ZANUS
PRODUCTION ROBOTICS

Move Dolly System Setup

March, 2025

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1. Safety and warnings

Follow all instructions and warnings marked on the product and given in this manual. These safety instructions must be followed to reduce the risk of personal injury and/or damage to the product and other equipment.

WARNING: Do not install this product onto a support, bracket or other equipment that is not designed to support the weight of the product and its payload. Make sure that the product and its payload are always well-secured.

WARNING: The payload needs to be installed on the product in the places provided for that.

WARNING: Regularly inspect the product for damages and do not operate it when damaged. In case of a malfunction please contact your dealer and do not attempt to disassemble the product yourself.

WARNING: This product needs to be connected to a power supply with the same voltage (V) and frequency (Hz) as indicated on the product and described in the specification section of this manual. To reduce the risk of electric shock, do not remove the cover and do not try to disassemble the product. Refer to qualified service personnel for all servicing.

WARNING: This product must be mounted and installed in accordance with the recommendations in this manual to avoid potential accidents and damage.

WARNING: Payload must be mounted and installed in accordance with recommendations in this manual to avoid potential accidents and damage.

WARNING: When cabling the product, for all the cables that are moving together with the movable parts of the product make sure that there is enough cable length allowed and that when moving cable is not getting tangled for other cables or other objects nearby. Tight cable pulling by the product could cause serious damage for the cables or the product itself.

WARNING: Before using the product make sure that end limits and curve indicator markers are set, In order to prevent collision damages between dolly and the surrounding objects.

WARNING: It is not recommended to use move dolly in combination with PoE switches. It can result in loss of network connection.

CAUTION: This product is designed for remote operation. Do not attempt to manually operate the product unless it is powered off.

CAUTION: Make sure that there are no obstacles in the working zone of the product. Restrict access to the working area of the product to reduce the risk of a person being hit by moving parts of the device. Power off the device before rigging, cleaning or adjusting the payload or equipment mounted on the product.

CAUTION: Do not use solvent or oil-based cleaners, abrasives or wire brushes to clean this product as they may damage protective surfaces. To clean mechanical surfaces, use only detergent-based cleaners.

2. General description and Technical specifications

The Move robotic dolly is built for smooth, stable and effortless camera motion. It can be controlled by a RoboProd software or RoboStick joystick. In this document we are going to go through the process of setting up the system and getting the system ready to be used.

Parameter	**Value**
Payload	40kg (Pauli PT head with camera of up to 20kg on PTZ Raise lift)
Temp. operating range	-10° - 45°
Power supply input	26 – 48V DC / 220V AC
Power supply output	3x AC pass trough, 5V-2A, 12V – 5A, 24V – 5A
Control	Zanus RoboProd control software with joystick or directly with joystick Skaarhoj, VISCA over IP or Canon PTZ joystick
Mounting flexibility	It is possible to mount camera directly on the dolly, to mount Pauli PT head on the dolly or to mount either mechanical or motorized lift on the dolly
Maximum acceleration	1m/s²
Speed	1mm/s – 3m/s (on straight track), up to 1m/s (on curved track)
Tracks	Aluminum, black anodized, 35cm gauge tracks straight and curved 1,5m long with integral levelling adjustment. Possibility to combine straight and curved tracks into complex shapes
End limits	Limit switches and physical barriers that the operator can easily mount and adjust
Min hight from the ground to the camera mounting plate	600mm (mechanical lift) 1312mm (motorized lift)
Max hight from the ground to the camera mounting plate	1300mm (mechanical lift) 1812mm (motorized lift)
Maximal travel	700mm (mechanical lift) 500mm (motorized lift)
Speed range	0.1 – 200mm/s
Maximal acceleration	100mm/ s²
Protection class	IP52

3. What is in the box

Move dolly is distributed in the form of the basic package and various additional accessories. The exact accessories that are included depend on the particular needs of the customers. The basic package, as well as the accessories, are listed below.

3.1. Basic package

The following parts are included with the **Basic package** of the Move dolly. This package includes the main parts for powering on the motorized dolly and attaching the camera to it. Keep in mind that rails are not included in the package and must be acquired separately for the system to be operational.

ID	Part	Quantity
1	Dolly “Move”	1
2	Camera mounting plate	1
3	Cable holder	1

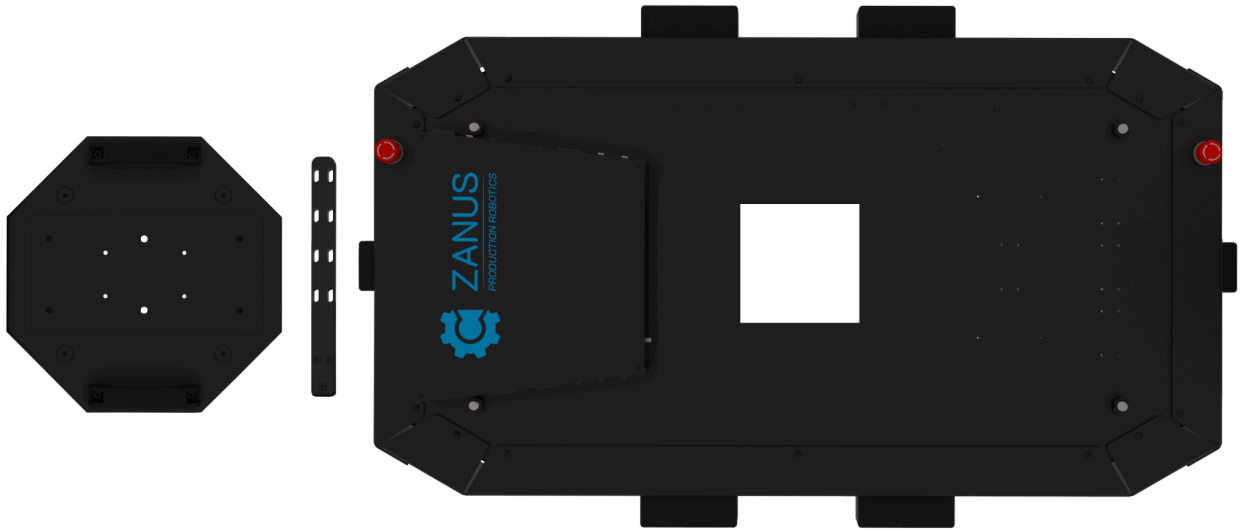

Figure 1: Basic package

If alongside the basic package is acquired Raise lift to be mounted on the dolly and used together, the package is extended to include Raise lift (without wheel base), and all cables and screws for connection with the Move dolly. See table and *Figure 2* below.

ID	Part	Quantity
1	Raise Lift	1
2	Power supply male/female AC cable	1
3	RJ45 CAT6+ ethernet cable for network connection	1
4	RJ45 CAT6+ ethernet cable for CAN connection	1

Figure 2: Extended basic package

4. Interface outline

Move dolly comes with many different possibilities when it comes to the interface. *Figure 3* and *Figure 4* show all interface connectors, buttons and indicators of the Move dolly.

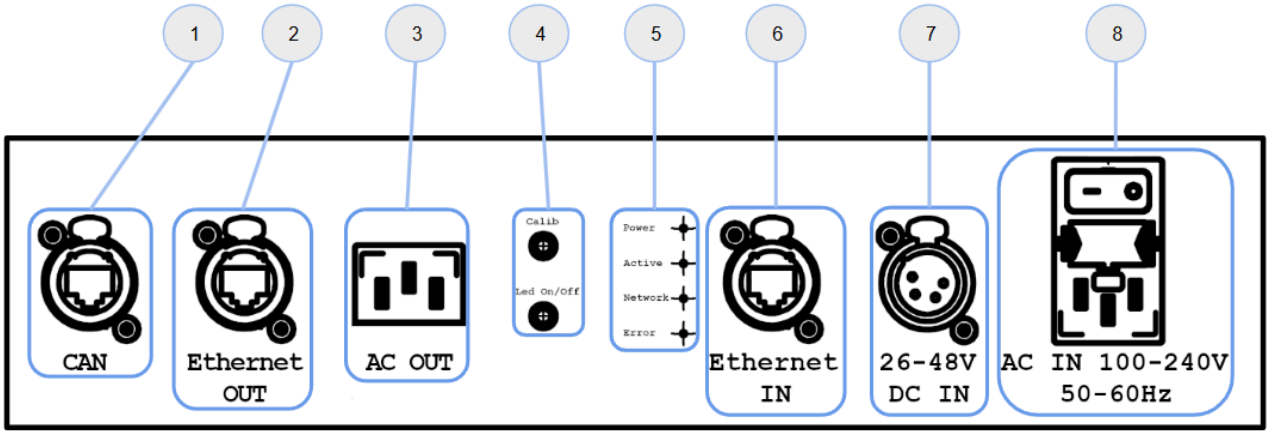

Figure 3: Dolly interface left side

ID	Part
1	RJ45 CAN Socket
2	RJ45 Ethernet Out Socket
3	AC Out Socket
4	Calibration and Led On/Off buttons
5	Led Indicators
6	XLR 26-48V DC In Socket
7	RJ45 Ethernet In Socket
8	AC IN 100-220V / 50-60Hz Socket

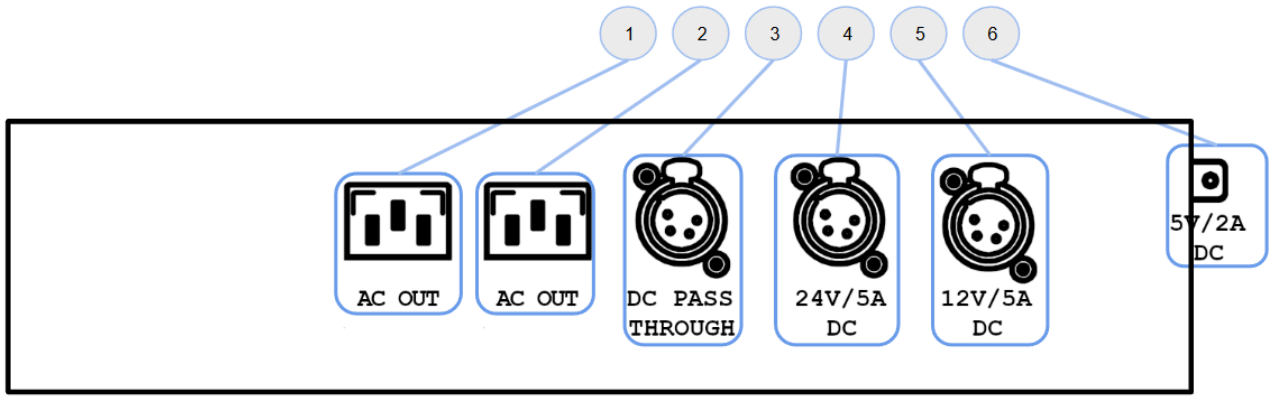

Figure 4: Dolly interface right side

ID	Part
1	AC OUT Socket
2	AC OUT Socket
3	XLR DC PASS Through 26-48V Socket (Provides power if there is power supply on DC In in Figure xxx; if AC In is connected no power supply on this socket)
4	XLR DC 24V/5A Socket
5	XLR DC 12V/5A Socket
6	5V/2A Out Socket

5. System setup

Before you want to use the Move dolly you must first assemble rails on which dolly moves.

