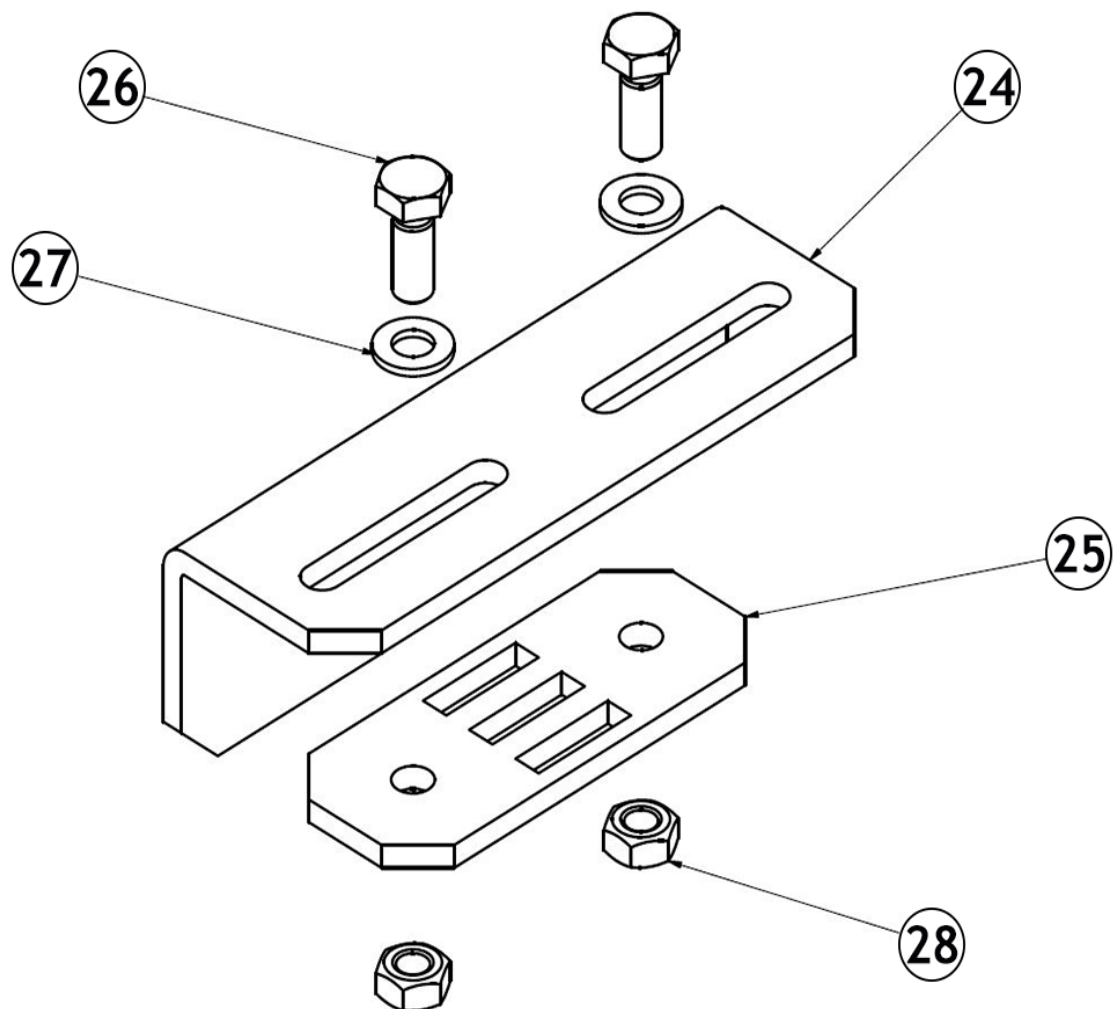
Part #	Order Code	Part Name	
8	B06RB02004	E-ROBOT HORIZONTAL AXIS / REDUCER BOX	1
9	B07RBM135	E-DRIVE RECIPROCATOR HORIZONTAL AXIS/ DUCTED WHEEL BASE-LEFT-COMPLETE	2
10	B07RBM136	E-DRIVE RECIPROCATOR HORIZONTAL AXIS/ DUCTED WHEEL BASE - RIGHT - COMPLETE	1
11	B07RBM134	E-DRIVE RECIPROCATOR HORIZONTAL AXIS/ WHEEL BASE - LEFT - COMPLETE	1
12	B07RBM137	E-DRIVE RECIPROCATOR HORIZONTAL AXIS/ WHEEL BASE - RIGHT - COMPLETE	1
13	B06RB02006	E-ROBOT HORIZONTAL AXIS / SENSOR PLATE	1
14	ELSN02008	SENSOR INDUCTIVE-ATEX	1
A2-part*	B07RBM138	E-DRIVE HORIZONTAL AXIS MOTO-REDUCER GROUP	1



