liniLED®

Handrail manual
liniLED® Handrail 48.3

CE | F | RoHS | IP40 | IP65 | IK10 | III | AISI 316L | UV RESISTANT | FROST RESISTANT | CLEANING AGENTS RESISTANT |

liniLED®

Handrail 48.3

reddot award 2015
winner

liniLED®

General

Read the instructions and safety precautions before installation, usage and storage of the products to secure safety of the user and reliability of the product.

- Hand over the instructions to the end-user and those responsible for installation and usage.
- Triolight BV cannot be held responsible for improper handling, product installation, usage or storage.

Handling

- Handle with care.
- The product may not be modified or converted otherwise than prescribed.
- Products are transported in proper packaging. Products should remain packed until installation.
- Take ESD (Electrostatic Discharge) protection measures when handling liniLED® products.
- The products and their components may not be exposed to mechanical, static loads and other tension/compression other than from the product itself.

Installation

- Attention: The power has to be switched off the main power supply or the connection before installation. Not doing so may damage the product.
- Installation has to be done by a professional with knowledge of electrical circuits or a specialised maintenance person known with valid directives.
- General and local construction-, safety- and installation regulations should be respected.
- Use only supplied parts, accessories and required tools as prescribed in the installation manual to guarantee a safe installation and use of the product.
- Products may solely be installed in the areas according to their prescribed IP-rating, IK-rating, temperature range and chemical resistances.
- Do not install the product in the following cases:
    - Damage is visible on the product or its cables
    - The inside of the product is moistened or dirty
    - The product or its cables have been modified. It could lead to an electrical shock or a short circuit may occur.

Operation and use

Solely use the product when its working correctly. If not, switch the power off immediately and advise an electrical specialist in the following cases:

  - Damage is visible on the product
  - The product does not function
  - Smoke or steam rises from the product
  - Crackling sounds are noticeable
  - The product is overheating

- Repairs on the installation may only be performed by qualified electricians.
- Product repairs may solely be done by Triolight BV.
- Use a suitable LED power supply / driver: 24 V DC constant voltage.
- Do not drive the product on other voltages than described in their datasheet/products specifications.
- Do not fasten anything on the product, same applies for hanging.
- Children may not play unsupervised with electrical products as they cannot judge the dangers in dealing with electrical circuits correctly.

Cleaning and maintenance

- **Attention**: Disconnect the power before maintenance and cleaning.
- Dust and dirt accumulated over time should be removed from the light-emitting surface to assure optimal functioning of the product.
- Paints, solvents and corrosive cleaning chemicals may not contact and thus affect the product.

Environment and waste

- Exterior decorative lighting should only be used after sunset.
- This product may not be treated as household waste. Dispose of the material through the waste recycling of electrical and electronic equipment.

Warning

This product comes with a 2 year warranty.

Warranty void if:
1. The installation guide has not been consulted (installation mistake).
2. The installation is not done by a certified installer.
3. Local rules and guidelines are not respected.
4. The invoice cannot be shown and/or has been altered.
5. Damage is caused by negligence, abnormal use or improper handling, use, maintenance and/or cleaning of the product.

This product is intended for professional use only! This product must be installed by a qualified and certified installer according to local rules and guidelines. Triolight BV cannot be held liable for (consequential) damage and/or injuries due to unintended use and/or installation errors.

Product information

The liniLED® Handrail is a revolutionairy LED based handrail system that provides continuous functional lighting for a safe indoor and outdoor environment. The liniLED® Handrail can be wall mounted or post mounted. By integrating the liniLED® Top LED strips (24 V DC) in the stainless steel liniLED® Handrail, the product is ideal for high- end indoor and outdoor projects in various sectors, such as: architecture, infrastructure, construction, health and entertainment industry. The liniLED® Handrail has the same light benefits as a LED fixture: energy efficient with an expected lifetime of more than 50.000 hours.

Technical specifications

Dimensions handrail:	Ø48.3 mm
Material handrail & baluster:	AISI 316L
Material brackets:	AISI 316
Material Profile in the handrail:	Aluminium 6060-T6
Power Supply:	24 V DC
Water resistance LED strip:	IP40 ('Normal' indoor situation)
	IP65 (Outdoor situation or non corrosion resistant environment)
Accessories:	Several accessories (See Datasheets)
Note:	The round 48.3 mm handrail is recommended for outdoor projects and can be used with the liniLED® Side LED strip.