5.1. Types of rails

There are two types of rails available: straight and curved rails. They can be assembled in all combinations and tightened together by screwed assembly. Types of rails are shown in *Figure 5* below.

Figure 5: Straight and curved rails

When acquiring a rail package you get a specified number of straight and curved rails alongside safety barriers and calibration indicators. *Figure 6* and table below.

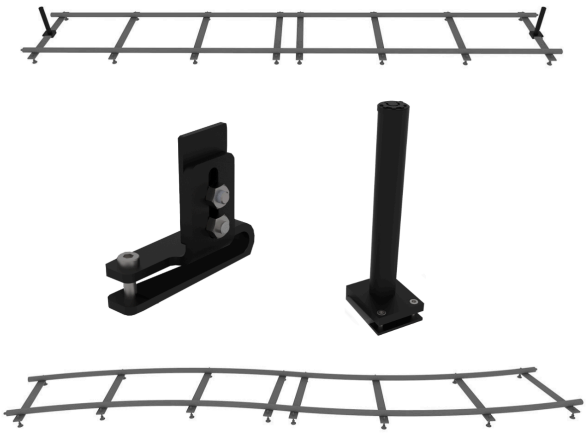

Figure 6: Rails Package

ID	Part	Quantity
1	Rail segment	1
2	Safety barrier	2
3	Calibration indicator	3

5.2. Setting up rails

In order to set up rails, first unpack them and place them on the floor. Rails are leveled using screwable legs which are placed on the end of the rails. The level legs can be adjusted using the combination flat key 13. Before placing the rails in the desired position, screw in all level legs at the half position in order to have enough space for leveling on the uneven ground. This is shown in *Figure 7* below.

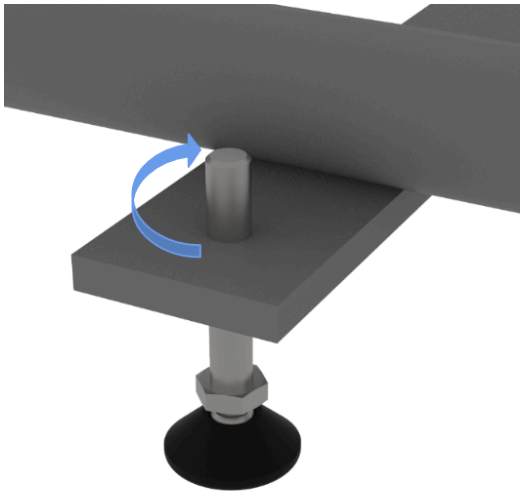

Figure 7: Leveling legs

Straight and curved rails are connected together with male / female adapters which can adjust the curve direction. Curve adapters are shown in *Figure 8* below.

Figure 8: Curve adapters

Before connecting straight and curved rail together place the respective adapter between rails and after that tighten the connection point between rails.

Both straight and curved rails are held together with screwed assembly shown in *Figure 9* below. In order to tighten, screw the central part of the connector, and in order to release it unscrew the central part.

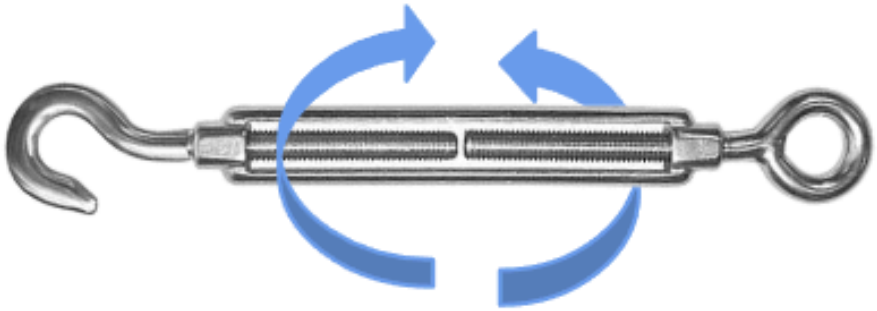

Figure 9: Connector between rails

Connection point between two rails is shown in *Figure 10* below

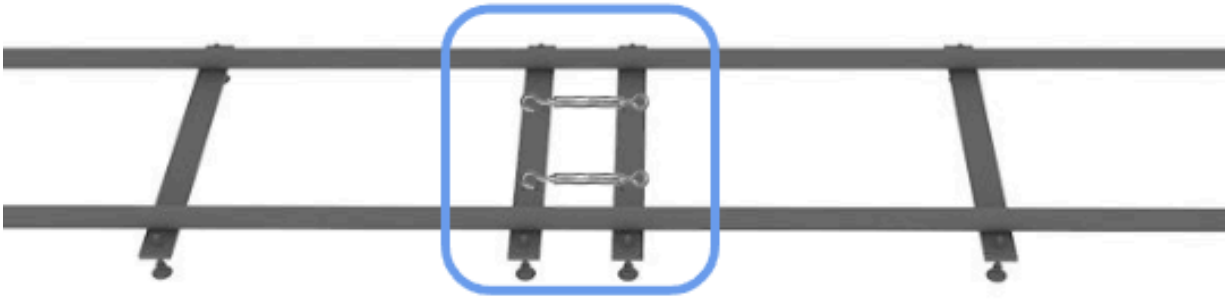

Figure 10: Two rails connection point

After the desired shape of the rails is laid down on the floor, rails are ready for the leveling. In order to level the rails you could use the leveling tool. Keep in mind that the floor itself should be as much leveled as possible in order to achieve perfect leveling of the rails.

5.3. Leveling of the rails

In order to level the rails first go through and lower the leveling legs until they touch the floor. Be sure to not overdo it because if you lower the leveling legs too much you will as a consequence raise that part of the rail. The best way is to lower it so it has good contact with the floor so it will not turn unless we apply greater force to the leveling leg screw. Adjust leveling leg down or up until satisfied.

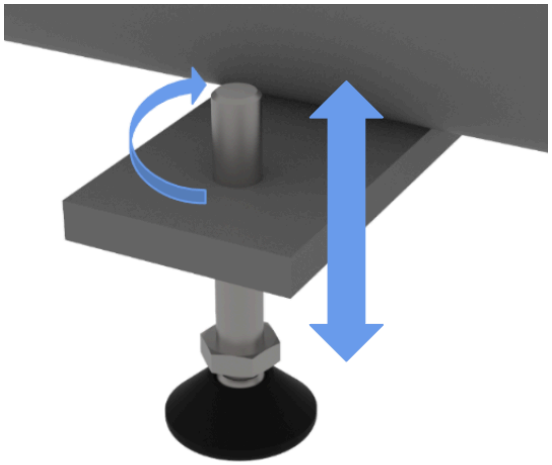

Figure 11: Adjusting leveling leg

After that you can once more go through all leveling legs and check if all of them have good contact with the floor, and that there is no dangling in the rails.

If you need a perfect level you could use a longer leveling tool in the directions shown in Figure 12 below, and according to the readings from the leveling tool adjust legs further.

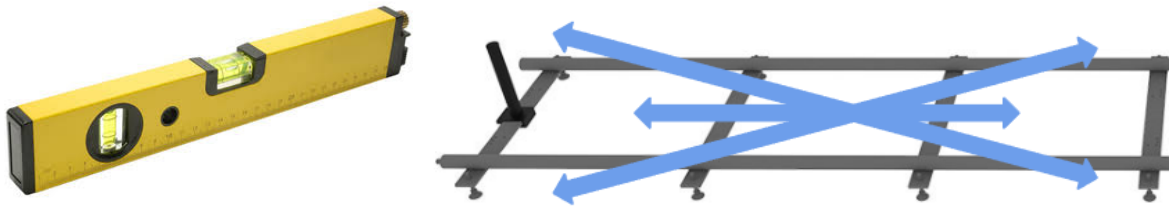

Figure 12: Using leveling tool to check level of the rails

After the rails are leveled we are ready to place the dolly on the rails. Keep in mind that you should also check the leveling after placing the dolly on the rails and also at the regular interval during the exploitation of the system.

5.4. Setting up dolly on the rails

Two persons can lift a dolly using the lifting handles on the sides of the dolly shown in *Figure 13* below.

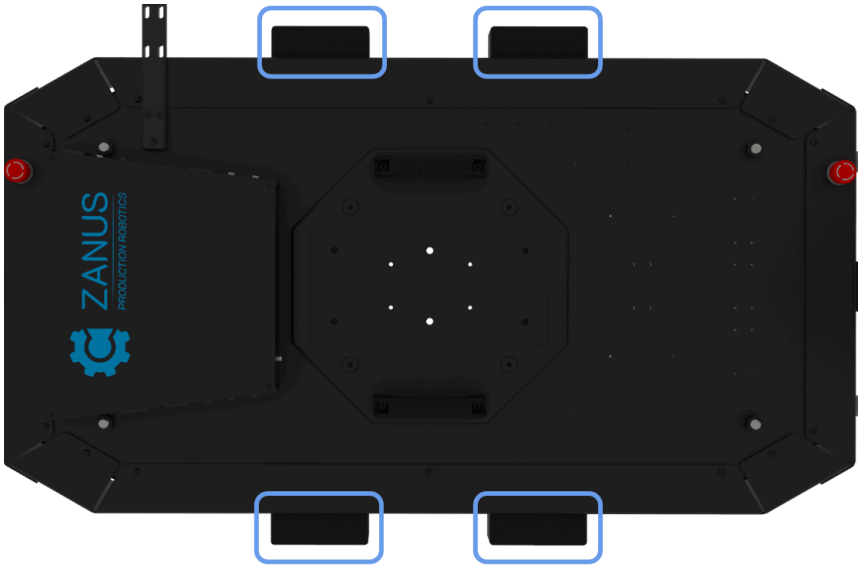

Figure 13: Lifting handles on the dolly sides

Make sure that wheels are placed in correct orientation while placing the dolly on the rails. Correct dolly wheel orientation on the rail is shown in *Figure 14* below.