## A2-PART

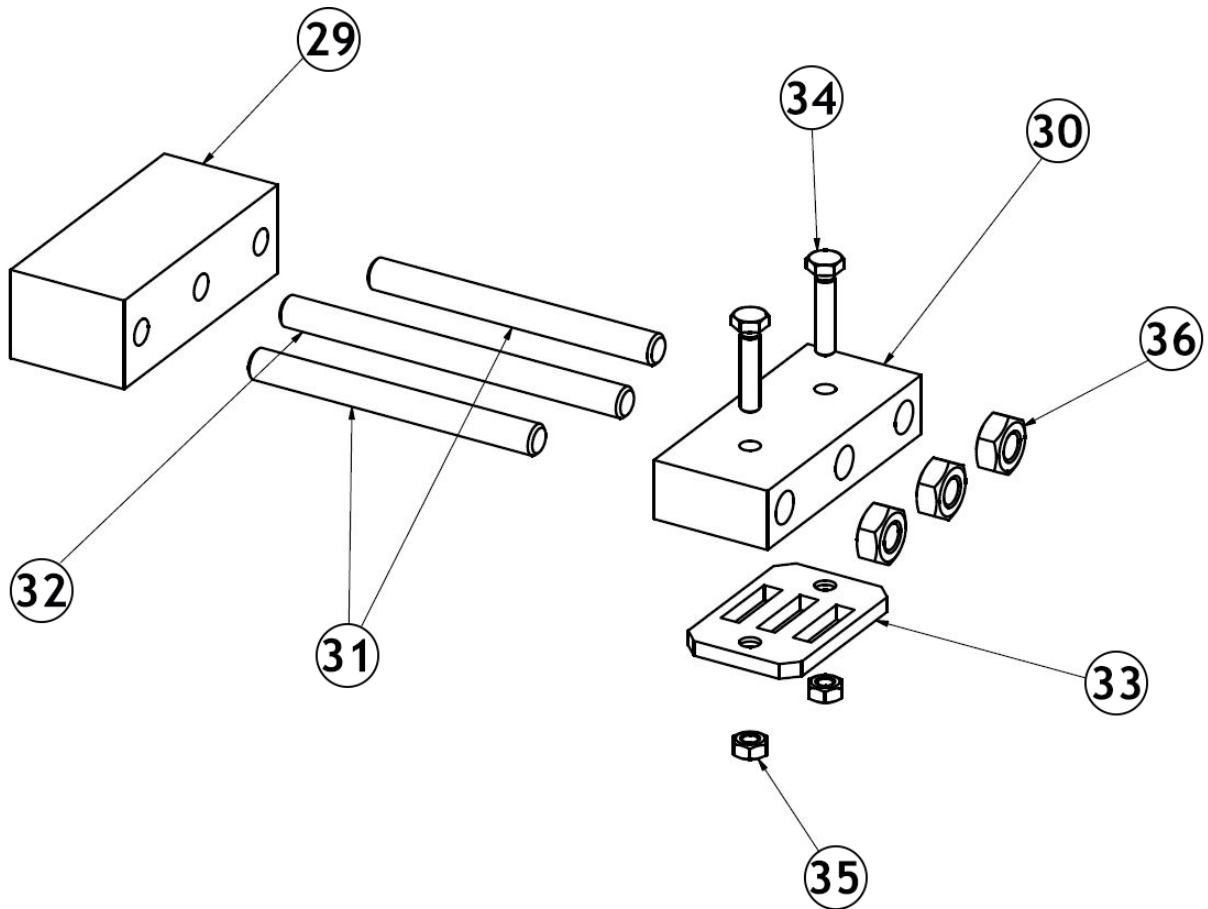


Part #	Order Code	Part Name	
18	GAAE02007	TRIGER GEAR Z = 22 BUSH TYPE (12.7 STEP BY Ø18 SHAFT)	1
19	B07500600	ENCODER ROTARY ATEX ZONE 22	1
20	TRTM06034	ROBOT - EX ENCODER CONNECTING SHAFT	1
21	B06RB03041	E-ROBOT+3 Horizontal Axis Gearbox Front Flange	1
22	TRTM03080	E-ROBOT+3 HORIZONTAL AXIS ATEX ENCODER CONNECTING SHAFT	1

