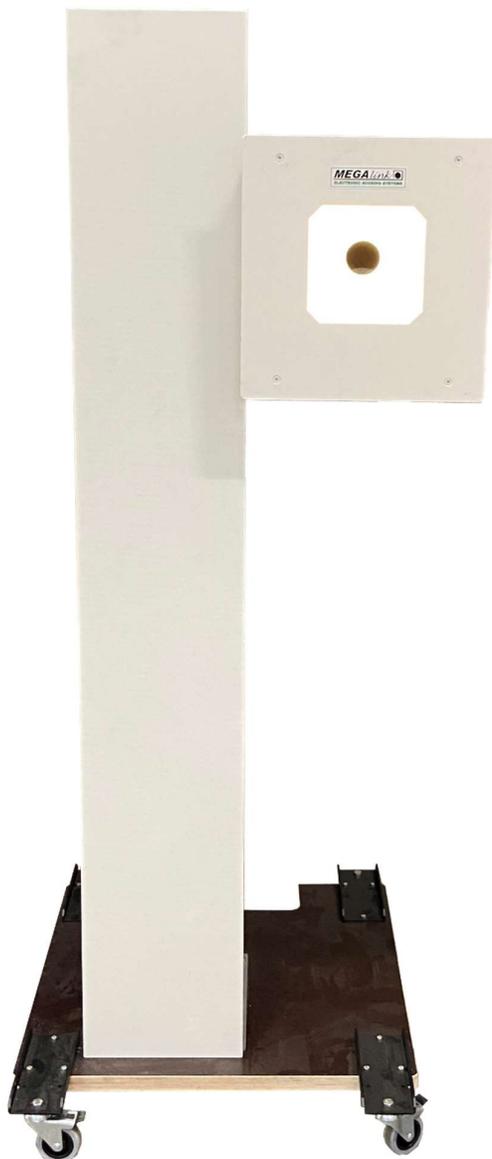


2023

**User manual for ML2000  
Target lift**



Megalink AS  
V23.20



# User manual for ML2000

## Target lift

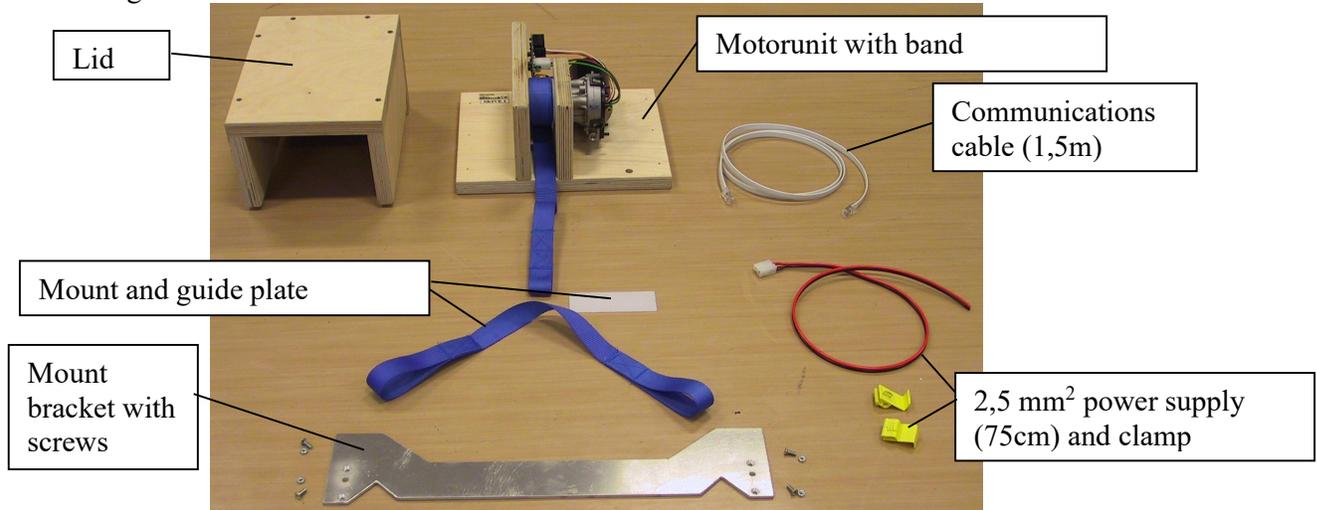
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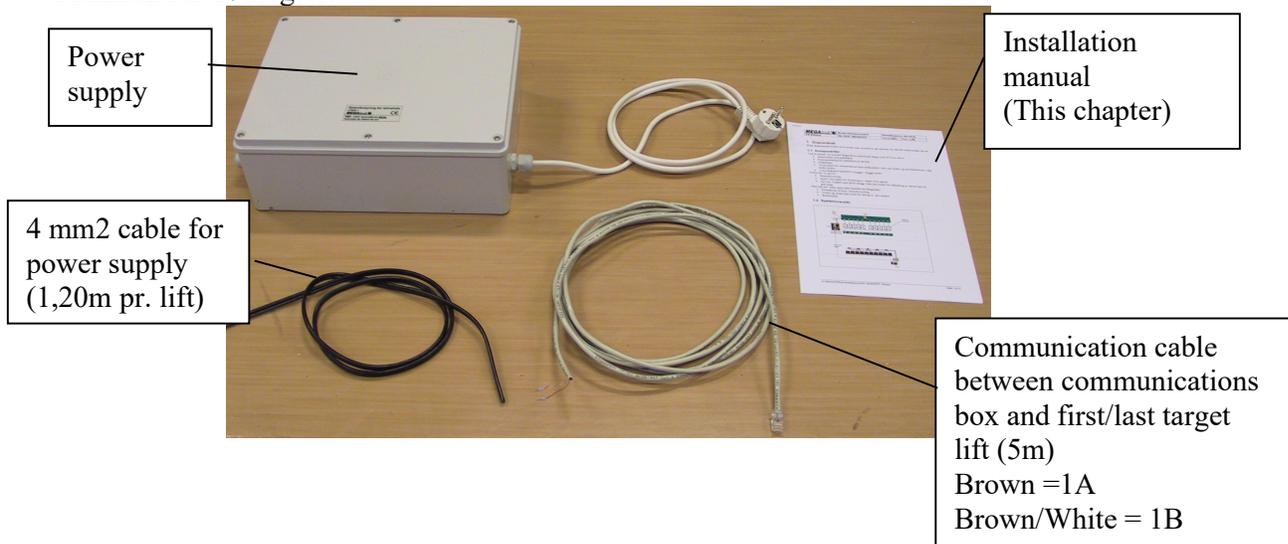
# 1 Wall mounted target lift

## 1.1 Components

Delivery of a lift system for wall mounting will normally contain the following objects for each target:



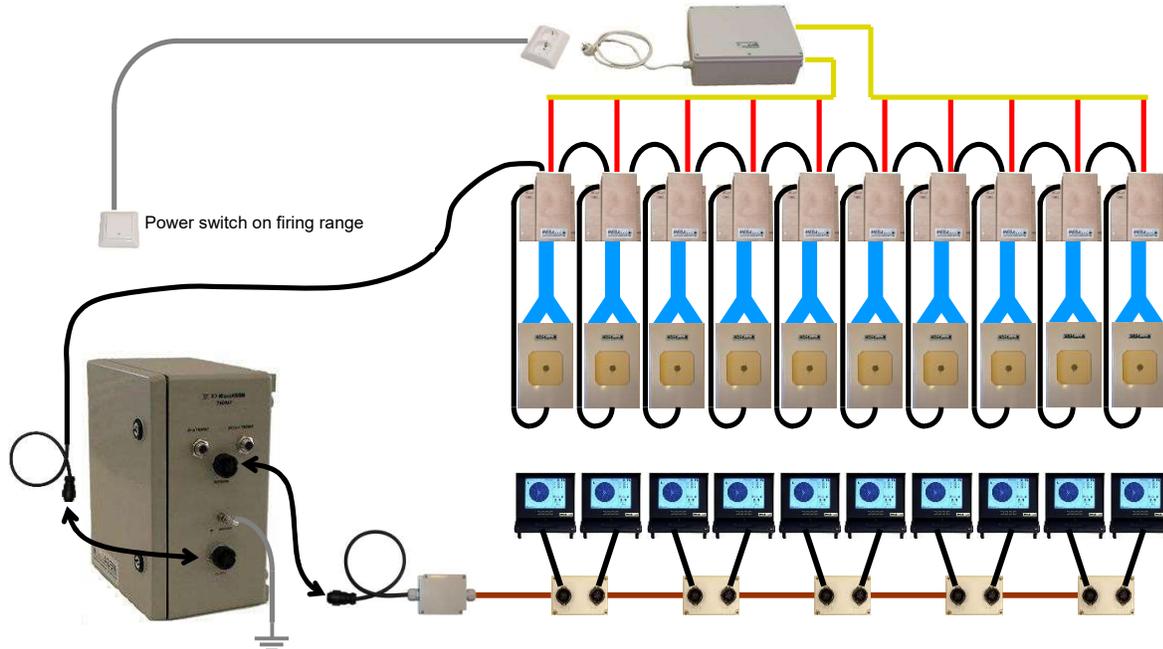
Common for 10 targets:



One should have the following (or ordre from Megalin):

- Screws for mounting target lift and power supply
- Cable clips/clamps for mounting the wires
- Pulley or equal for guiding the target cable
- Protection of the equipment
- Glides

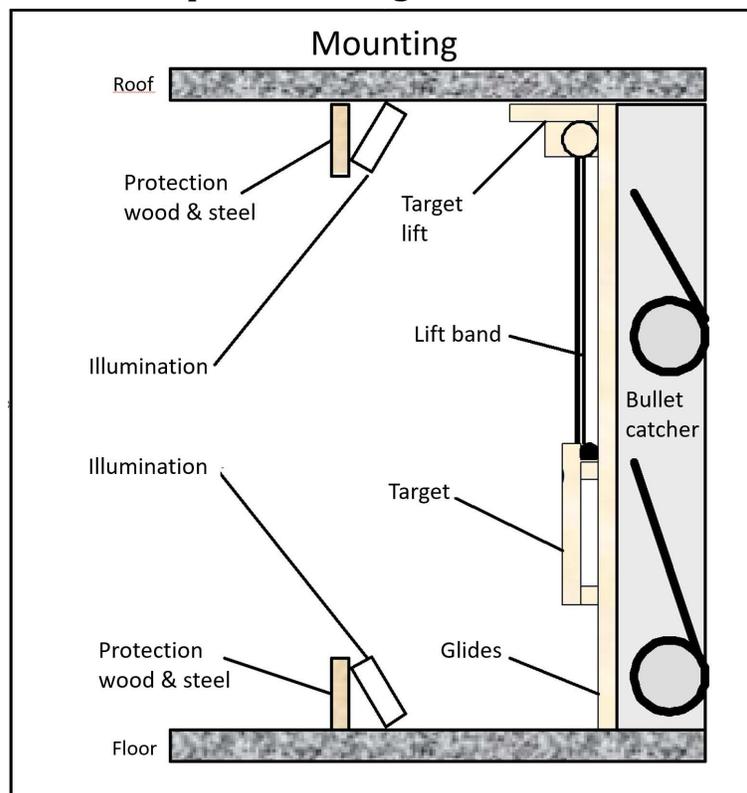
## 1.2 System overview wall mounted target lift



Five and five target lifts connect to the power supply. The targets get power and communication directly from each target lift. The lifts are connected with RJ45 cable.

## 1.3 Mounting

### 1.3.1 Princip for mounting



### **1.3.2 Mounting of glides**

The system is constructed so that the target hangs against the a wall or glider. When the lift goes up and down, the target will glide along the wall or in the gliders.

Gliders can be made from for instance ply wood.

Gliders for 3D-Score can be delivered from Megalink.

### 1.3.3 Mounting of band on 3D-Score

The band is mounted on the delivered bracket, and the target is mounted to the bracket.



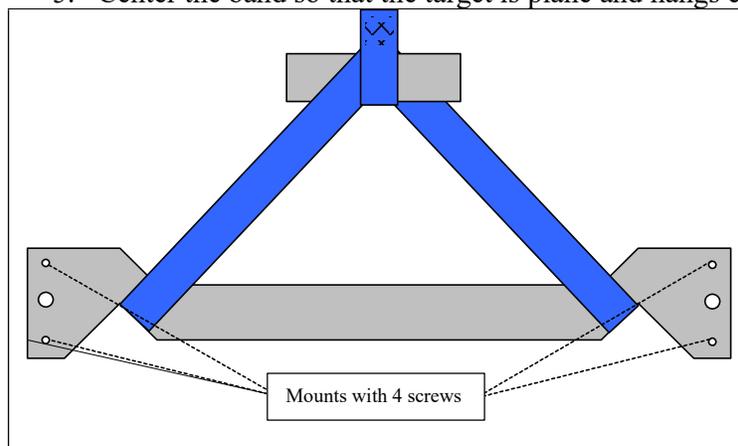
### 1.3.4 Mounting of the band on 4K300 target

The band is mounted on the target with the use of the included bracket. The bracket is mounted to the target with 4 screws. When mounting the bracket to targets that have been delivered earlier, you need to drill these wholes in the target. Do as follows:

1. Put 6mm bolts in to position the bracket.
2. Drill the 4 holes with a 4mm drill bit.

The bracket and the band is mounted like this:

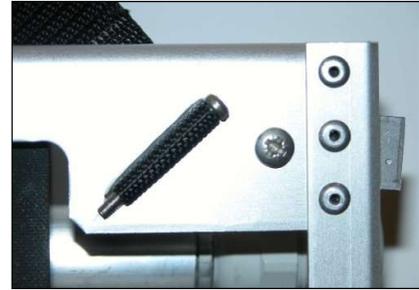
1. Pull the short band through the end of the band attached to the lift.
2. Twist the band as shown on the drawing below and place it on the bracket
3. Tighten the bracket with the four 4mm screws with nut and washer
4. Lift the target a little bit and put in the guide (plastic bit) so that the band is level
5. Center the band so that the target is plane and hangs correctly



### 1.3.5 Mounting of band on 4K187 target

The band is mounted as follows:

1. Put the band into the oblique slit on the target. Put it in from behind, fold and put it back in. Use the included 3mm screw to lock the band in place.
2. Take the short band and put it through the end of the band connected to the lift.
3. Twist the band as shown on the drawing for the 4K300
4. Put the other end into the other side and lock in place as described above.
5. Lift the target a little bit and put in the guide (plastic bit) so that the band is level
6. Center the band so that the target is plane and hangs correctly

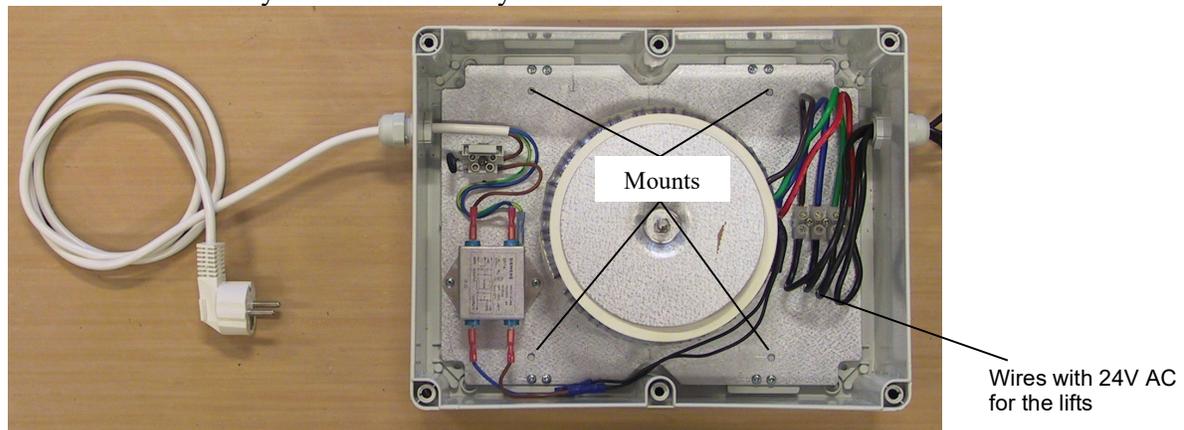


### 1.3.6 Placement of the target cable

It is recommended that the target cable is laid so that it is as protected as possible. The cable can be pulled down midway between the target and the previous target. Fasten the cable with clips or similar down half the length of the wall. Thus, the cord is long enough to reach both the lying position and park.

### 1.3.7 Mounting of the power supply

To avoid long supply lines for 24VAC, the power supply should be mounted high up and in the middle between the targets. If 10 targets are to be used, the box is mounted between target 5 and 6. The box must be fixed with proper screws. Use the mounting holes as shown in the picture below. The box is 310x240x110mm (WxHxD). Connection is described later. It is recommended to have a switch to switch the power to the lift system on and off at the stand. This is to make it easy to switch off the system when it is not in use.



### 1.3.8 Protection mounting

It is important that the targets are protected  
 Det er viktig at man beskytter utstyret etter behov.

- Target lifts can be delivered with a steel plate behind the plywood, so that you don't need additional protection.
- The power supply and 110/230V **must** be protected.
- The wires need protection, both the 24VAC and signal wires between the lifts.
- The target cable also needs protection

### 1.3.9 Connection of power supply

Once the power supply has been installed, you can start laying out the power supply for each target. There are two cables with power supply, each of which can supply up to 5 targets. If you have fewer than 10 targets, it may be good to spread the load evenly on the two sockets.