	IP40	IP65
liniLED® Top LED strip Mono	X	X
liniLED® Top LED strip TW & RGB	X	
liniLED® Side LED strip Mono	X	
liniLED® Side LED strip TW & RGB	X	

Product specifications

The maximum unit length of the handrail is 6 metres and can easily be connected mechanically or by welding. All handrails can be applied indoor and outdoor. However, the round 48.3 mm handrail is recommended for outdoor projects.

liniLED®

Product specifications LED strips

The high-quality, flexible liniLED® Top LED strips are fully integrated into the stainless steel handrail. With a unique co-extrusion technology, all the liniLED® Top LED strips realise an optimal light output (24 V DC). The LED strips are available several colours. Only use the liniLED® Side LED strips in combination with the liniLED® Handrail 48.3.

liniLED® Top Deco LED strips

Colour	V DC	W/m	lm/m	Max. Length
2400K	24	1.1	90	20 m
2700K	24	1.1	106	20 m
3000K	24	3.3	102	20 m
4000K	24	1.1	113	20 m
6500K	24	2.2	113	20 m
Red	24	4.4	55	20 m
Green	24	2.5	106	20 m
Blue	24	1.7	23	20 m
Amber	24	4.4	47	20 m

liniLED® Top Power LED strips

Colour	V DC	W/m	lm/m	Max. Length
2400K	24	4.5	381	10 m
2700K	24	4.6	415	10 m
3000K	24	4.3	381	10 m
4000K	24	4.1	411	10 m
6500K	24	4.1	426	10 m
Red	24	8.3	102	10 m
Green	24	4.9	153	10 m
Blue	24	7.2	68	10 m
Amber	24	8.3	94	10 m

liniLED® Top High Power LED strips

| Colour	V DC	W/m	lm/m	Max. Length
2400K	24	8.9	623	10 m
2700K	24	8.9	703	10 m
3000K	24	8.3	617	10 m
4000K	24	8.6	711	10 m
6500K	24	8.6	693	10 m

liniLED® Top Photon 1200 LED strips

Colour	V DC	W/m	lm/m	Max. Length
2000K	24	10.6	811	9 m
2400K	24	10.6	958	9 m
2700K	24	8.9	997	9 m
3000K	24	8.9	1023	9 m
4000K	24	8.1	1008	9 m
6500K	24	8.1	1003	9 m

liniLED® Top Tunable White LED 1200 strips

| Colour	V DC	W/m	lm/m	Max. Length
2700K/6500K	24	10.5	838	9 m

liniLED® Top RGB 160/240 LED strips

| Colour	V DC	W/m	lm/m	Max. Length
RGB 160	24	4.8	139	10 m
RGB 240	24	7.2	209	5 m
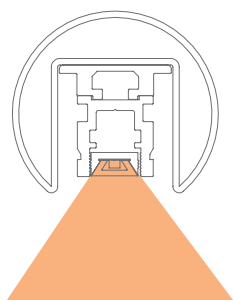
12100
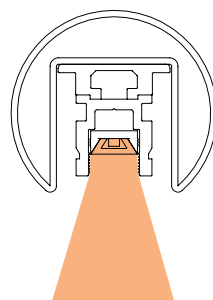
12134
For a complete Diffuse appearance use the liniLED® High Power LED strip in combination with the Handrail (12134) and a Diffuse Cover (12124)

liniLED® Side Deco LED strips

Colour	V DC	W/m	lm/m	Max. Length
2400K	24	1.1	81	20 m
2700K	24	1.1	84	20 m
3000K	24	3.3	91	20 m
4000K	24	1.1	92	20 m
6500K	24	2.2	93	20 m
Red	24	4.4	46	20 m
Green	24	2.5	88	20 m
Blue	24	1.7	19	20 m
Amber	24	4.4	39	20 m