**B-PART**


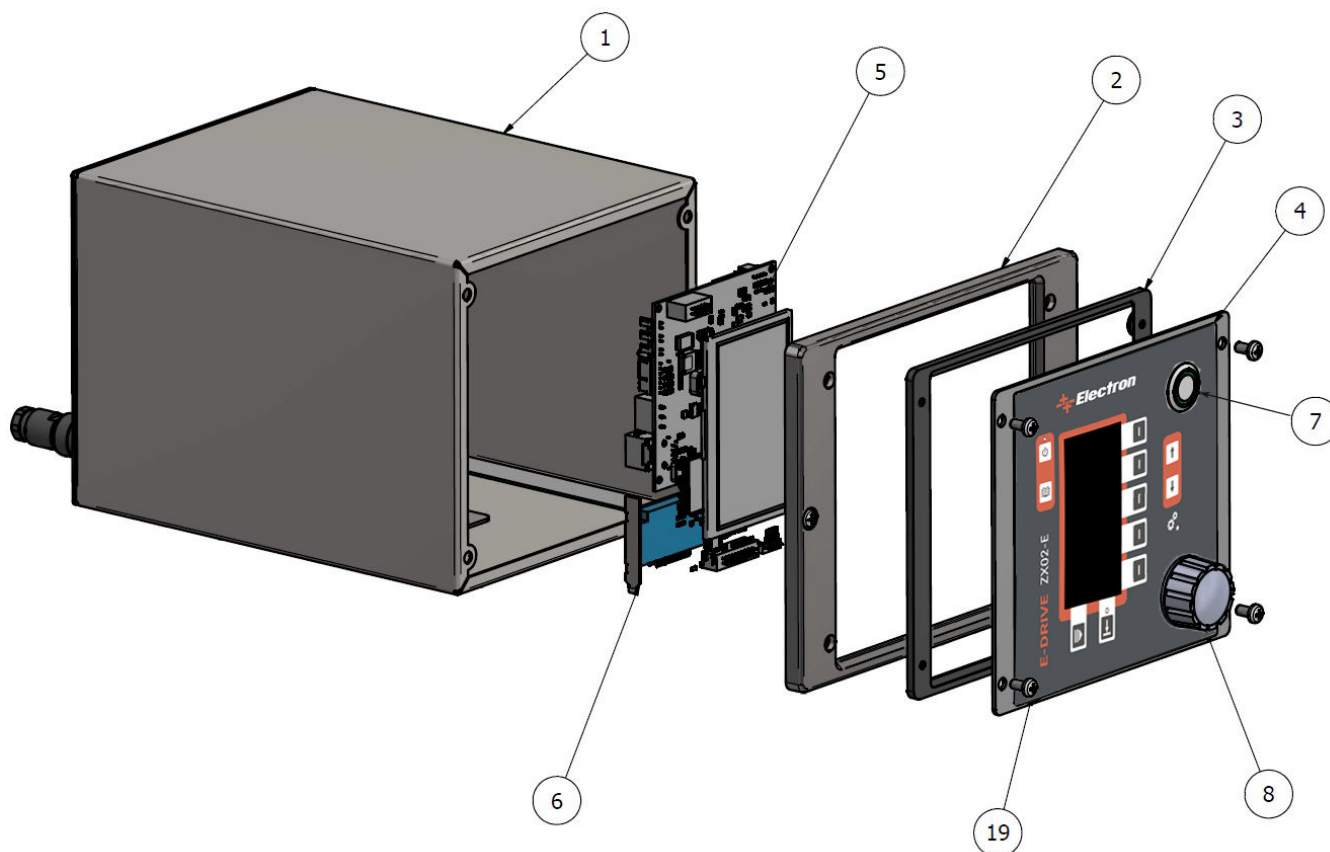
Part #	Order Code	Part Name	Qty
24	B06RB02003	E-ROBOT HORIZONTAL AXIS TRIGER BELT FIXING PLATE	1
25	B06RB02016	E-ROBOT HORIZONTAL AXIS FIXED SIDE TRIGER LOCK	1
26	BECV06014	BOLT M8X25 PLATED	2
27	BEPL04005	M8 SPRING RONDELA PLATED	2
28	BESM01006	BOLT M8 PLATED	2