A 4mm<sup>2</sup> wire is added to each side in relation to the power supply. A parasitic connection with a blunt 2.5 mm<sup>2</sup> cable is used for each target lift. At the other end of these stubs, there is a coupling sleeve that fits into the control board in the target lift. Make sure that all contacts are connected with the same polarity. Use the following standard:

- Red wire (on the leg of the T connection) is connected to the cord with a stripe

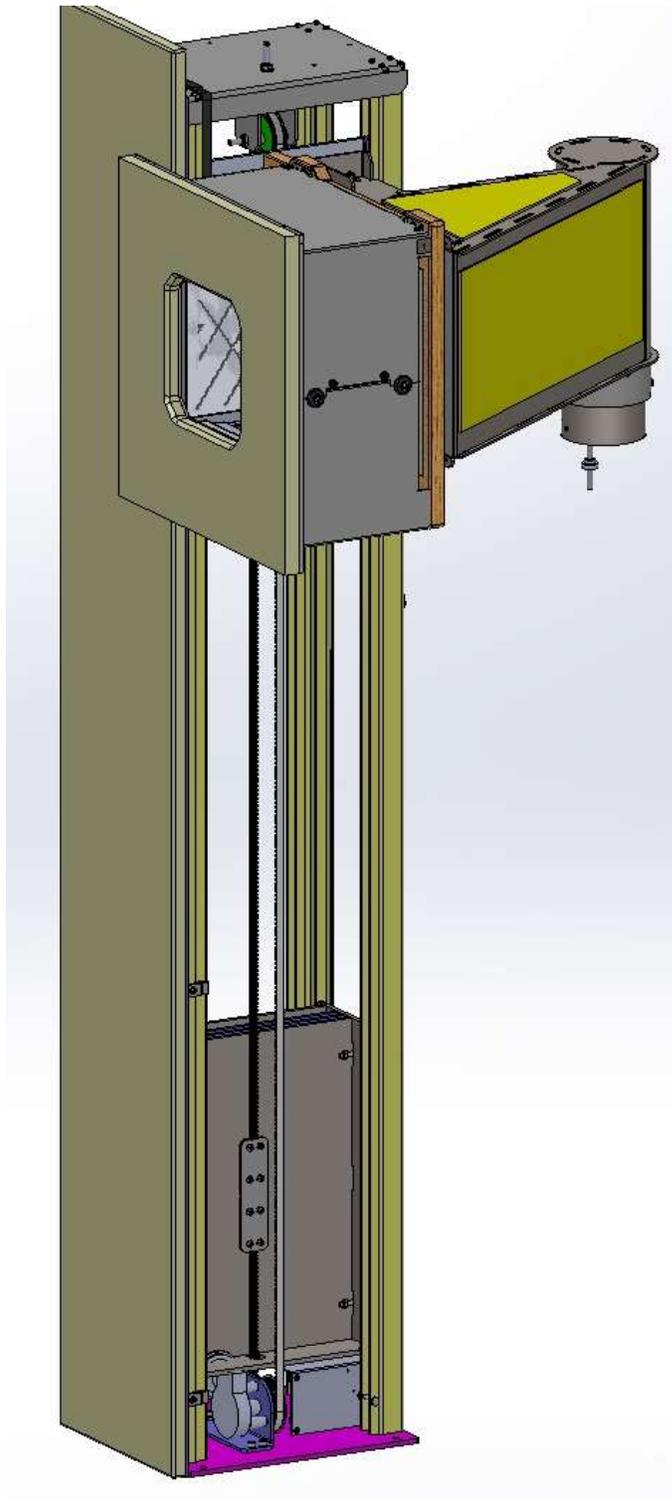
It is important that at least 2.5 mm<sup>2</sup> wire is used in the supplied parasite clamps. If not, you will not be able to make contact. When the cable is connected to all the target lifts, it can be connected to the terminal block in the power supply. It is connected as follows (the sockets are connected together):

- Socket 1:
  - Red: Wire with stripe (red cord to target lift)
  - Green: Wire without stripe (black cord to target lift)
- Socket 2:
  - Blue: Wire with stripe (red cord to target lift)
  - Brown: Wire without stripe (black cord to target lift)

Even if 24VAC is used, different polarity can cause voltage differences between the ground level of the various lifts. This can affect communication negatively. It therefore does not matter which polarity is used, as long as it is the same on all lifts.

**NB! Remember that the 110/230V must be disconnected when the lid of the power supply is off!**

## 2.0 Counterweight lift



Art. 7659 Target lift with counterweight. Here shown with the 3D-score target and bullet catcher in steel for cal. .22LR with self-emptying mechanism.



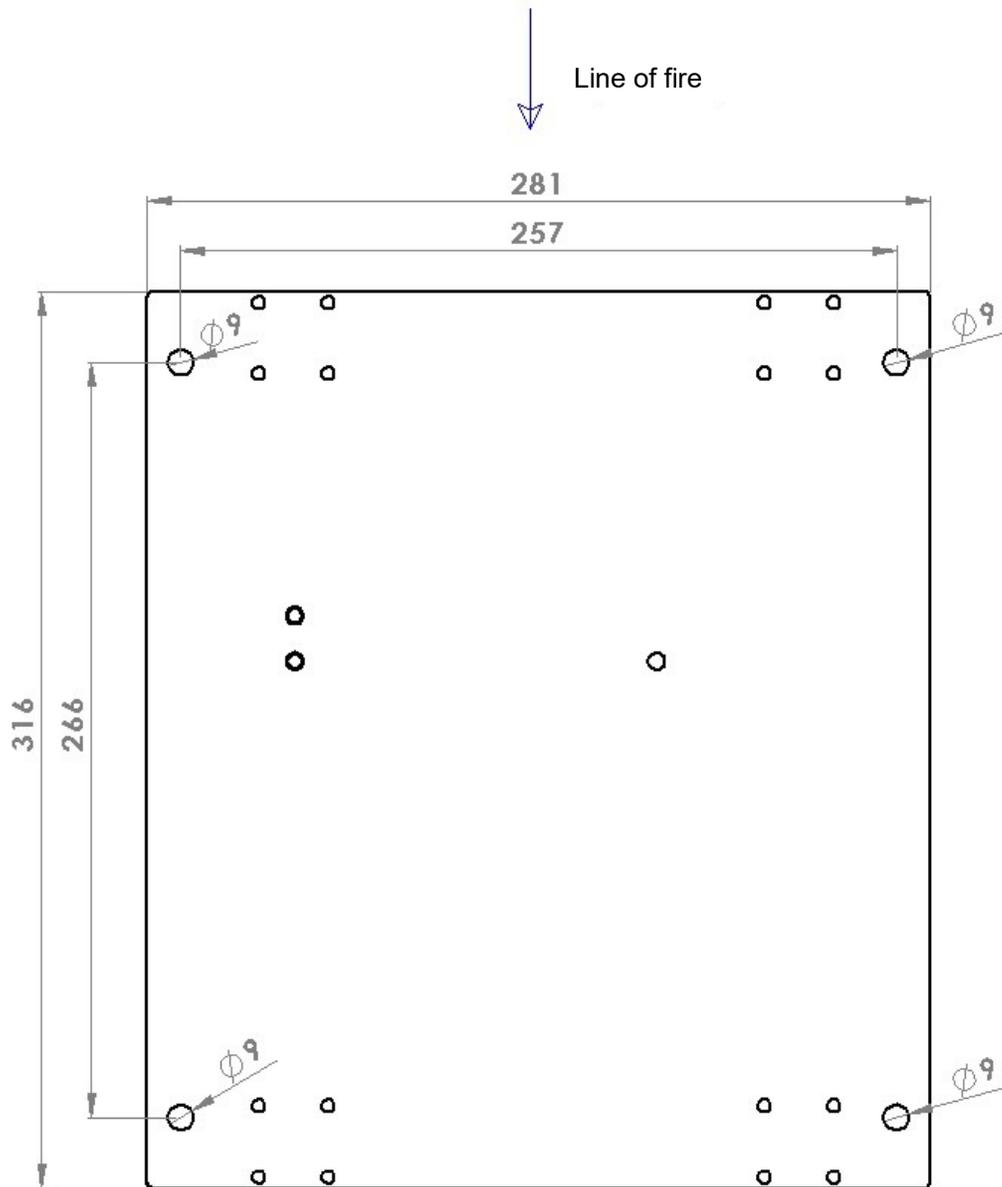


Fig. 1 Four mounts  $\varnothing 9$ .

A procedure for aligning the target can be the following. First insert only one screw (left), so that the lift does not tip over. Hook on the target and insert the target face, look at the target from the shooter's position and straighten until the target face is symmetrical. Or attach a mirror to the front of the target and point at the mirror with a laser pen standing in the shooter's position. Adjust the target so that the beam is reflected back to the shooter's position. The lift itself is protected with a steel plate at the front with a plywood plate at the front. If the plywood plate is not fitted, screw it in place with 6 pcs. plate screws 4.2x16. The right edge of the plywood plate is laid edge to edge with the steel sheet. The screws are inserted into the holes in the back of the steel plate. Contacts for power supply and data are at the back, down by the floor. To get short power cables, the best location of the power supply is down behind one of the targets in the middle of the segment. The target cable comes up along one leg of the lift and is constantly covered by the steel plate in front of the lift.