liniLED® Side Power LED strips

Colour	V DC	W/m	lm/m	Max. Length
2400K	24	4.5	316	10 m
2700K	24	4.6	320	10 m
3000K	24	4.3	290	10 m
4000K	24	4.1	324	10 m
6500K	24	4.1	298	10 m
Red	24	8.3	84	10 m
Green	24	4.9	126	10 m
Blue	24	7.2	56	10 m
Amber	24	8.3	77	10 m

liniLED® Side High Power LED strips

Colour	V DC	W/m	lm/m	Max. Length
2400K	24	8.9	499	10 m
2700K	24	8.9	546	10 m
3000K	24	8.3	505	10 m
4000K	24	8.6	557	10 m
6500K	24	8.6	559	10 m

liniLED® Side Photon 1200 LED strips

Colour	V DC	W/m	lm/m	Max. Length
2000K	24	10.6	697	9 m
2400K	24	10.6	799	9 m
2700K	24	8.9	827	9 m
3000K	24	8.9	836	9 m
4000K	24	8.1	831	9 m
6500K	24	8.1	830	9 m

liniLED® Side Tunable White 1200 LED strips

Colour	V DC	W/m	lm/m	Max. Length
2700K/6500K	24	10.5	681	9 m

liniLED® Side RGB 160/240 LED strips

Colour	V DC	W/m	lm/m	Max. Length
RGB 160	24	4.8	97	10 m
RGB 240	24	7.2	168	5 m
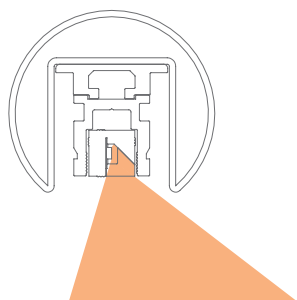
12134

Product dimensions
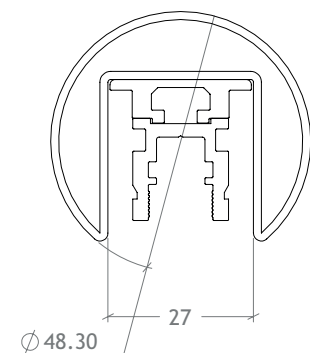
Dimensions liniLED® Handrail 48.3 mm

12100
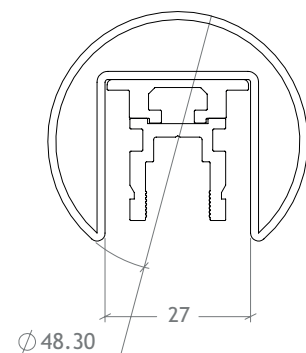
Dimensions liniLED® Handrail 48.3 mm

12134
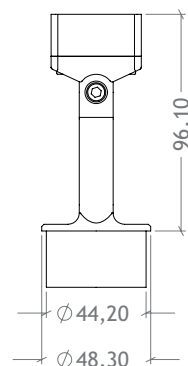
Dimensions liniLED® Handrail 48.3 mm

Balluster
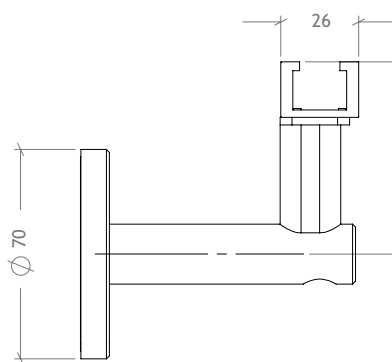
Dimensions liniLED® Handrail 48.3 mm

Wall Mounting
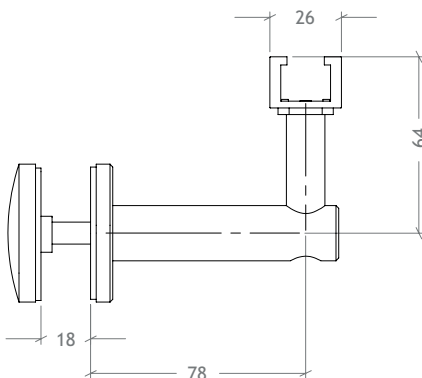
Dimensions liniLED® Handrail 48.3 mm

Glass Mounting

Required tools and products

Depending on the project, standard tools and metal working tools should be present at the location.
Make sure the following tools and products are present:

- Metal saw
- Grinding tool
- Metric Allen key 3, 4 and 5
- Torx 20 screwdriver
- Screwdriver nr. 2 and nr. 3
- Stripping tool
- Anaerobic adhesive suitable for stainless steel
- Degreaser
- Welding equipment (When performing welding on site)
- liniLED® Roller
- liniLED® Pliers

Installation

This chapter is described in the correct installation order: We advise you to follow this order.
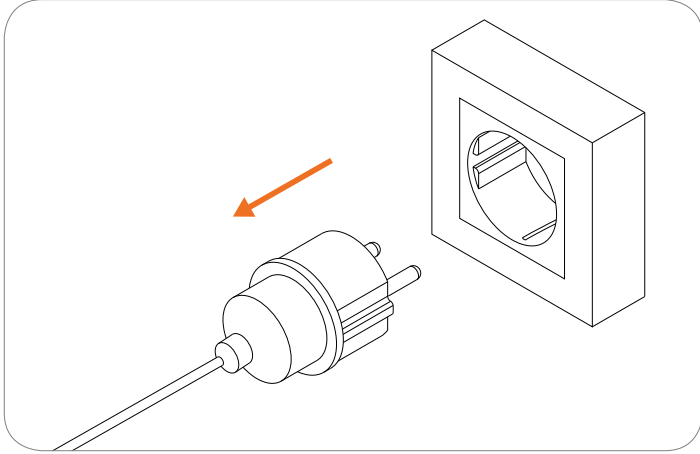
⚠ **Danger!** Turn off the power before starting the installation.

⚠ **All electricity points should supply 24 V DC!** Check if the power supplies are in the correct positions and if there are enough power supplies.*
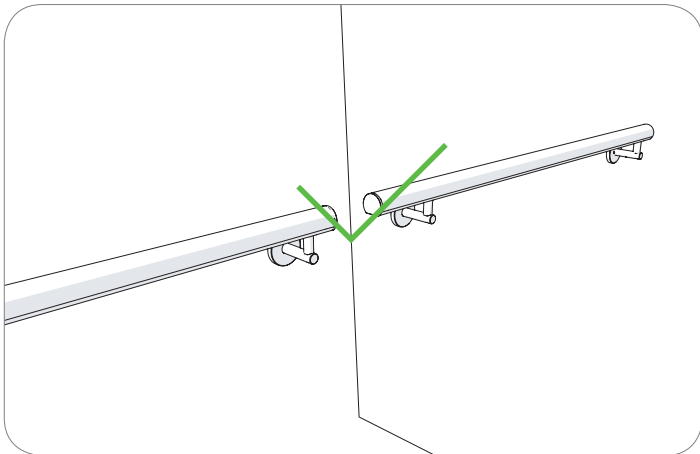
Right Construction
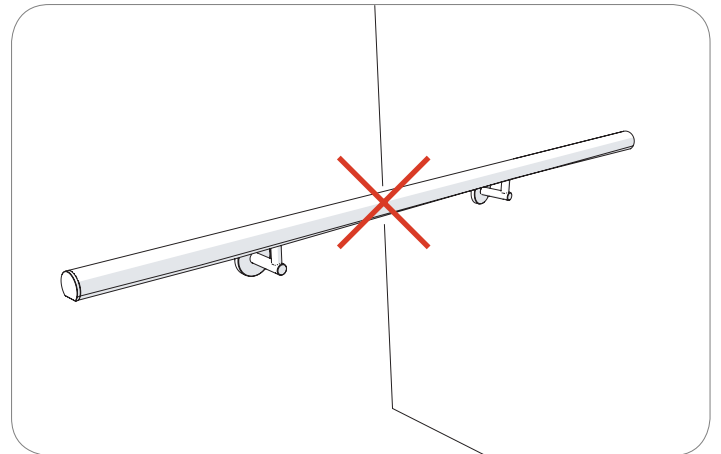
Wrong Construction

During the installation of long lengths, take into account the expansion joints of the constructions, buildings or surface on which or against the liniLED® Handrail is mounted. Determine whether there are expansion joints in the wall or floor. The handrail needs to end at an expansion joint, to prevent any pressure on the liniLED® LED strip and possible damage.