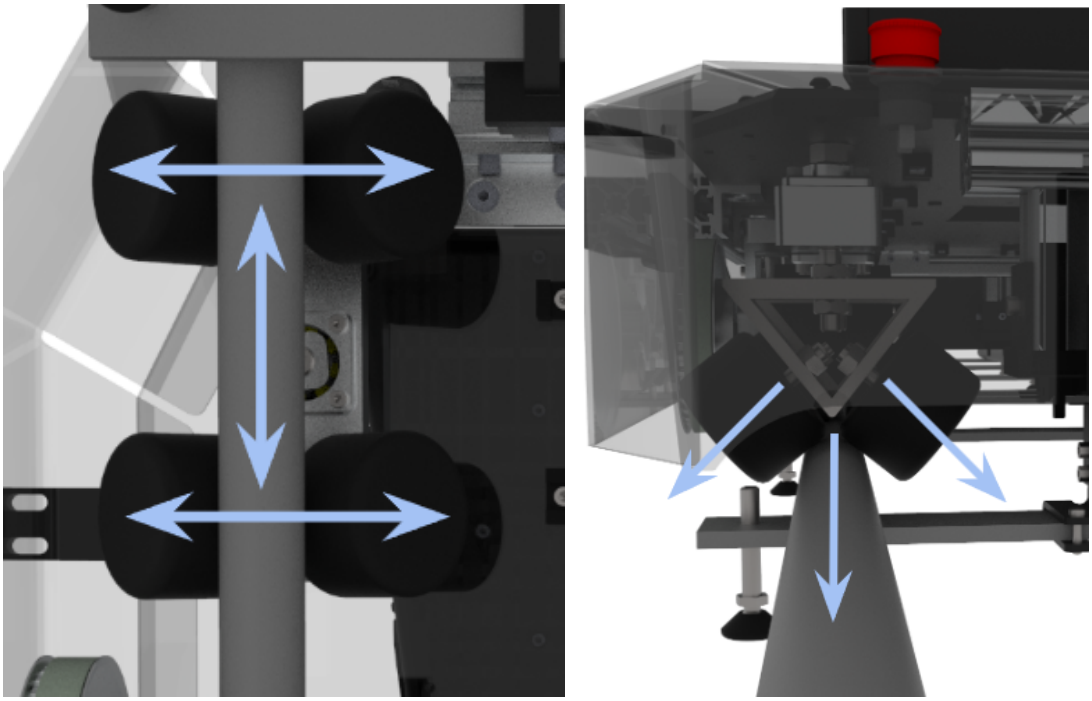

Figure 14: Correct dolly wheels orientation on the rails

After the dolly is placed on the rails, the cable holder can be mounted.

5.5. Setting up cable holder

The cable holder is mounted in the doly using the three M5 screws which come with it. Screw the cable holder in the position shown in *Figure 15* below.

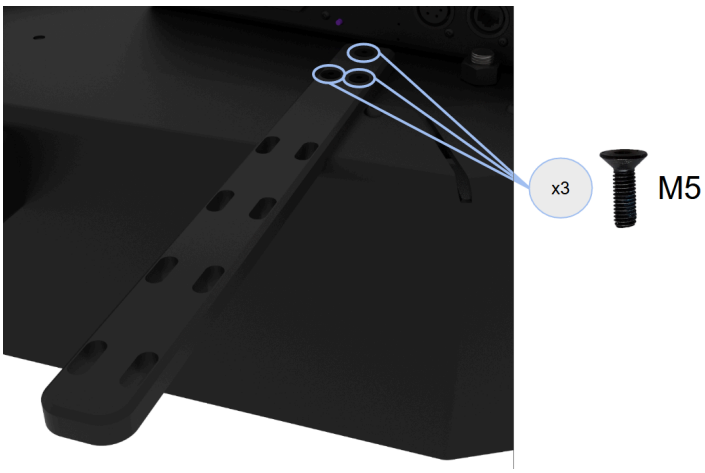

Figure 15: Mounting cable holder

Holes in the cable holder can be used to pass through the zip ties in order and fasten the cable.

5.6. Setting up end barriers

Before connecting the cables and powering on the dolly it must be ensured that the safety barriers at the end of the rails.Safety barrier can be placed on the rail by sliding it on and positioning left or right in order to have the contact with dumper on the dolly as shown in Figure 16 below.

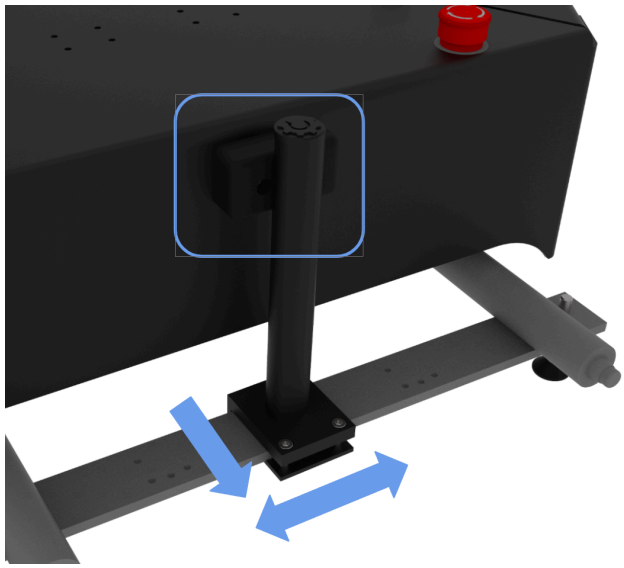

Figure 16: Positioning safety barrier

After the safety barrier position is established it needs to be fastened to the rail using two accompanying M5 screws as shown in *Figure 17* below.

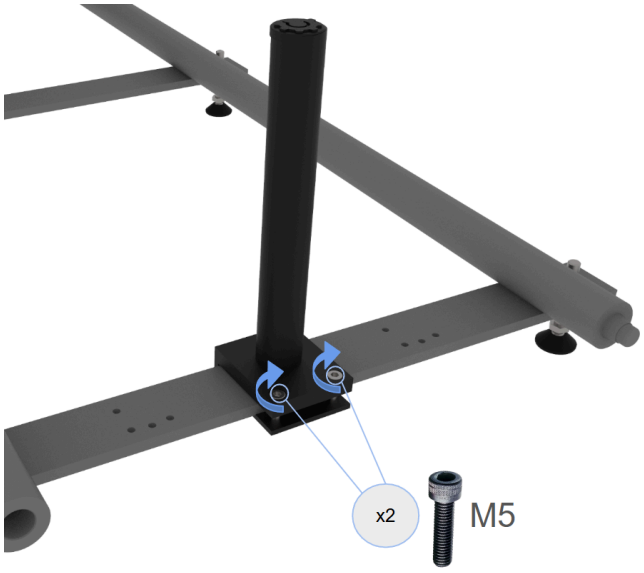

Figure 17: Fastening the safety barrier to the rail

5.7. Setting up calibration indicators

Calibration indicators are to be placed next. There are three of them, two for the indicated end of the drivable part of the dolly track, and one indicator called a curve indicator that goes somewhere in the middle of the track.Calibration indicator should be placed by sliding it on the rail and fastening the M3 screw.

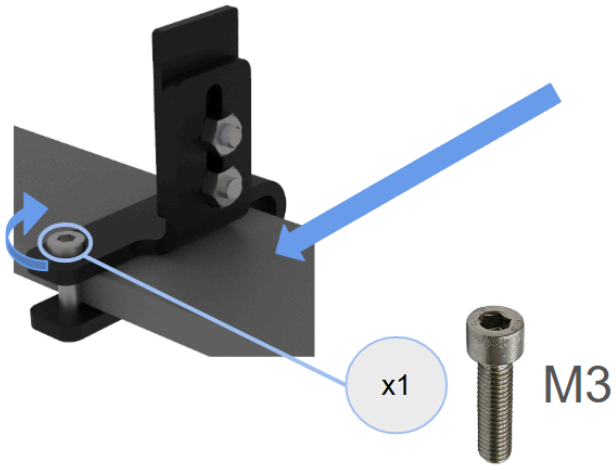

Figure 18: Positioning calibration indicator on the rail

The horizontal position of the calibration indicator is determined by the limit switch for it. There are two limit switches on the dolly. One is the end limit which has two calibration indicators which are placed at the end of the track. Its position can be determined by the END LIMIT label on the dolly itself. The second limit switch is a curve indicator which has one calibration indicator which is placed in the middle of the track. Its position can be determined by the CURVE INDICATOR label on the dolly itself. Height of the calibration indicator is also important because it should close the optical view inside the switch.

Height of the calibration indicator could be adjusted using the two screws and bolts on the indicator itself as shown on *Figure 19* below.

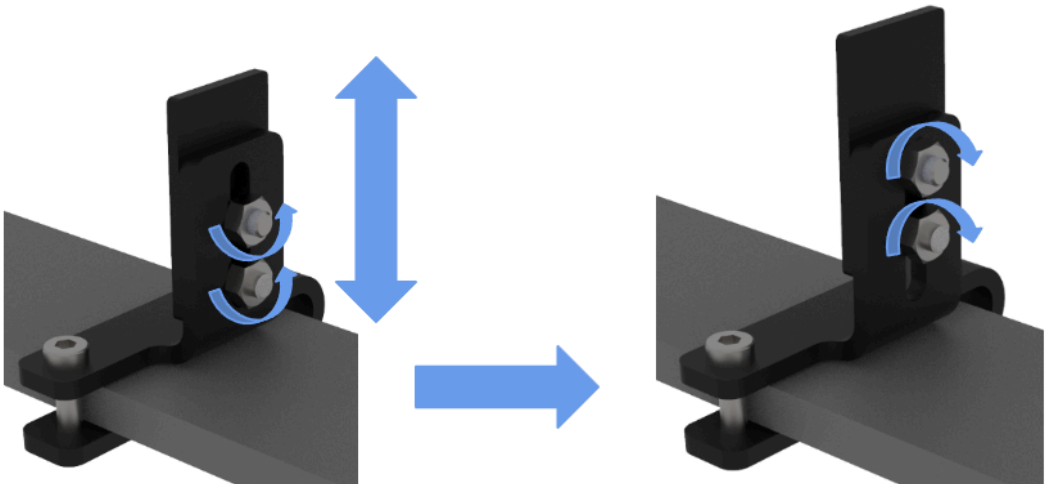

Figure 19: Positioning calibration indicator on the rail

Correct placing of the indicator and the switch could be seen highlighted in the Figure 20 below.