### 2.2.1 Mounting the target and bullet catcher

For practical reasons, the lift is delivered without the target and bullet catcher fitted. Bullet catcher in steel is screwed on with 4 pcs. M6x16. A shelf for environmental bullet catcher is screwed on with 4 pcs. M6x35. The plate for mounting the target is screwed on with 2 pcs. M6x35. See fig. 2 and 3. In the front of the steel bullet catcher there must be a foam plate and a U-shaped plastic part to prevent splash back into the disc. (The bullet catcher should be delivered with these attached)

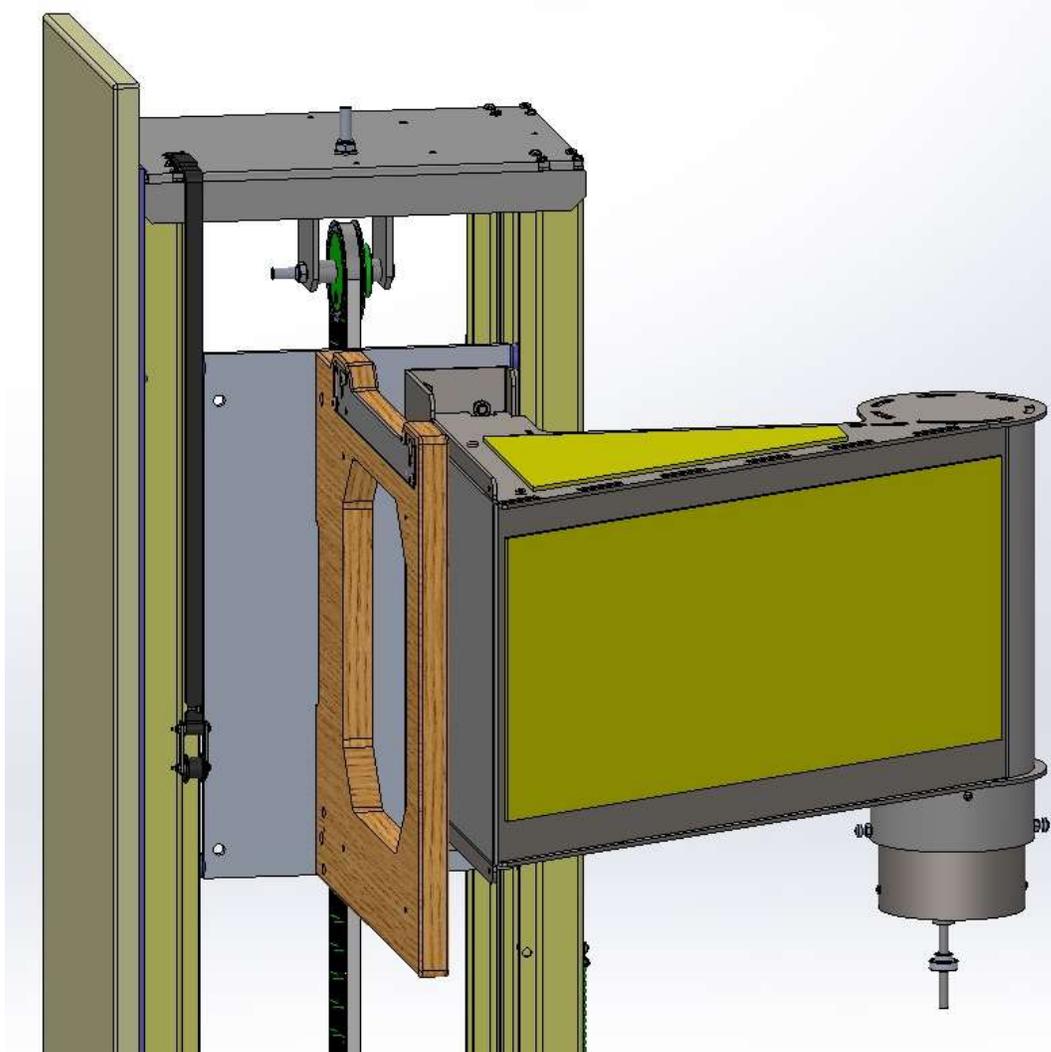


Fig. 2 shows the mounts for the target and steel bullet catcher. Mounts with delivered screws.

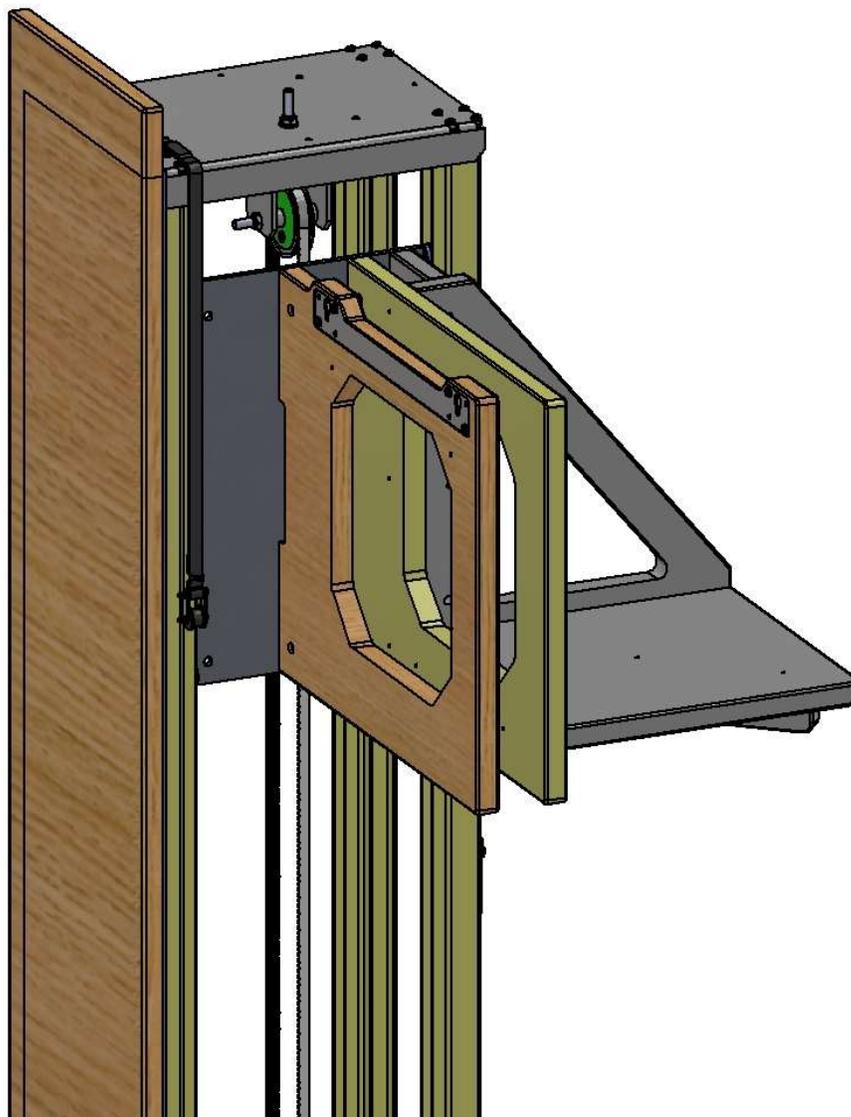


Fig. 3 shows the mount for the target and the shelf for the environmental bullet catcher. (This bullet catcher cannot be used with air rifle/pistol)

Place the lift in standing position. Thread the target cable in between the roller that is mounted in the rubber band, and put the plug into the target.

Sett heisen i stående posisjon. Tre skivekabelen innom snella som sitter i gummistrikk og sett kontakten i skiva. Secure the cable with strain relief as shown in fig.4.