* Correct positions power supplies:

Deco:	Connector every 20 metres
Power:	Connector every 10 metres
High Power:	Connector every 10 metres
Photon 1200:	Connector every 9 metres
Tunable White:	Connector every 9 metres
RGB 160:	Connector every 10 metres
RGB 240:	Connector every 5 metres
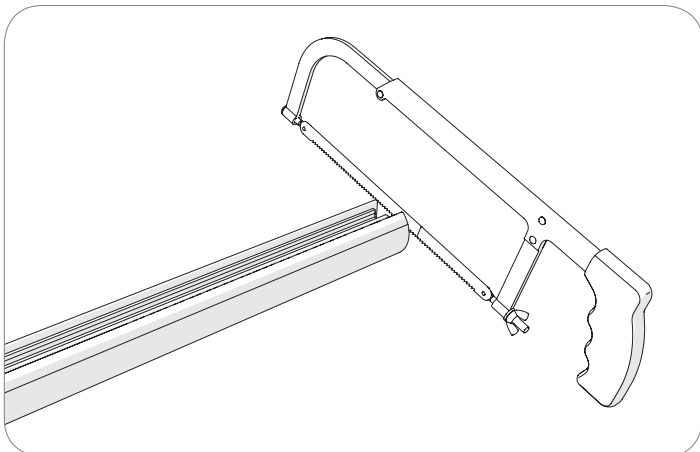
Cut the stainless steel handrail in the correct length