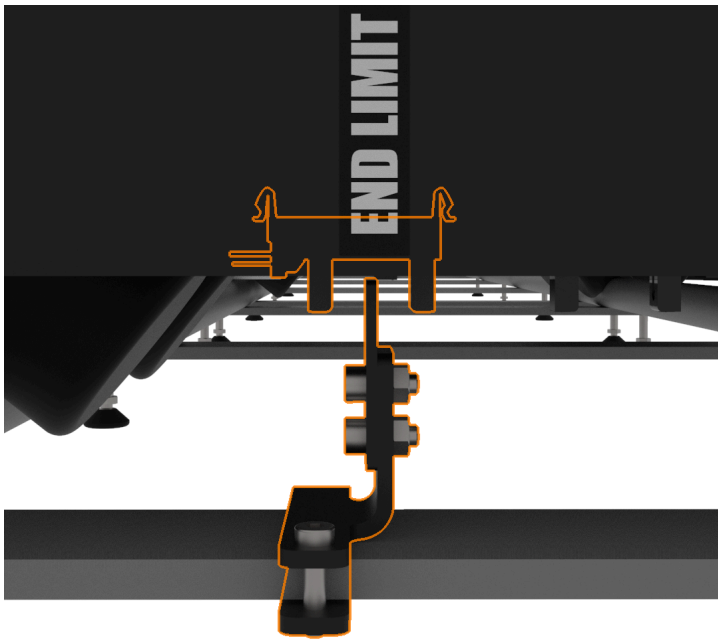

Figure 20: Positioning calibration indicator on the rail

5.8. Connecting the Move dolly

In order to finalize Move dolly for usage it needs to be connected with the power cable and ethernet cable.

This can be achieved by connecting the AC IN 100-220V / 50-60Hz cable to the socket labeled with number 8, and the Ethernet to the Ethernet In RJ45 socket labeled with number 7 in the *Figure 21* below,

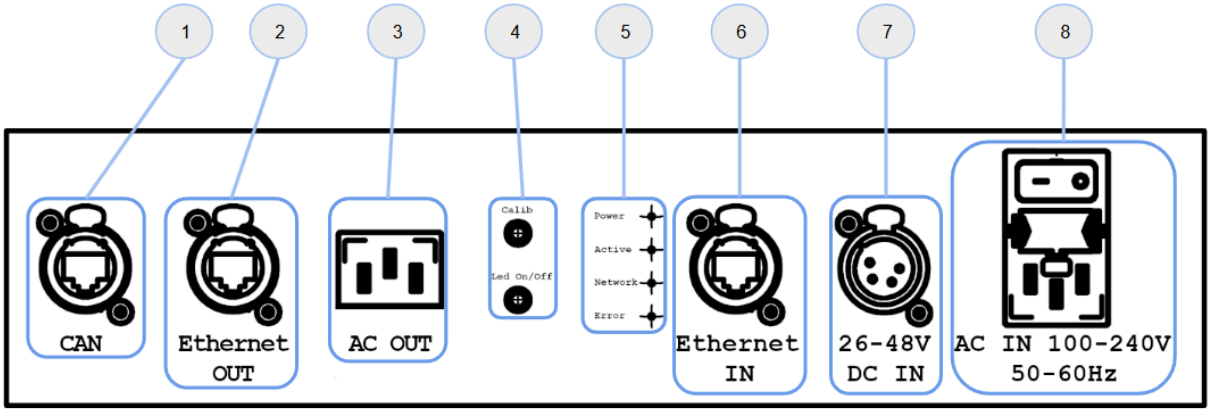

Figure 21: Dolly interfaces

After cables are in place the I/0 switch above the AC input cable should be turned on. Any additional cables needed for the camera and / or camera device placed upon Move dolly (for example PTZ camera shown in *Figure 26*) as a payload need to be brought alongside Ethernet input cable and Power cable.

Any additional SDI / Video and other cables need to be brought to the dolly alongside 2 main cables.

Ethernet standard RJ45 CAT6+ cable and power cable are shown in *Figure 22* below.

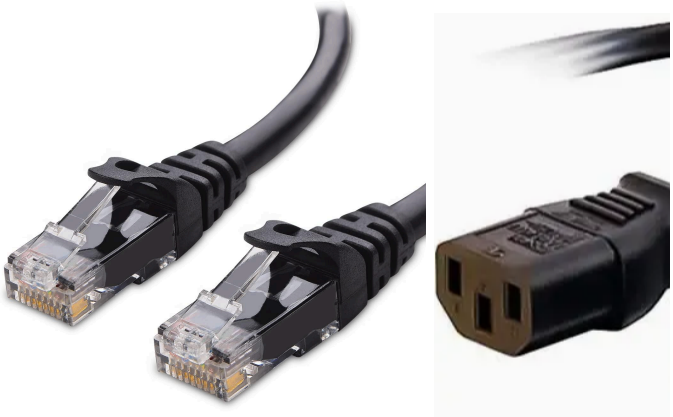

Figure 22: Ethernet and AC power cables

Interfaces such as ethernet or power supply for the payload device can be utilized from the dolly itself.

On the *Figure 21* ethernet out is marked with number 2, AC output connector with number 3.

On the *Figure 23* below with numbers 1 and 2 are marked AC output connectors, other 3 XLR outputs (numbers 3,4 and 5) are DC Pass Through (48V/10.45A), 24V/5A DC and 12V/5A DC. With number 6 is marked 5V.2A output.

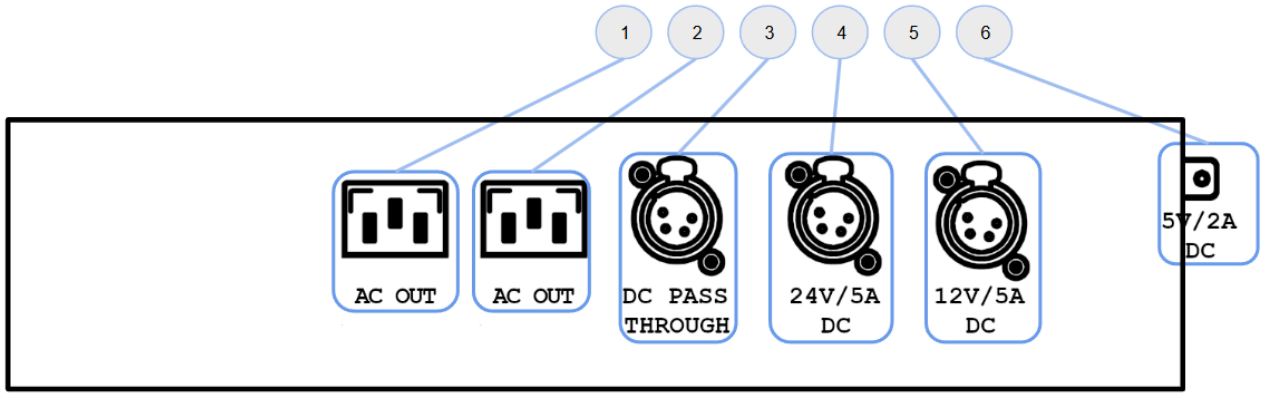

Figure 23: Ethernet and AC power cables

5.9. Dolly emergency stop

Movement of the dolly can be stopped at any time by pressing the emergency stop button on either side of it which is depicted in *Figure 24* below.

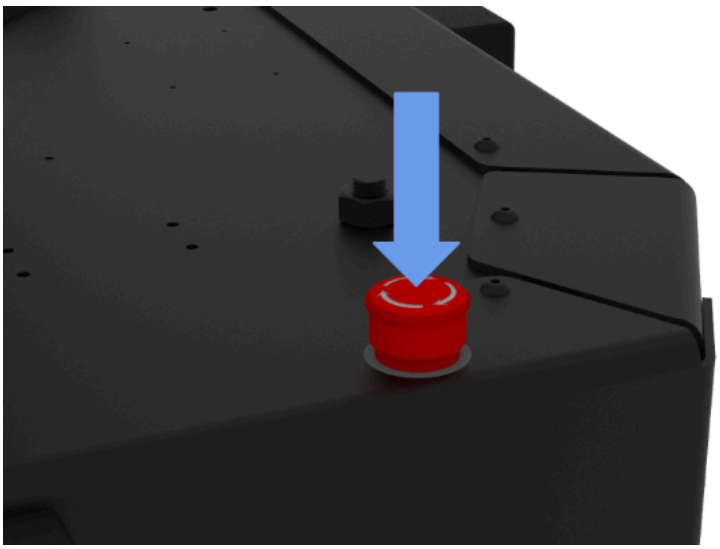

Figure 24: Pressing the emergency stop button

In order for the dolly to continue its movement again the emergency stop button needs to be released. The emergency stop button is released by slowly rotating it to the right and releasing it upwards. This is shown in *Figure 25* below.

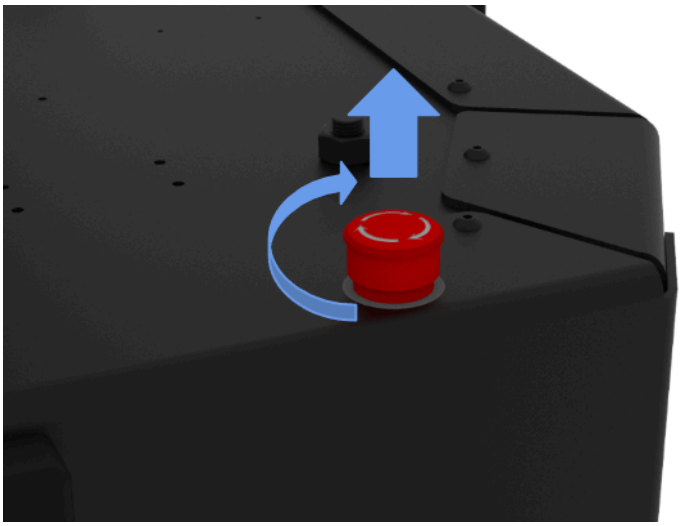

Figure 25: Releasing emergency stop button on the dolly

5.10. Connecting Move dolly with other Zanus robotic devices

Figure 26: Combining Move dolly with other devices

Move dolly can be combined with multiple different payload options such as PTZ Cameras, Pan Tilt heads and / or mechanical or motorized pedestals with Pan Tilt heads or PTZ Cameras. In the following parts of this document we are going to explain connection options for the most complicated combination which is Move dolly, Raise motorized lift and Pauli PT Head.