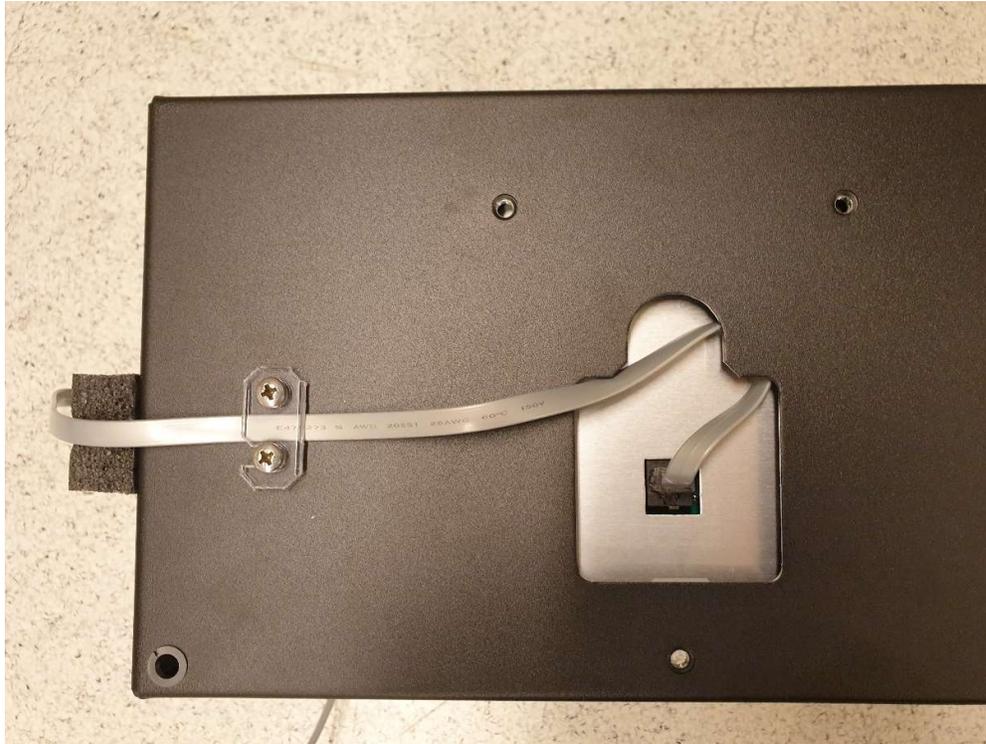


Fig.4 Target cable with strain relief.

The lift can be programmed to 3 positions plus park. Currently, programming must take place in the order prone-knee-standing. Nominal standing height is 140cm. When the lift is not in use, the lift should be put in the standing position. This is because the stretch in the rubber band that tightens the target cable is then gone. Two steel plates are inserted as an additional counterweight, see fig. 5.

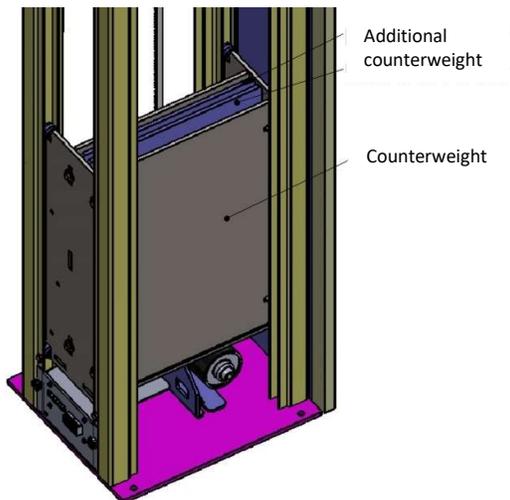


Fig. 5

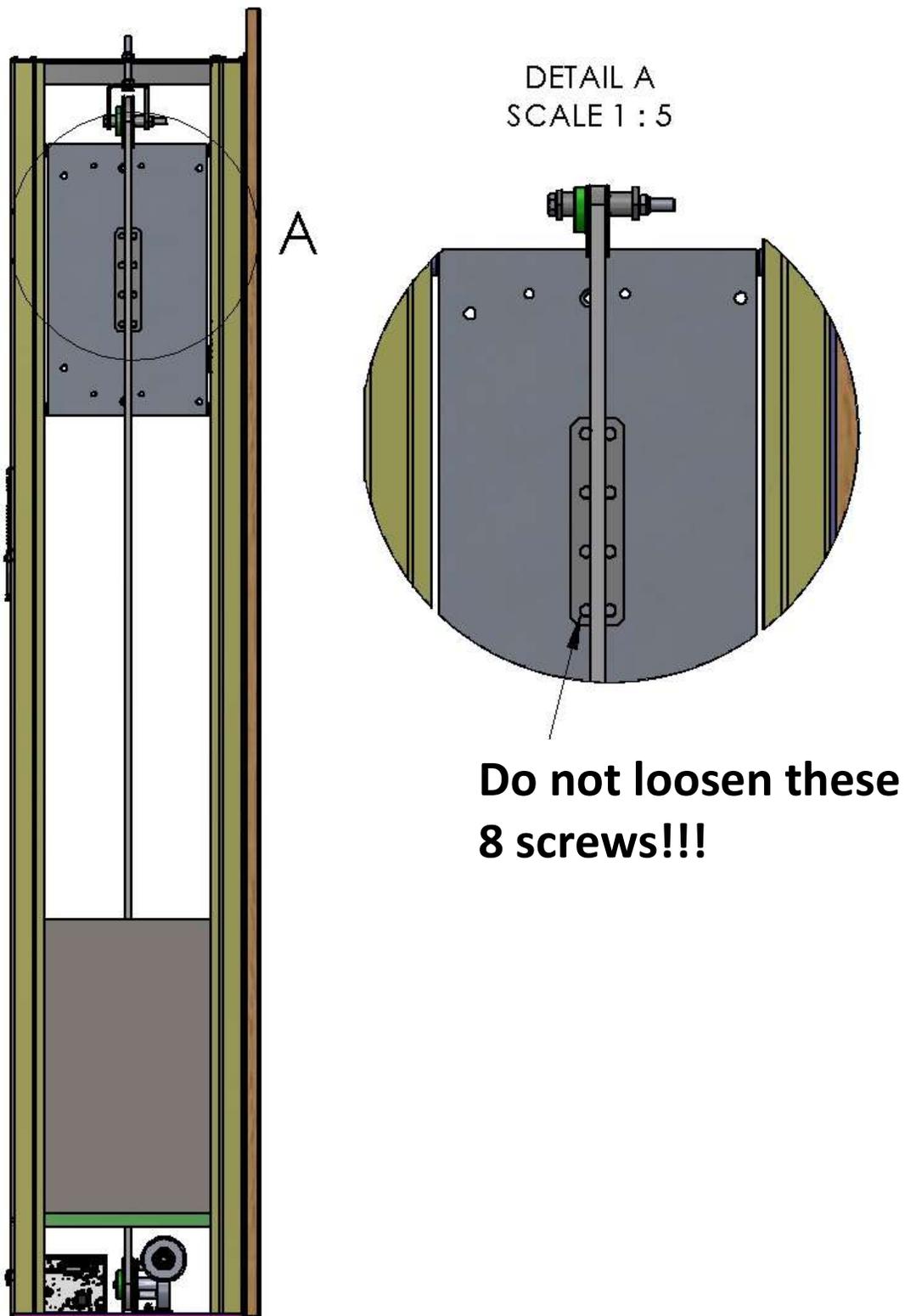


Fig. 6 shows 8 screws that you never must loosen! The joint of the toothed belt is located under the metal plate and if the screws are loosened, the disc and counterweight will fall down.

**2.2.2 Adjustment of the toothed belt.**

When everything is mounted on the lift, the toothed belt will stretch a little. At the top is a screw for adjusting the tension in the timing belt. Put the lift in prone or standing position. If the strap is slack on one side, tighten the strap until the slack is almost gone. Do not tighten too much. If the strap is initially tight on both sides, loosen the screw a little.

**2.2.3 Automatic emptying of the bullet catcher with fixed installation.**

A proposed solution is as follows. Put the lift in prone position (center of target 35-40cm above the floor). Mount the plastic plate 4136-P3 as shown in fig. 7.

Balloon	ItemNumber	PART NUMBER	DESCRIPTION	QTY.
1		Kloss	-	1
2	4136-P3	4136-P3-PC-Plate	PC-plate	1
3	6221	M5_5,3x1,5x1,2-DIN9021-A2	M5 skive DIN 9021, A2	2
4	7623	4,2x1,6 TX_DIN7981-C,Zn	Skrue	2

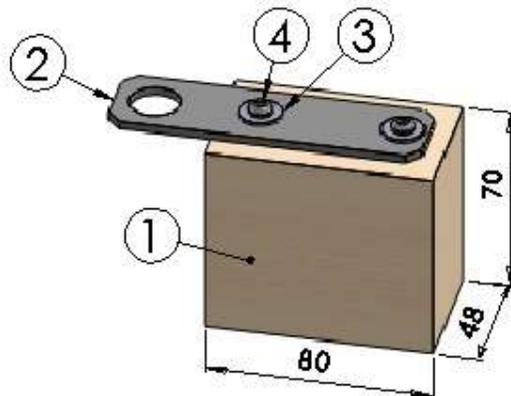


Fig. 7

Place a small plastic box as shown in fig. 8 to collect lead. Place the box approximately as shown in fig. 8 and 9. Glue the wooden block so that the threaded rod that hangs down is in the center of the hole in the plastic plate. Secure it with a couple of screws after the glue has dried. Lock the case in the correct position as shown. Adjust the white plastic bush so that it just touches the plastic plate (target in prone position). When a new series is selected, either prone, kneeling or standing, the lift goes down a little (approx. 3cm) before it goes to the desired position and the lead in the bullet catcher is emptied.