liniLED®

Installation 3 or more Handrails

Connecting 3 or more Handrails? Then you have to intermediate handrails. In case you don't need to connect intermediate handrails you can skip this installation pages. Go to page 11.
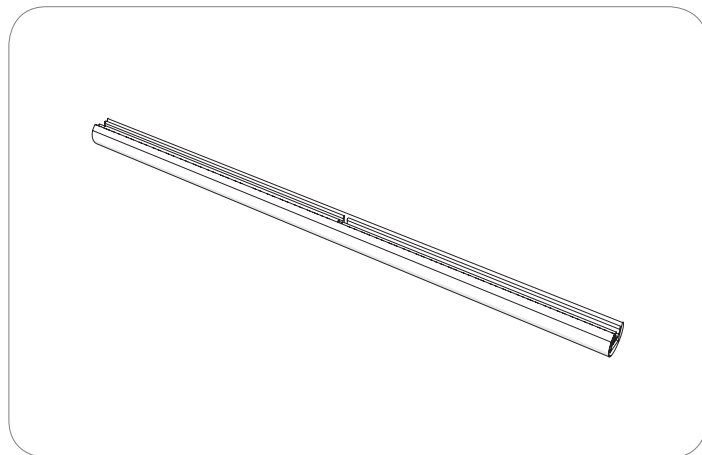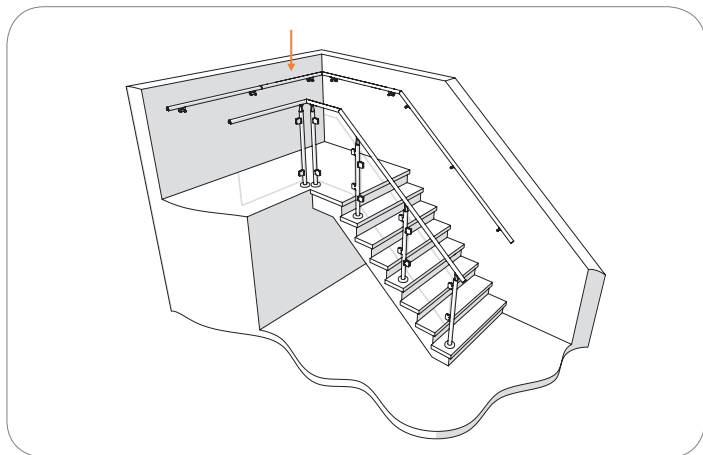
To be able to place the supports in the profile, you need to make space in the intermediate handrail. ⚠ *
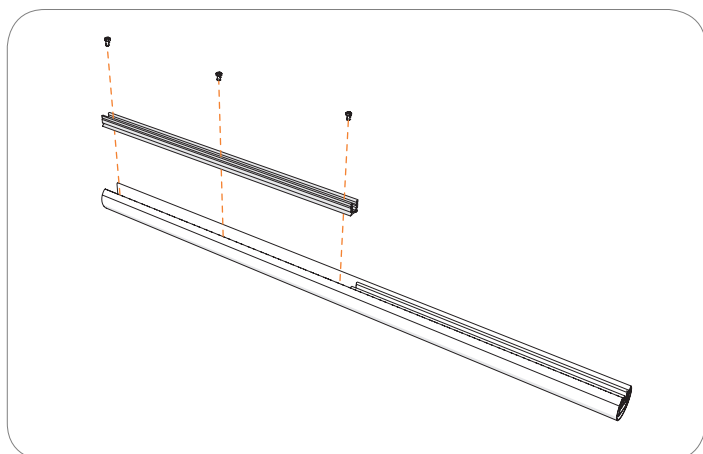
Disassemble one of the aluminium mounting profiles. To do this, unscrew all hex screws of the aluminium mounting profile and remove the aluminium mounting profile.
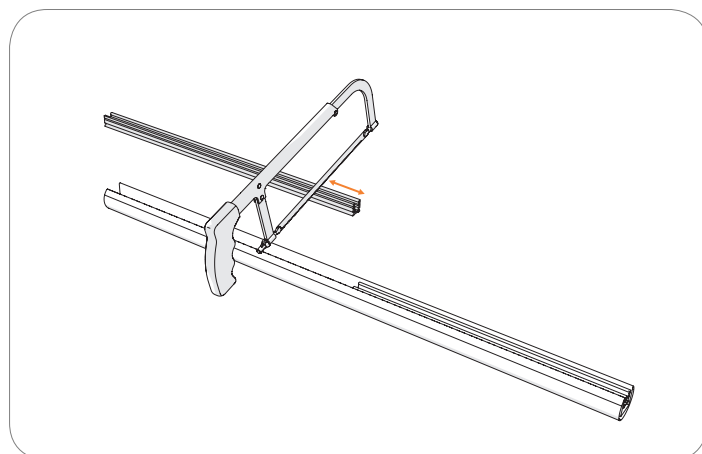
Cut a piece of 40 mm (+/- 1 mm) of the disassembled aluminium profile. This step is essential to create space to place the clamp of the stainless steel adapter. ⚠ *
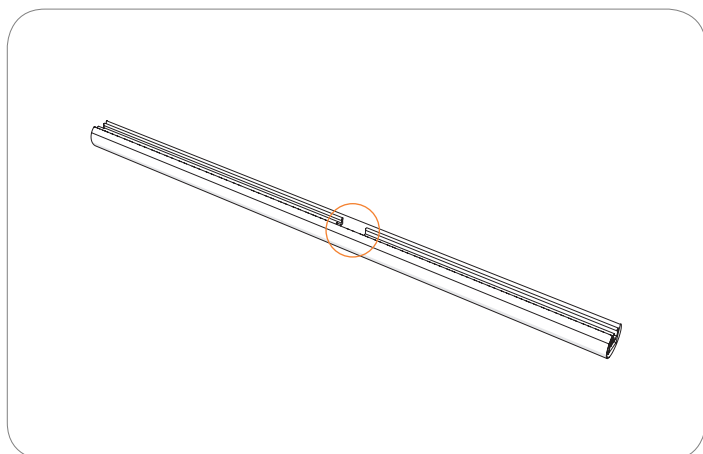
Place the aluminium mounting profile back on its original position and fasten with the hex screws. (40 mm)

⚠ Because the aluminium profile is missing on this position, it is not possible anymore to mount a wall support.

Connecting the Handrails

The Handrails can be connected in two ways, by gluing of by welding.