5.11. Connecting Move dolly with Raise lift and Pauli PT Head

Before connecting or changing the current configuration of the devices, always make sure that the power supply that comes to the dolly is turned off and cable plugged out.
This combination of devices consists of Move dolly, Raise motorized pedestal and Pauli / Pauli B PT head. For more information about any of those devices always refer to their respective manuals.

5.12. Mounting the Raise Lift on the Move Dolly

In order to place the Raise lift on the Move dolly we need to use a mounting plate for the dolly alongside with accompanying M8 and M10 screws. This plate with labeled screw holes that are going to be used are labeled in *Figure 27* below.

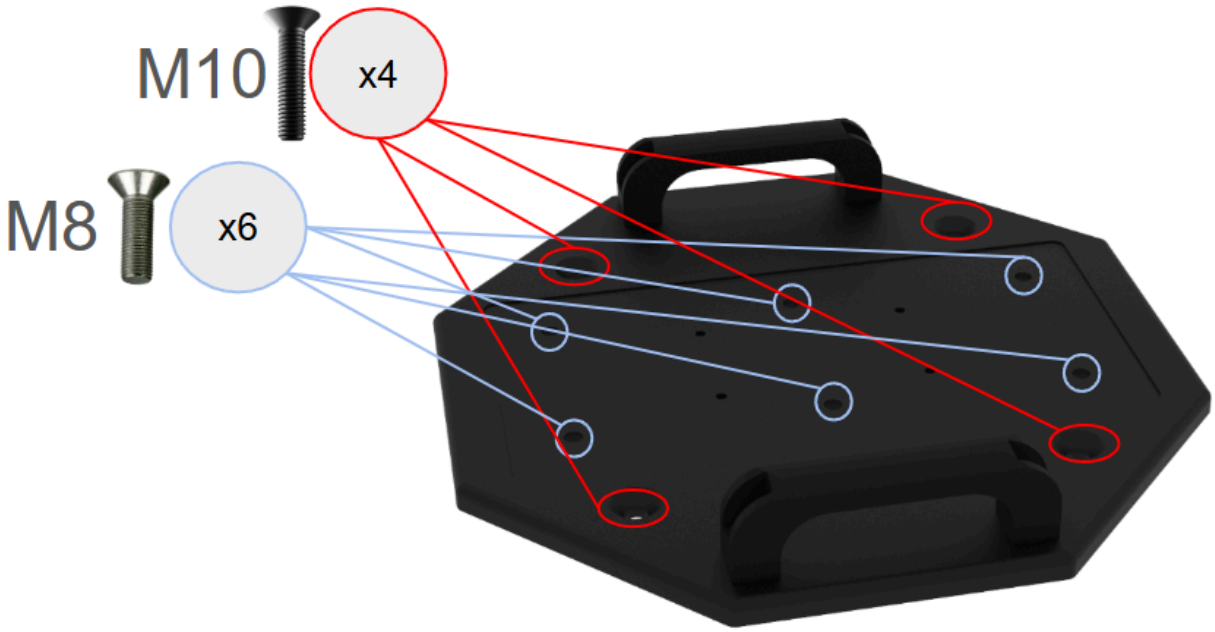

Figure 27: Dolly mounting plate screw holes

First we need to connect the plate to the Raise lift. This can be achieved by tightening the 6 M8 screws from the bottom side of the mounting plate. This is shown in *Figure 28* below.

Figure 28: Mounting Raise lift on the Dolly mounting plate

After tightening the mounting plate to the Raise lift, whole construction should be placed on the dolly and with 4 M10 screws connected to the Move dolly itself. The screw points are shown with red labels in *Figures 27 and 29*.

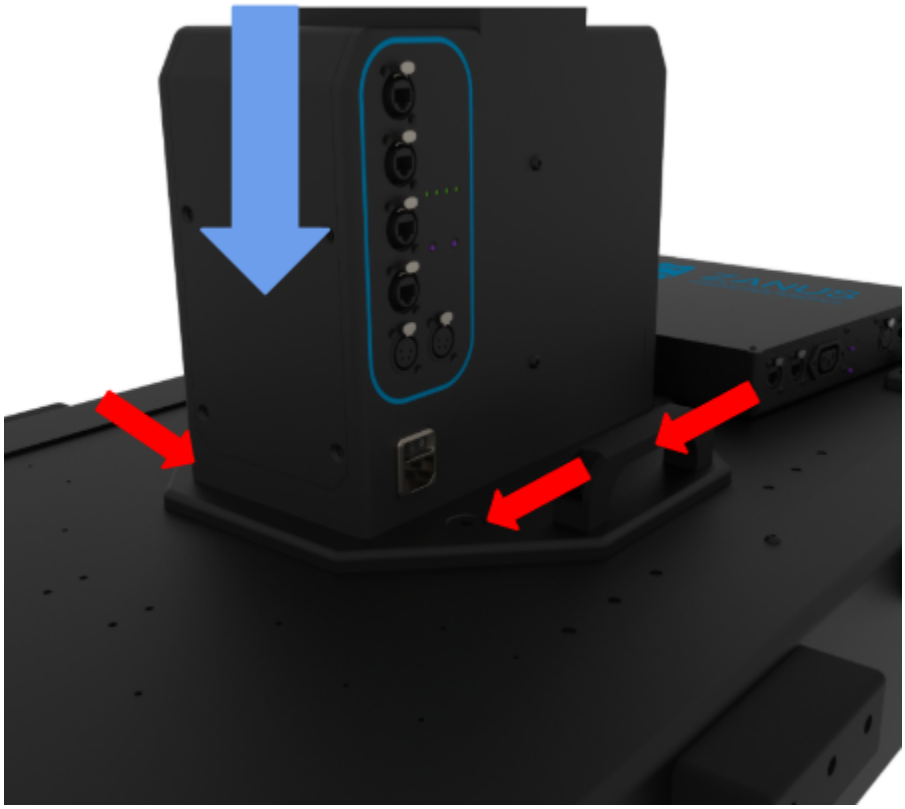

Figure 29: Mounting and securing Raise lift on the Dolly

With this finished Raise lift is successfully secured to the Move dolly.

5.13. Cabling between Raise Lift and Move dolly

Cables needed to connect Raise lift and Move dolly are as follows: 1x Male/Female AC cable, 1x CAT6+ Ethernet cable, 1x CAT6+ Ethernet cable for CAN connection, as seen in *Figure 30* below.

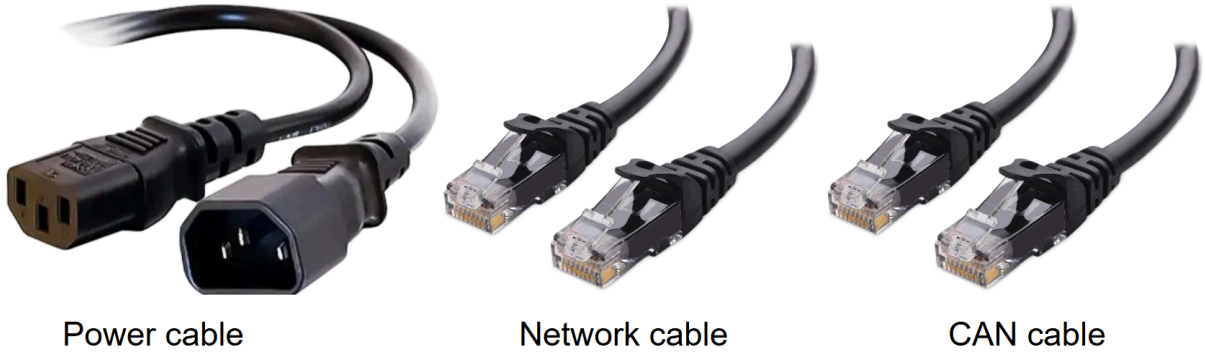

Figure 30: Cables for connecting Move dolly and Raise lift

Power cable should be plugged in AC OUT socket on the dolly and AC IN socket on the lift.First ethernet cable for network should be connected to the Ethernet Out socket on the dolly and either Ethernet socket on the lift. Second ethernet cable used for CAN connection should be connected to the CAN socket on the dolly and one of two CAN sockets on the lift.
With that connection between dolly and lift is finished. This is all represented in the scheme on *Figure 31*.

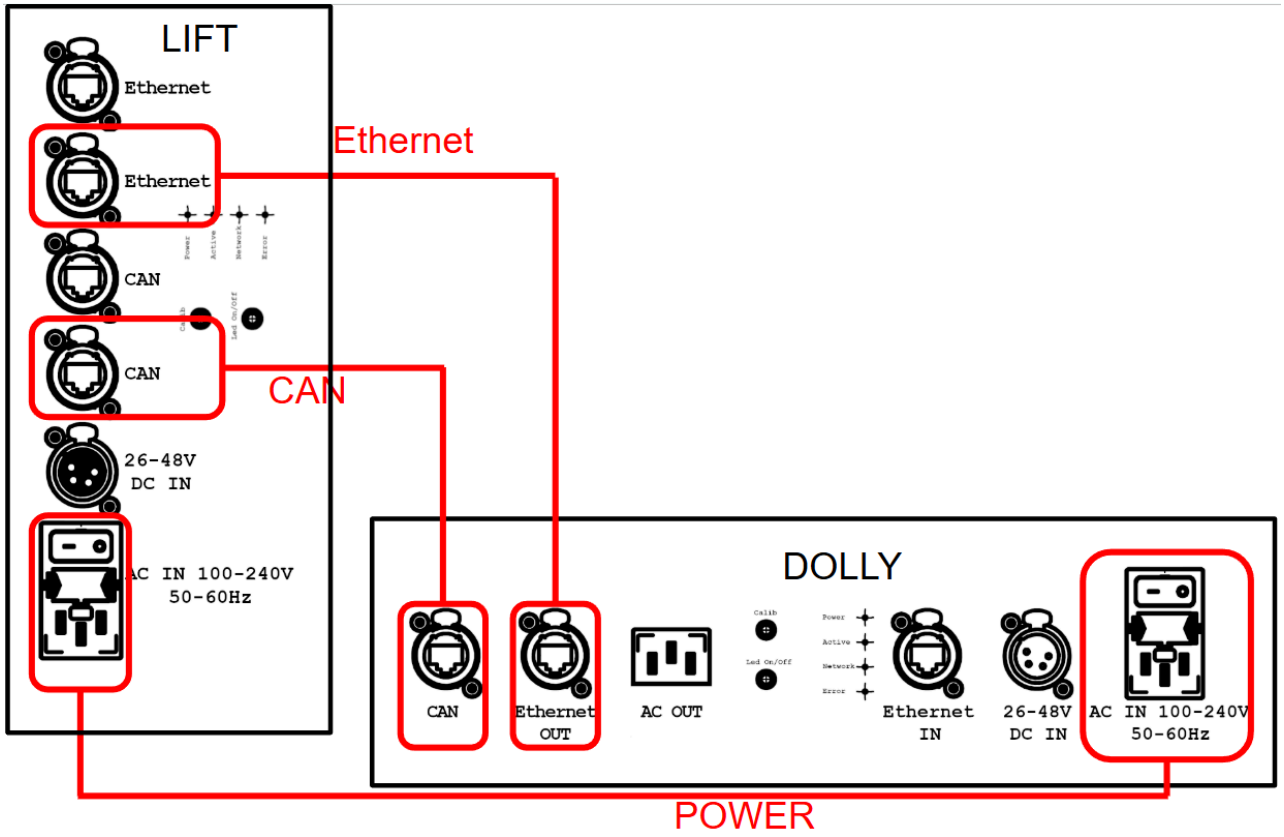

Figure 31: Move dolly and Raise lift cabling

5.14. Mounting Pauli PT Head on the Raise Lift

In order to mount the Pauli PT head on the Raise lift it is first necessary to connect the lift mounting plate to the bottom of the head using provided M5 screws as shown in *Figure 32* below.