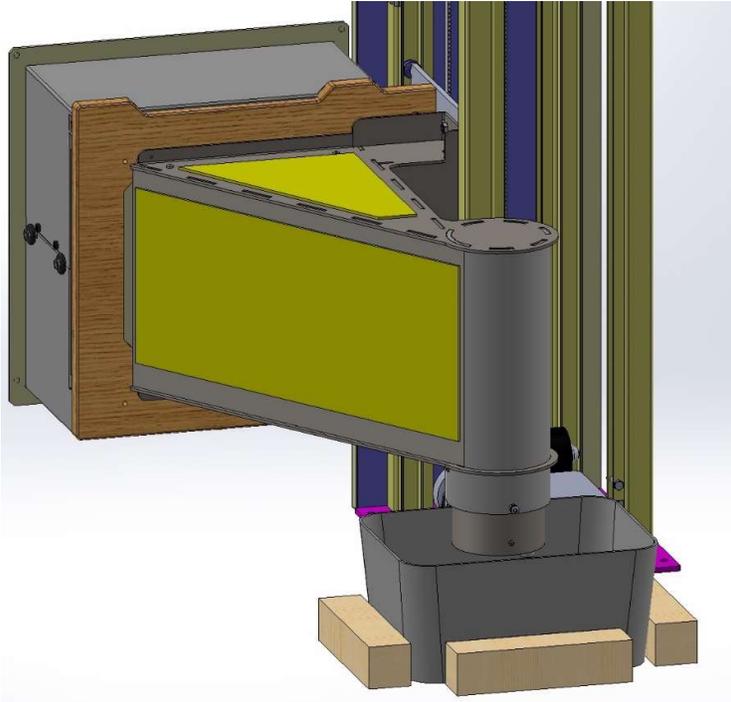


Fig. 8

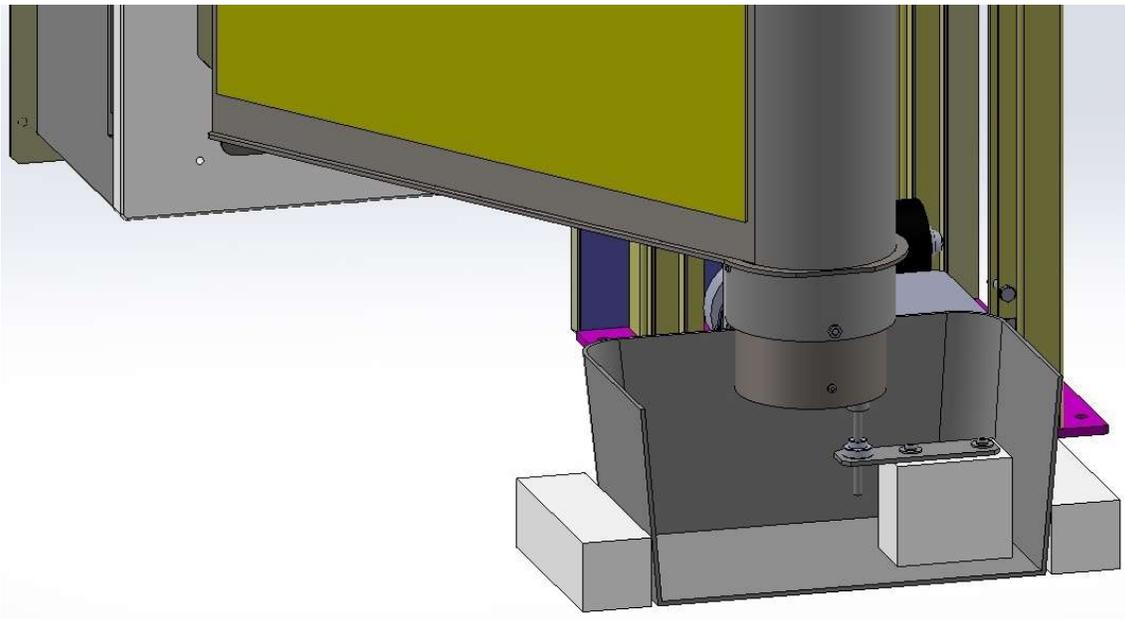
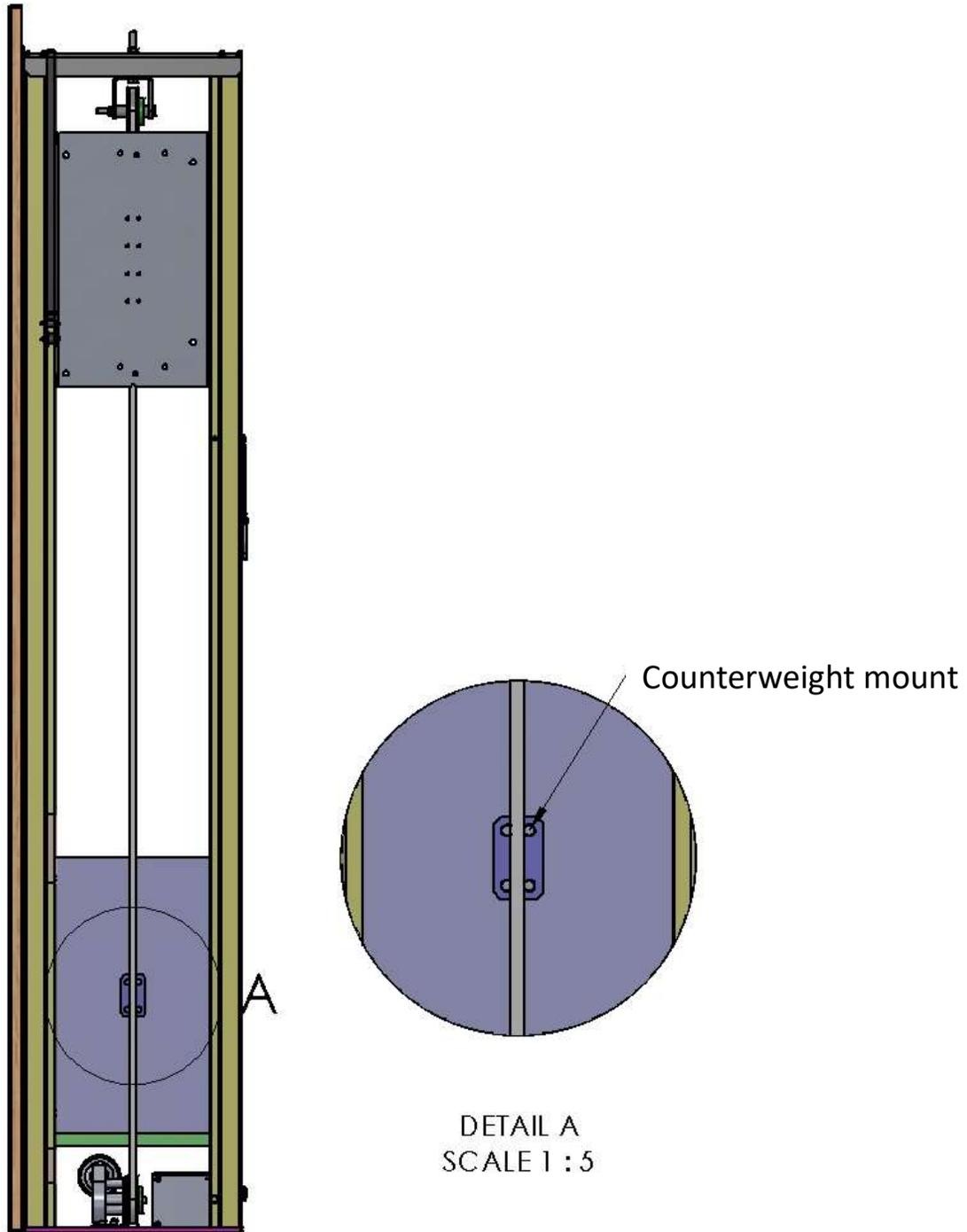


Fig.9

If the desired standing position cannot be programmed, it may be necessary to move the counterweight. Drive the lift so that the counterweight is in the lower position and insert the safety pin. Unscrew the 4 screws in fig. 10 (there are 8 screws on the latest models) so that the counterweight is disconnected. Drive the lift to the desired standing position plus 1-2 cm. Screw the counterweight back on. Tighten well. Remove the safety pin and program prone-knee-standing