## C-PART

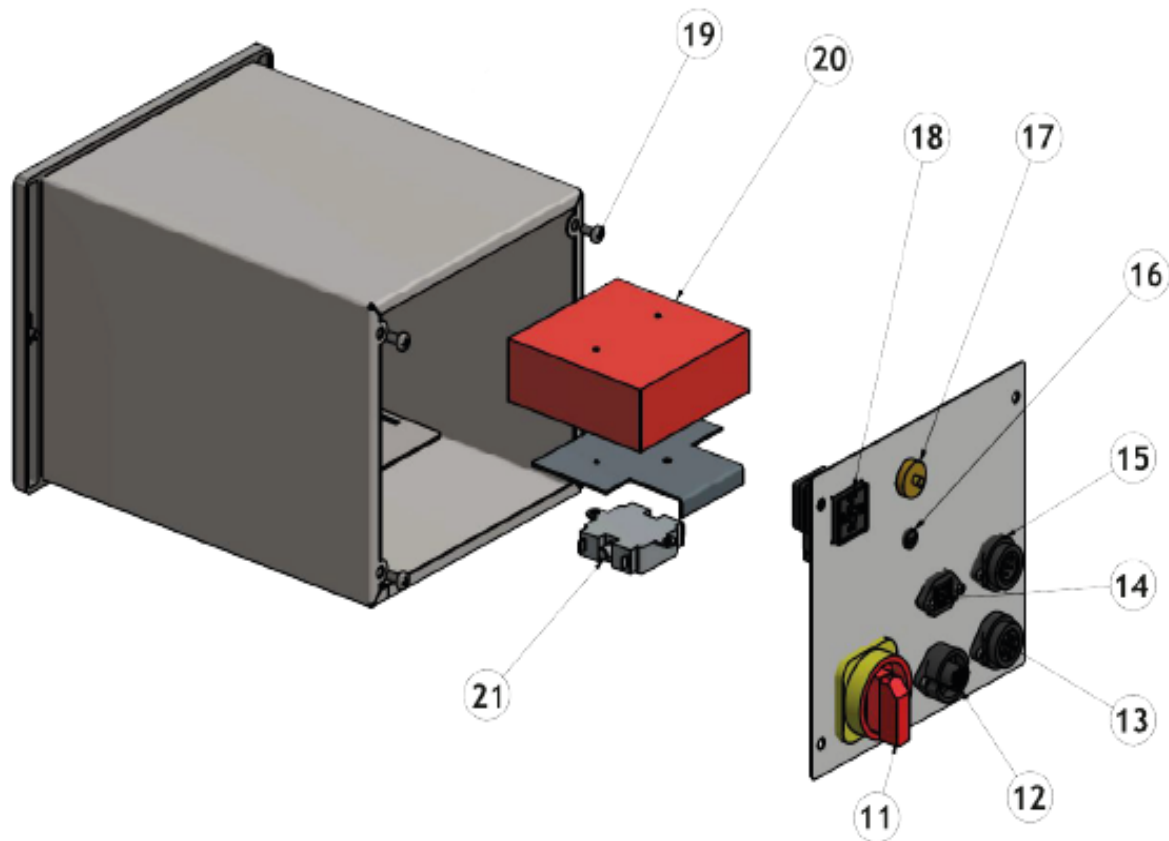


Part #	Order Code	Part Name	Qty
29	TRTM06007	TRIGER STRETCHING TOP LOCK PROVISION 30X40X80	1
30	TRTM06028	TENSION UPPER LOCK 40X90X20	1
31	BEDH06003	M10 GIJON PLATED-0.10 M	2
32	BEDH06003	M10 GIJON PLATED-0.12 M	1
33	B06RB02015	E-ROBOT HORIZONTAL AXIS TENSION SIDE TRIGER LOCK	1
34	BECV06007	BOLT M6X35 PLATED	2
35	BESM01005	NUT M6 PLATED	2
36	BESM01011	COUNTER-NUT M10 PLATED	3