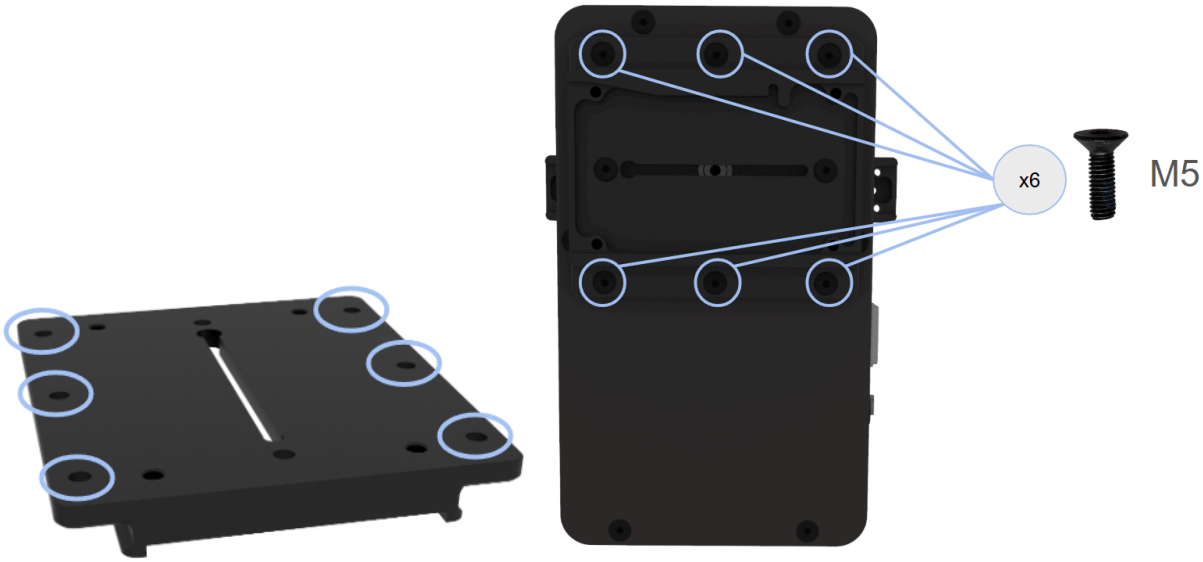

Figure 32: Mounting Pauli PT Head on the Raise lift rail

After the mounting plate is secured it can be slided on the lift claw by sliding it and at the same time pressing the safety pin on the lift mechanism as shown in *Figure 33* below. Note that the safety pin must be on the side of the mounting plate that is circled in order to properly work.

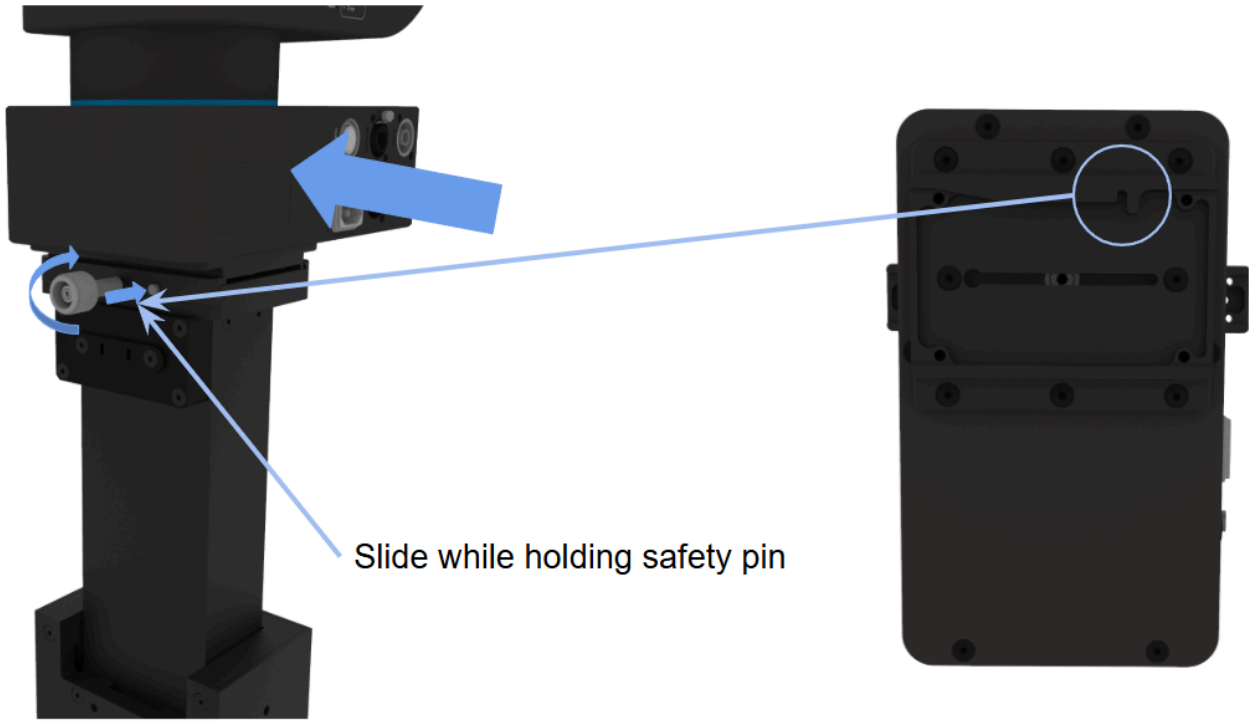

Figure 33: Mounting and securing Pauli PT Head on the Raise lift

5.15. Cabling between Pauli PT Head and Raise Lift

After Pauli PT Head is placed atop of the Raise lift it can be connected with provided cables. Cables needed for the connection between Raise lift and Pauli PT Head are 1x Male/Female AC cable, 1x CAT6+ Ethernet cable, 1x CAT6+ Ethernet cable for CAN connection, as seen in *Figure 34* below.

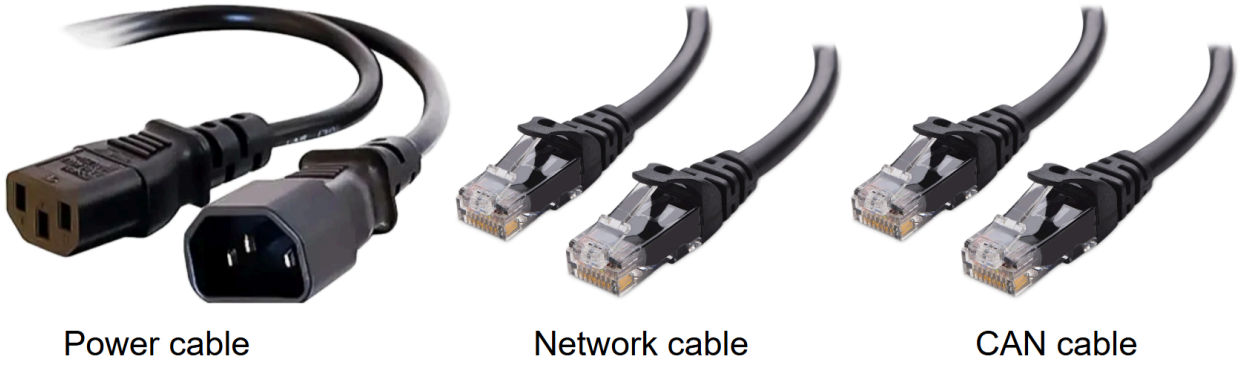

Figure 34: Cables for connecting Raise lift and Pauli PT Head

AC Power cable should be plugged in AC OUT socket on the lift and AC IN socket on the Pauli PT Head.First ethernet cable for network should be connected to the free Ethernet socket on the lift and Network socket on the Pauli PT Head. Second ethernet cable used for CAN connection should be connected to the CAN socket on the lift and CAN socket on the Pauli PT Head.

With that connection between the lift and Pauli PT Head is finished. This is all represented in the scheme on *Figure 35*.