**Fig.10**

**NB! Do not stay under the lift until the counterweight is in the lowest position and the safety pin is inserted.**

As an option the lift can be delivered with a trolley. See fig. 11

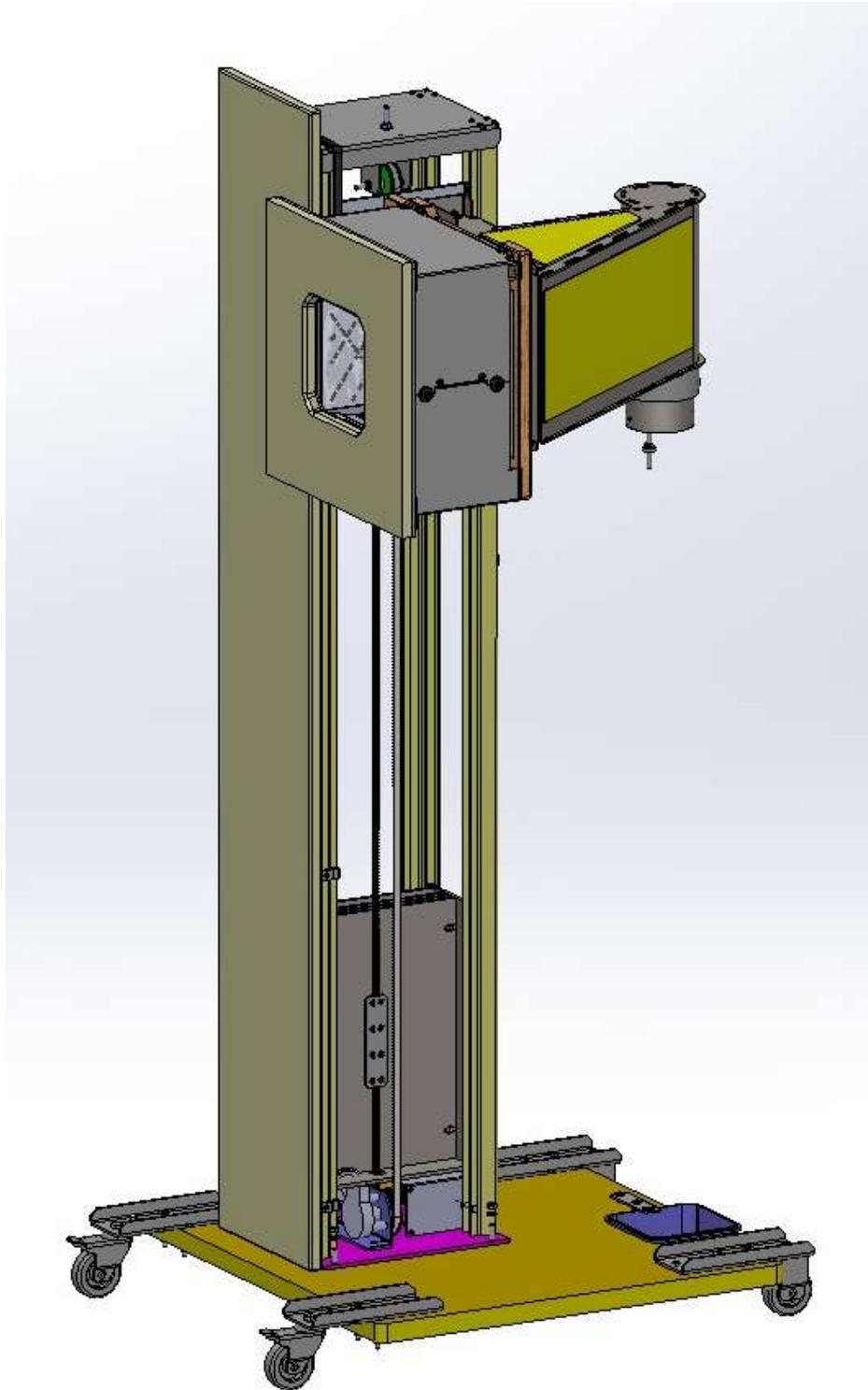
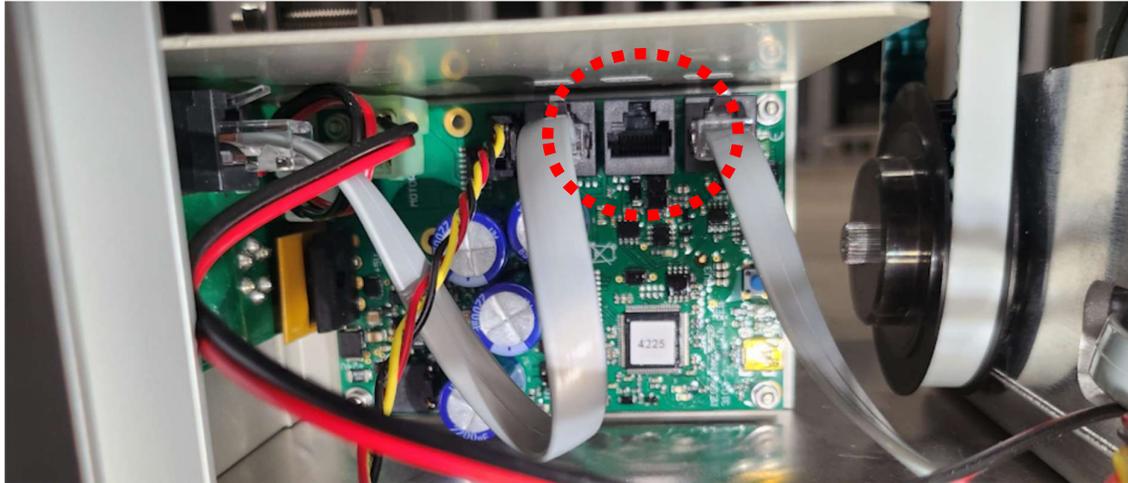


Fig.11 Lift on trolley

For the collection of lead, a plastic box is attached to the trolley. Adjustment of the emptying mechanism is done in the same way as for a fixed lift.