### 12.2.3 E-DRIVE ZX02- EX Reciprocator Control Unit - Spare Parts List



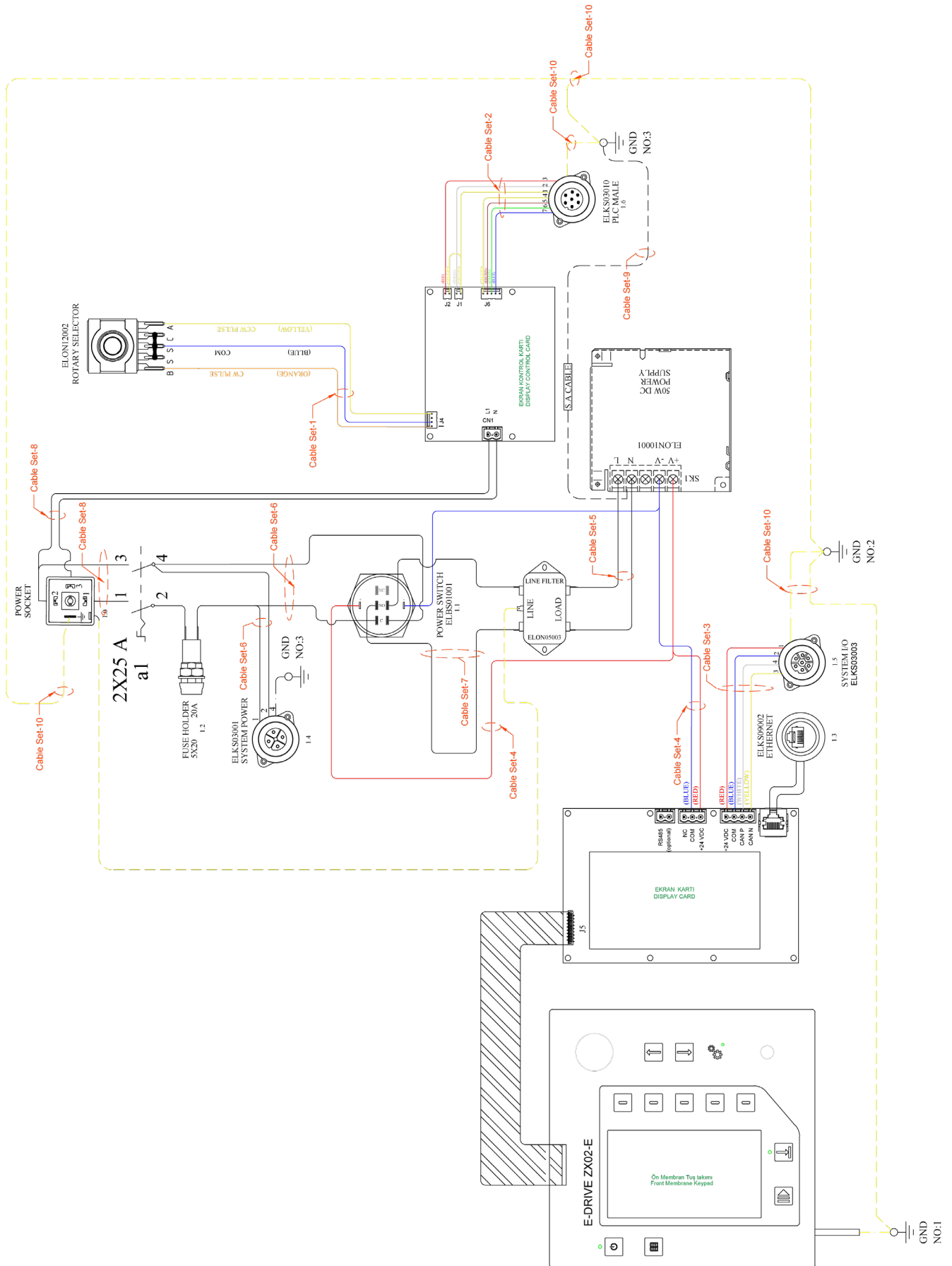
Part #	Order Code	Part Name	Qty
1	B07EC5001	E-COAT UNIT CASE	1
2	ENEM02001	E-COAT CONTROL UNIT FRAME	1
3	IZCS01004	E-COAT FRONT/BACK SEALING	1
4	B07EC5003	E-COAT MASTER FRONT ALUMINUM SHEET	1
5	ELON09021	E-DRIVE-E ROBOT MODULE MAINBOARD	1
6	ELON09022	E-DRIVE-E ROBOT MODULE I/O CARD	1
7	ELBS01001	0-1 SWITCH Ø22 STAINLESS POWER LED	1
8	B07IENC01	INCREMENTAL ENCODER	1
9	BECV01009	M4X15 YSB SCREW	4
10	B07EC0027	E-DRIVE-E ROBOT MODULE FRONT MEMBRANE	1