Gluing
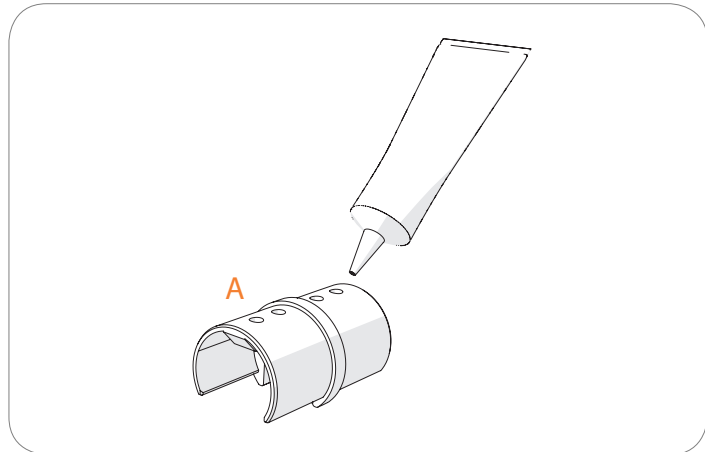
Degrease the contact surfaces (A). Apply the glue on the contact surface (A) of the coupler.
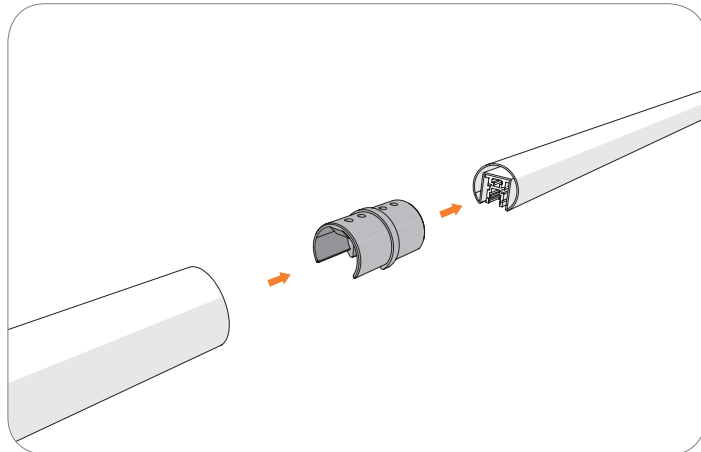
Place the coupler in the stainless steel handrail, which you would like to extend.
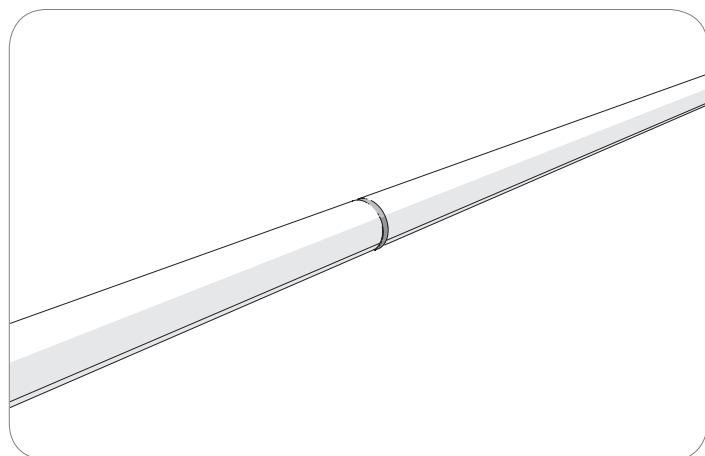
Slide the second handrail on the other side of the coupler.

Are there expansion joints present?

Yes   **Go to page 12**
No   **Go to page 13**

Use this step also after welding the coupler.