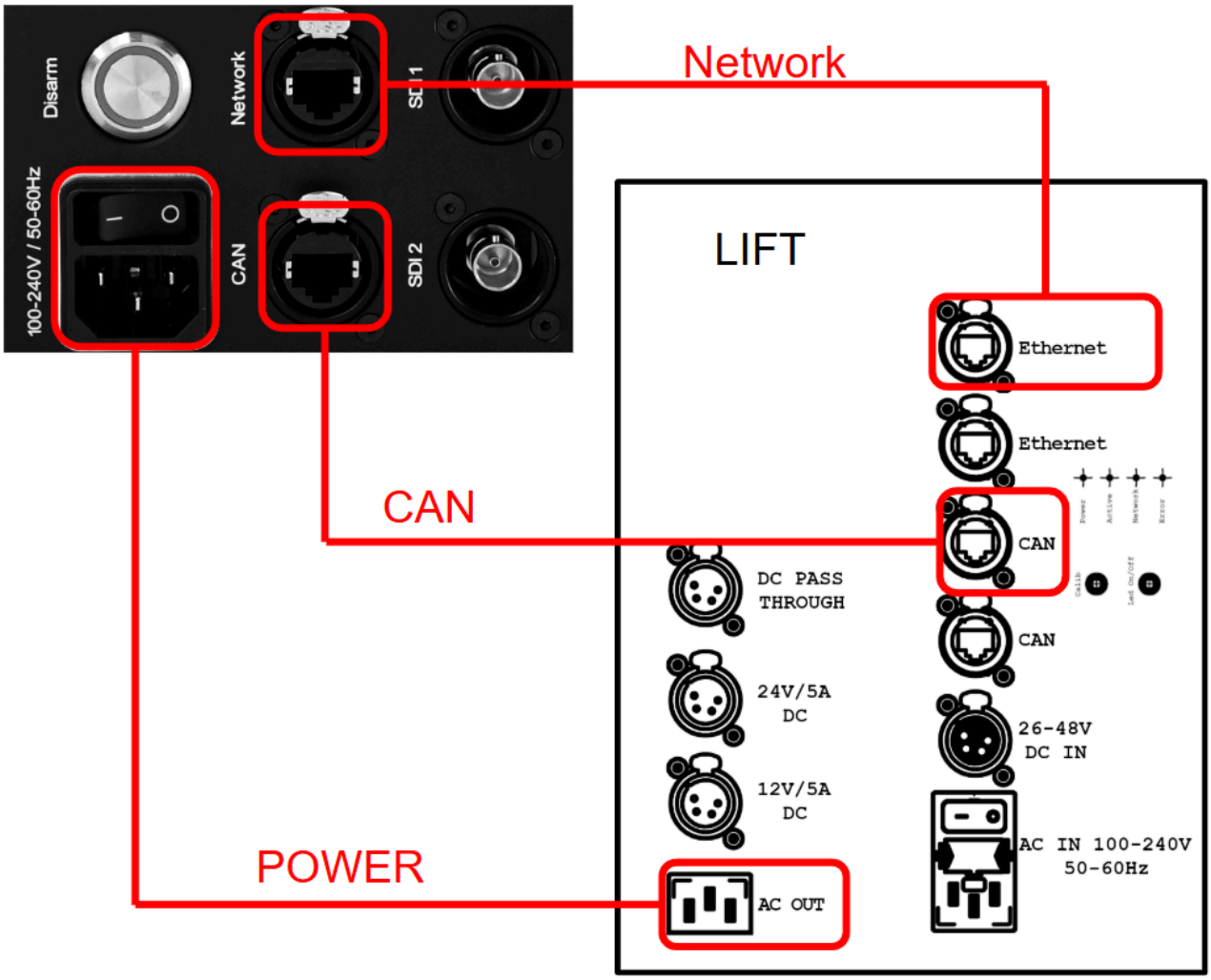

Figure 35: Raise lift and Pauli PT Head cabling

Cables needed for the connection between Raise lift and Pauli B PT Head are 1x Male/Female DC XLR cable, 1x CAT6+ Ethernet cable, 1x CAT6+ Ethernet cable for CAN connection, as seen in *Figure 36* below.

Figure 36: Cables for connecting Raise lift and Pauli B PT Head

DC XLR Power cable should be plugged in the 12V/5A DC socket on the lift and 12V/5A DC socket on the Pauli B PT Head.First ethernet cable for network should be connected to the free Ethernet socket on the lift and Network socket on the Pauli B PT Head. Second ethernet cable used for CAN connection should be connected to the CAN socket on the lift and CAN socket on the Pauli B PT Head.

With that connection between the lift and Pauli PT Head is finished. This is all represented in the scheme on *Figure 37*.

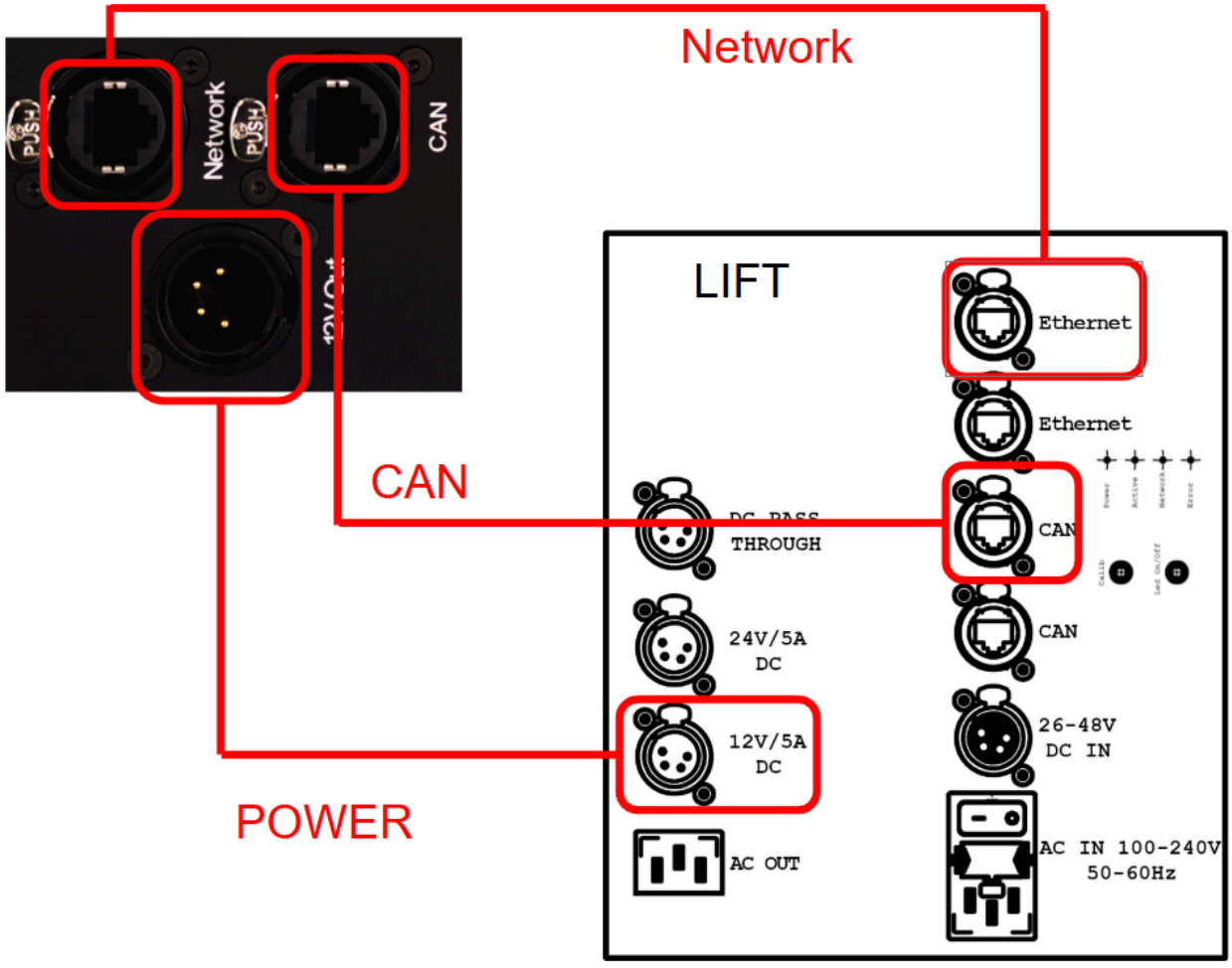

Figure 37: Raise lift and Pauli B PT Head cabling

5.16. General cabling recommendations and good practices

In this section we are going to go through the recommendations for cables and cabling.

- Always use cables provided with your device if not instructed otherwise.
- If you want to use the cables that you own or that you want to assemble by yourself, always contact us in order to receive instructions or recommendations / specifications from us.
- Cable length should be always with some extra length because of the movements.
- Cables must not stick to any part of the devices and by that block the movement of the device itself. Check the full range of motion a couple of times in order to check if any cable can stick somewhere.
- It is good where applicable that cables are located within flexible cable wiring snakeskin or managed by something similar.
-

In the following scheme in Figure 38 we are going to show one example of the cabling variation between Move dolly Raise lift and Pauli head. This variation is field tested. In this variation Pauli PT head is master and lift and dolly are slaves. Inter-device cables are shown in red color and those are only CAN cables and Power supply cables between devices. Cables that are coming externally are marked with green color and must include at least Power supply (which goes in the Move dolly socket) and Network cable which goes to the Pauli PT Head directly. Beside those two cables alongside them are usually attached video cables that go either to the Pauli PT Head base SDI slots or directly to the camera which is mounted on top of the Pauli head.

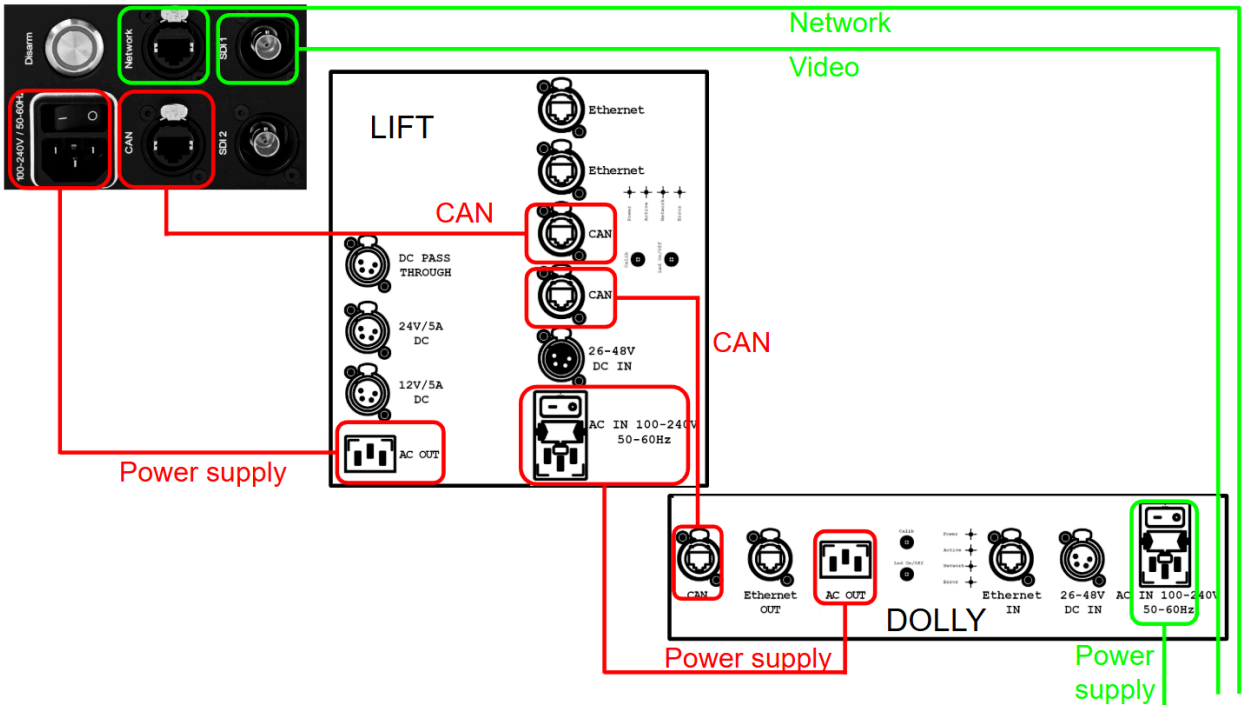

Figure 38: Cabling recommendation for the full system

Regarding management of the external cables that are coming to the Move dolly, those cables often need anchoring points on the flor where the cables will be fixed. Make sure that the anchoring point is sufficiently moved away from the rails so the cables don't tangle below the rails and that a sufficient amount of cables are left for either side of the anchoring point. Usually it is best for the anchoring point to be somewhere in the middle of the track length. Below in *Figures 39 and 40* we can see the respective anchoring points for the straight rail track and for the curved rail track. For the curved rail it is important that the cables are located and fixed on the inside of the curve. Also keep note that the red arrow is marking the side of the dolly from where cables are going out. Always orient the dolly to the correct direction so the cables could move freely.