Part #	Order Code	Part Name	Qty
11	ELSL07012	MAIN AND EMERGENCY ON/OFF SWITCH 2X25A	1
12	ELKS03001	SOCKET RD24-SCREW TYPE 4 PIN FEMALE PANEL CONNECTOR	1
13	ELKS03003	SOCKET RD24-SOLDERED TYPE 7 PIN FEMALE PANEL CONNECTOR	1
14	ELKS09002	SOCKET RJ 45 ETHERNET PANEL TYPE	1
15	ELKS03010	SOCKET RD24-SOLDERED TYPE 7 PIN MALE PANEL CONNECTOR	1
16	ELDE06006	FUSE HOLDER SHURTER IP67 5X20A	1
16.1	ELDE06010	GLASS FUSE 20 A	1
17	TRTM05017	GROUNDING NUT	1
18	ELKS10004	SOCKET VALVE GSA3000 A TYPE	1
19	BECV01009	M4X15 YSB SCREW	4
20	ELON10001	SMPS 50W 220V INPUT 24V OUTPUT	1
21	ELON05003	EMI LINE FILTER - 3A FI TYPE	1

### 13. Electrical Schematic Diagram

#### 13.1 Electrical Scheme of E- Drive ZX02-E Reciprocator Control Unit





## 14. Grounding Diagram

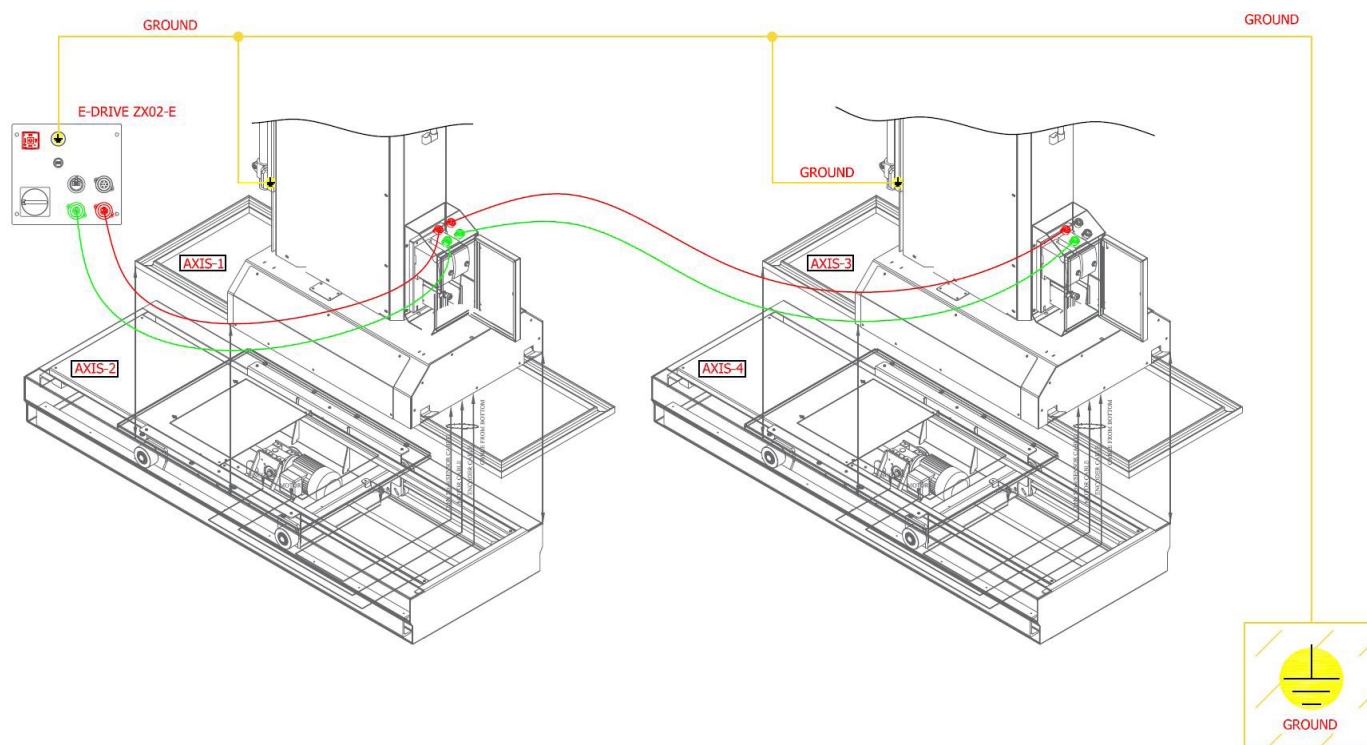


### WARNING:

Missing or incorrect grounding

A bad or missing ground connection can be dangerous to the operator.

- Ground all metal parts of the axis according to the general, local safety regulations.
- Check regularly the grounding of the axis.



Part #	Order Code	Part Name
1	B07M00138	E-ROBOT GROUNDING CABLE



## 15. Fault Chart

Error	Solution
The toothed belt rides up on the flanged wheel	<ol style="list-style-type: none"> <li>1. Loosen the motor and move it manually into the appropriate opposite direction.</li> <li>2. The toothed belt may not ride up on the flanged wheel at the whole driveway as well as in the reversal points.</li> </ol>
Reciprocator and carriage plate are wagging	<ol style="list-style-type: none"> <li>1. Check the connecting bolts between reciprocator, carriage plate and the E-ROBOT+3 Z Horizontal Motion Unit carriage for tightness.</li> <li>2. Adjust the counter rollers without clearance by the corresponding screws on the running wheel bearing/guide wheel bearing (see also the spare parts list).</li> <li>3. In no case press the counter rollers, otherwise they wear quickly!</li> </ol>