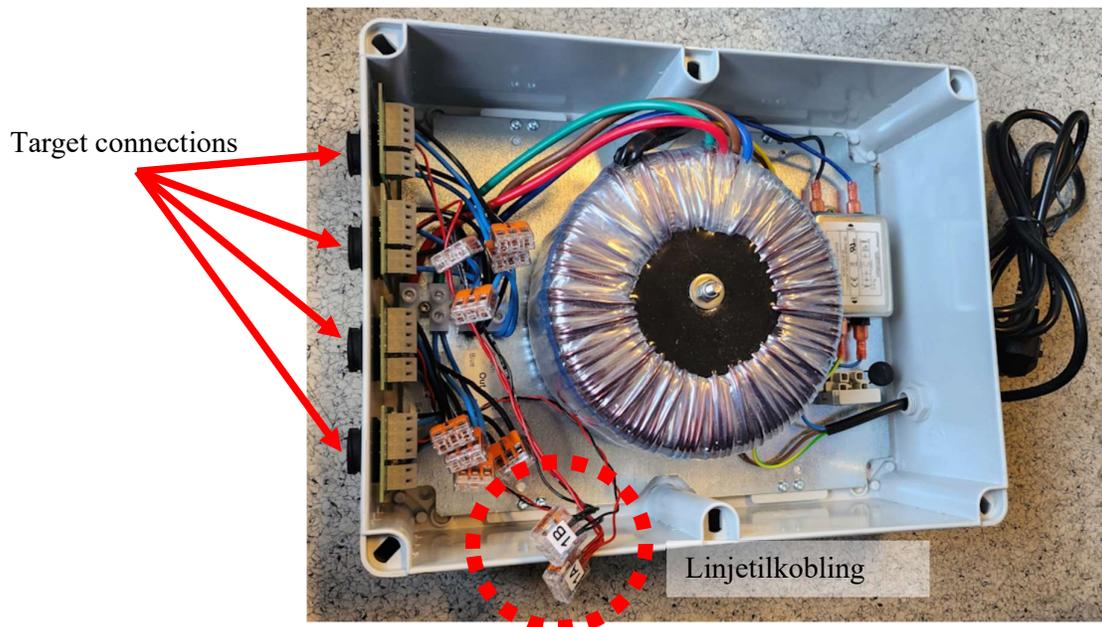
## 2.2.4 Connecting line 1 A/B

### 2.2.4.1 Alternative 1



Connect the line in the line connection on one of the target lifts PCB cards

### 2.2.4.2 Alternativ 2

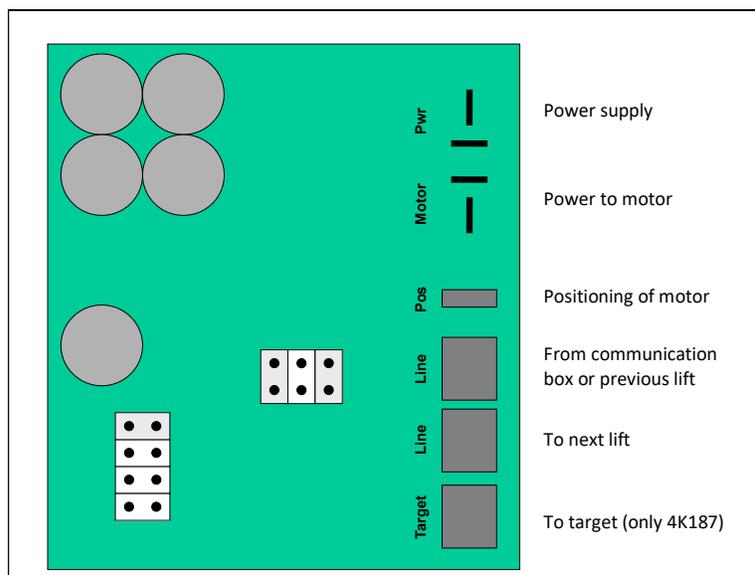


Connect the line (1 A/B) to the connection inside the power supply

### 3. Communication from firing line to the targets

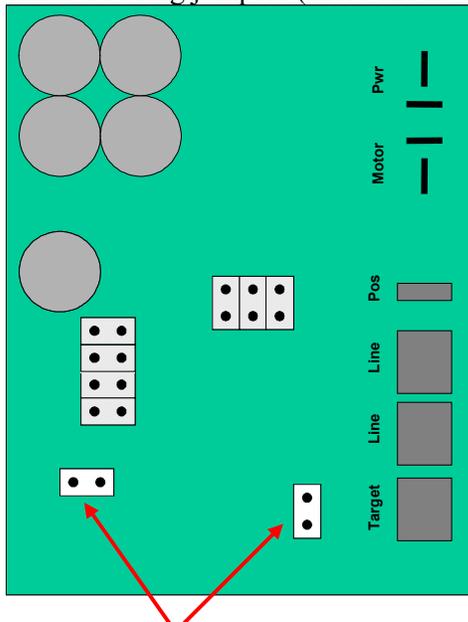
A standard patch cable is connected between the target lifts (Std. straight Cat. 5 cable with RJ45 connectors). The first or last target lift is connected to the communication box. This can be done in several ways:

- By using spread connector for 4K187
  - Connect the first or last target lift to the socket between the round connections on the spread connector.
- By the use of a patch cable to the wallconnection connected to LINE IN on the communications box
- By using the screw clamps in the communication box
  - The socket is marked OUT 1A/1B.
  - Pin 7 is 1A (normally Brown/White)
  - Pin 8 is 1B (normally Brown)



### 3.1.1 Power to target – old setup (prior to 2020)

If the only power supply to the target is through the cable from the lift, then this must be connected using jumpers (short-circuit clips).



If the target is to have a power supply from the lift, two jumpers must be placed here.

### 3.1.2 Setting the target number – old setup (prior to 2020)

Each target lift is given a target number by means of jumpers (short-circuit clips) on the circuit board in the lift. This is normally set up in advance, but the following system is used:

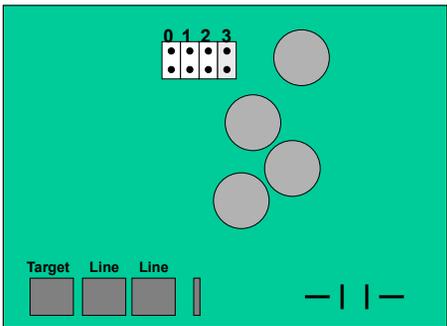
Nr	A	B	C	D
1	□	:	:	:
2	:	□	:	:
3	□	□	:	:
4	:	:	□	:
5	□	:	□	:
6	:	□	□	:
7	□	□	□	:
8	:	:	:	□
9	□	:	:	□
10	:	□	:	□

□ Betyr at det settes på jumper  
 : Betyr at pinnene står åpne

If there is more than 10 target lifts lift number 11-20 is set up as lifts 1-10 and so on.

### 3.1.3 Setting the target number - new (from 2020)

Each target lift is given a target means of jumpers (short-circuit clips) on the circuit board in the lift. This is normally set up in advance, but the following system is used:



Nr	0	1	2	3
1	□	:	:	:
2	:	□	:	:
3	□	□	:	:
4	:	:	□	:
5	□	:	□	:
6	:	□	□	:
7	□	□	□	:
8	:	:	:	□
9	□	:	:	□
10	:	□	:	□

□ Betyr at det settes på jumper  
 : Betyr at pinnene står åpne

If there is more than 10 target lifts lift number 11-20 is set up as lifts 1-10 and so on.

## 4. Setup and use

### 4.1 *Configuring the lift positions*

The targets three positions must be set. This is done by using the master monitor. Enter the lift adjustment menu. See chapter 3 "Configuration and upgrade" for more information.

- Choose the target lift number (target number) with Previous or Next
- Go to adjust
- Run the target lift to the desired position with Up or Down. A short push of the button runs the lift one step. If you press and hold the button, the lift will start to run continuously until the button is released.
- Choose save and choose the which position that will be stored (Park means parking)
- When all positions are saved, you finish and move to the next target lift (start over)
- When all target lifts is adjusted you can turn of the monitors.

This procedure is normally just performed when mounting. But it can be used at any time if there is need to adjust one or more positions. It is very easy to adjust a stored position using the following procedure:

- Run the lift to the already stored position.
- Enter the menu for lift adjustment and run some steps up or down.
- Save the new position.
- Exit the adjustment menu.

The following target center positions is recommended:

Følgende senterposisjoner anbefales:

- Prone: 35cm
- Kneeling: 90cm
- Standing: 140cm (according to ISSF rules)

Make sure that you don't get any trouble with the rubber or paper band from the target in the prone position by making it to low. It is also important not to run the target lift so low that it breaks the target cable.

### 4.2 *Configuration of target lifts with automatic emptying*

*Only applies to target lifts with counterweight (after 2020) and with software 21.36 or newer.*

Target lifts with counterweight needs to be configured for automatic emptying. This is done in the following steps:

1. Hold the button on the circuit board for at least 5 seconds while the power is turned on.
2. After this you can choose between emptying or not.
  - a. Rapid flashes of the PWR LED means you don't have emptying
  - b. Slow flashes of the PWR LED means you have emptying (the target and bullet catcher moves about 1 cm when run from prone position)
3. The change is stored when chosen. Turn the power off and on to exit the configuration mode.

This can be tested with the following procedure:

1. After normal startup, press the button on the circuit board
2. The lift goes into test mode and runs between the position from prone, kneeling, standing, kneeling and back to prone. If the emptying is configured it will also do this in the test mode.
3. End the test by pressing the button.

### **4.3 Function of the LEDs**

#### **4.3.1 LEDs old (prior to 2020)**

The LEDs on the lifts circuit board indicates the following:

- Green
  - Startup: Green light in approx. 0,5 seconds
  - Normal operation: Slow flashing
  - Power failure: Rapid flashing
- Red
  - Flashes when data is received (does not blink if polarity is wrong)

#### **4.3.2 LEDs new (after 2020)**

LEDs on the lifts circuit board indicates the following:

- Orange LED inside the card (Rx)
  - Flashes when the board receives data from the firing line
- Green LED inside the card (Tx)
  - Flashes when the board sends data to the firing line.
- Green LED on the bottom of the board (Power)
  - Lights up when the current is OK and no message is received.
  - Flashes slowly when the board is in demo-mode og no message is received.
  - Flashes rapid when power disappears
  - Shuts down for 0,5 seconds when receiving a message
- Orange LED on the bottom of the board (Diagnose)
  - Lights up at start-up, but should go out when start-up is successful
  - Flashes ones when storing data in a power out situation
  - Flashes fast in the event of an unexpected event on the motor driver. This is reset at the next motor start.
  - Flashes more slowly at high current draw (only with new type of motor driver)

### **4.4 Normal use**

For single shots, you will be able to move the target lift manually up and down from the monitor for normal shooting. Ready-made courses of fire can also be set up where the lift position is selected based on the defined program.

The parking position is reached by pressing the UP key three times and then holding the UP key until the lift starts to move. To get out of the parking position, press DOWN three times before holding DOWN until the lift starts to move.

When using MLRange, the lift can be controlled from a PC. The shooters may choose their own position for single-shot series.

#### **4.5 Safety mechanisms Sikkerhetsmekanismer**

There are multiple safety mechanisms in the system:

- If the pulse generator from the motor stops working or the system is jammed, stored positions will be deleted and the motor stopped. You can use the setup function again, but you should of course correct the error with pulse generator or jamming first.
- If the power is cut when the motor is running, the lift will stop immediately, and the current position will be saved. If the power returns, the system will restart. The system always stands still after a start-up. This means that the target will not be positioned in one of the stored positions until a position command is given to the lift

#### **4.6 Demo-mode**

Demo-mode only works with the new lift circuit boards (beyond 2020).

One push of the button on the circuit board will activate the demo-mode. The lift automatically moves between the three positions (P-K-S-K-P....). A second push of the button disengages the demo-mode.

### **5. Software upgrade**

Lift circuit board of a newer kind can be upgraded. These have been produced from and including the end of 2019.

*The procedure for upgrading is explained in the document Handbook for ML2000 – Configuration and upgrading.*