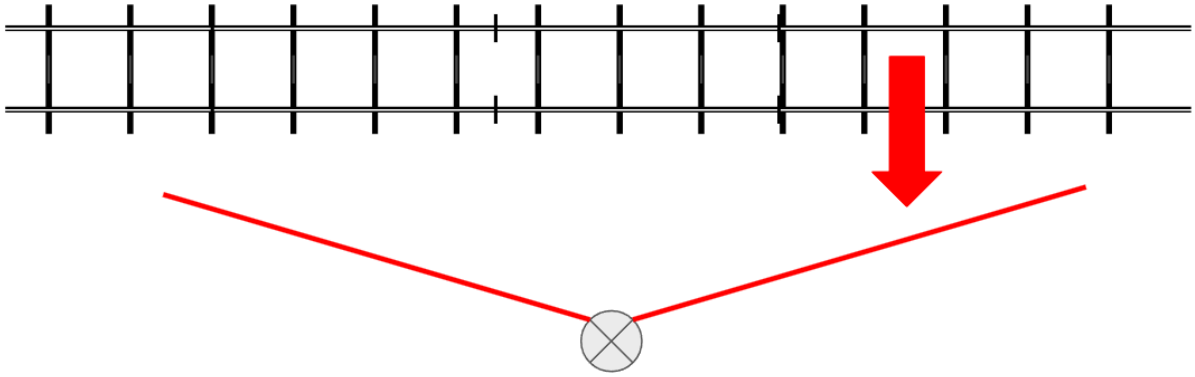

Figure 39: Recommended cable anchor point for the case of the straight rails

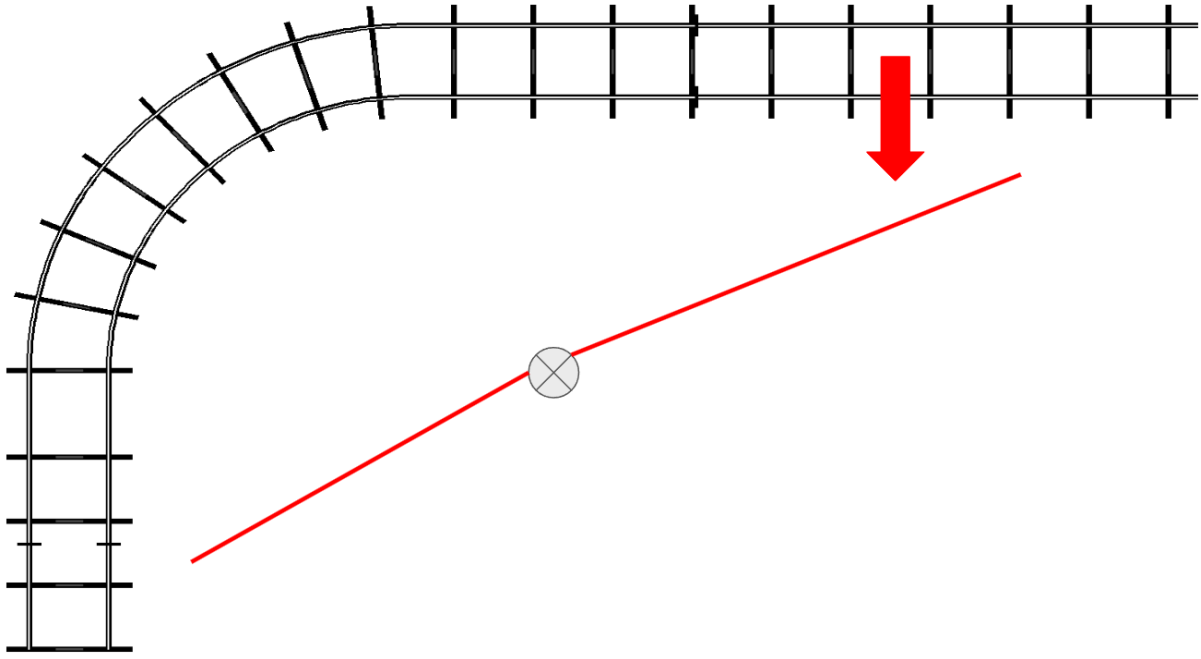

Figure 40: Recommended cable anchor point for the case of the curved rails

5.17. Manual track check

After all setup procedures are done, the first thing to do before powering on the system is to manually move the dolly by hand from one side to the other in order to do the final check of the track and everything. Make sure that the dolly is turned off and do it slowly in order to react if something is not placed correctly or the dolly hits or catches something. With great care pass over calibration indicators and check if they are placed correctly. If everything looks fine and there isn't anything suspicious, the system is ready for powering on and usage.

5.18. Powering on the Move dolly

After assuring that everything is looking good after manual track check the Move dolly can be turned on. Before turning on the main power switch on the dolly itself please make sure that if you have Pauli PT Head and / or Raise lift also installed on the dolly that their respective power switches shown in *Figure 41* below are also turned on.

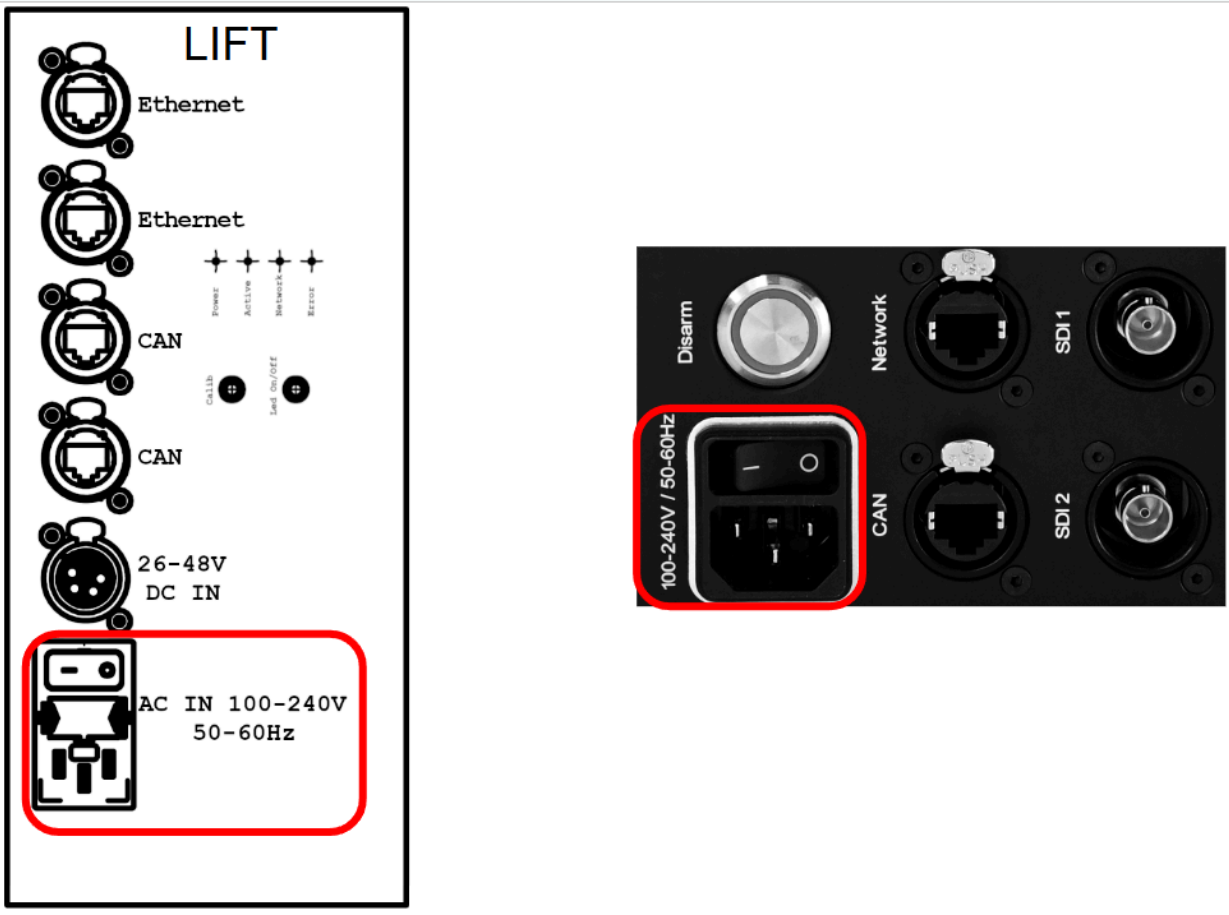

Figure 41: Raise Lift and Pauli PT Head power switches

If all that is necessary is done we can turn on the main power switch on the Move dolly.

5.19. Dolly calibration

In order to be used, the dolly first needs to be calibrated, this can be done by following the manual for RoboProd control software or RoboStick joystick and running calibration for the dolly. During calibration dolly moves to one side of the rails, detects the calibration indicator on that end and then moves to the other side where it detects the curve indicator and other end calibration indicator.

5.20. Using the dolly

Move dolly in any setup as we said at the beginning can be used with the RoboProd software or RoboStick joystick controller. Please refer to their respective manuals for details on calibration, making presets, traces and driving the dolly.