**WARNING:**

Faults are to be corrected by trained personnel only!

**16.SERVICE AND MAINTENANCE CHART**

DATE	MAINTENANCE TYPE -Weekly maintenance -Yearly maintenance -Service	MAINTENANCE OR SERVICE PERSONNEL	PROCEDURE REPLACEMENT PARTS NOTES	AUTHORIZED CONTROLLER

## 17. Product Life and Warranty

### 17.1. Product Life

- The economic life of E-DRIVE ZX02-E Z-Axis Reciprocator is approximately 10 years.
- This product life is highly dependent on the periodic maintenances and spare part changes in a timely manner. Improper maintenance will lead to lower product life.
- SİSTEM TEKNİK A.Ş. warrants supplying the needed service and the spare parts for the entire product life.

### 17.2. Warranty and Warranty Conditions

- The reciprocator is warranted for production and parts failure for 2 (two) years.
- Spare parts that are changed from the warranty are free-of-charge.
- The parts that are supplied in the system which are not produced by SİSTEM TEKNİK A.Ş. are warranted with their own manufacturers and their own conditions.
- SİSTEM TEKNİK A.Ş. will not be held responsible for the improper usage of the machine or any unauthorized usage.

*These are not in the warranty.*

### 17.3. Operating Conditions

- Read the user manual before using the reciprocator.
- Only legally allowed people can operate E-DRIVE ZX02-E.
- Only trained and authorized people can operate E-DRIVE ZX02-E.
- SİSTEM TEKNİK A.Ş.'s suggested spare parts should be used at all times.
- Proper maintenance has to be done and the spare parts has to be changed in a timely manner.
- The operational safety has to be assured by the customer; the operators who are not capable of working under safety rules shouldn't be operating the Control Unit.
- All the suggestions and warnings in this manual have to be carefully considered and applied.



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