Welding
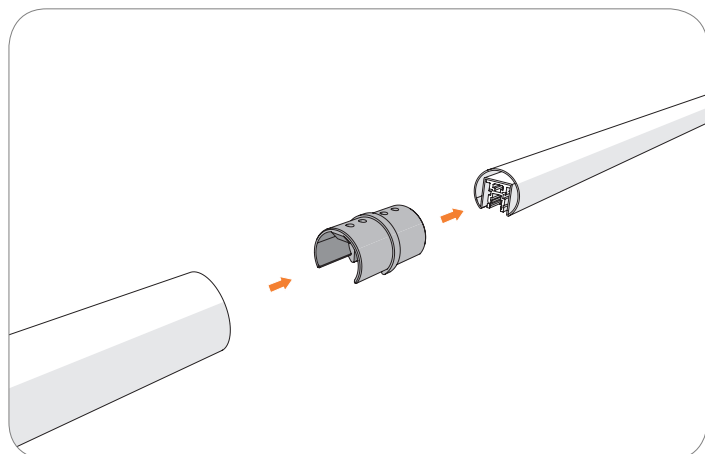
Place the aluminium mounting profile back on its original position and fasten with the hex screws. (40 mm)
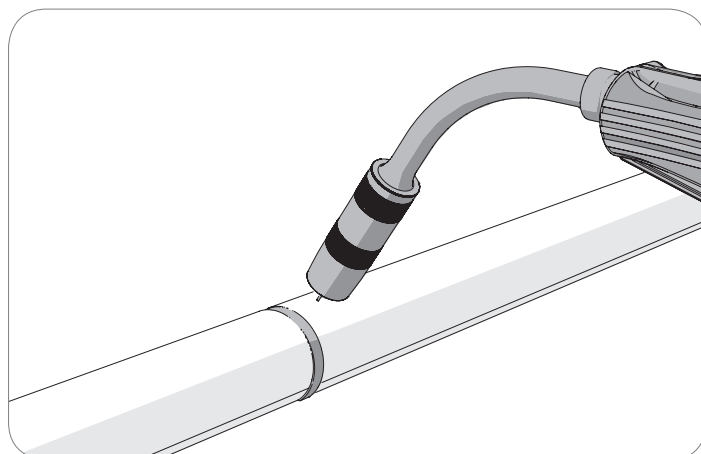
Slide the second handrail on the other side of the coupler.

Weld the parts together.

liniLED®

Expansion Joint

To prevent possible pressure and damage on the liniLED® LED strip, the handrail and LED Strip needs to end at an expansion joint. The handrail can end with a **coupler** (step 1 and 2) or with **end caps** (step 3). For more information about placing/interrupting the LED strip, see page 13.
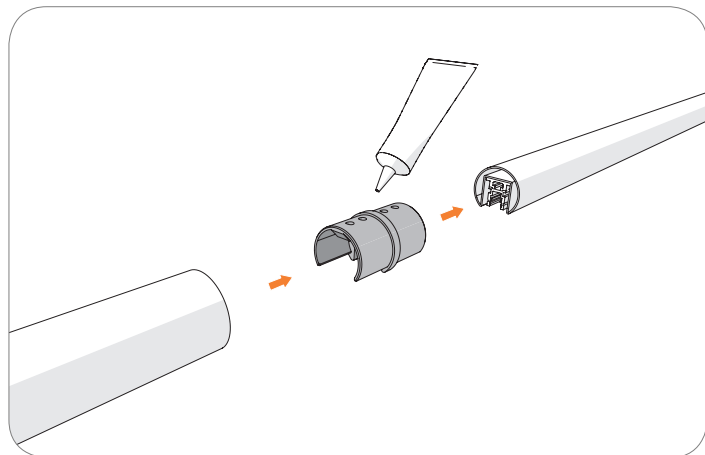
Apply the glue on one side of the coupler. Place the coupler between the two handrails.
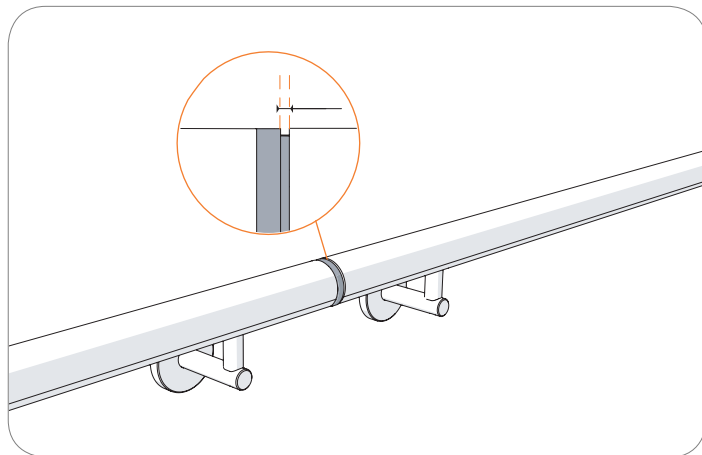
Make sure there is enough space between the handrail and the coupler, to deal with possible expansion and shrink by change in temperature of the construction.

⚠ Warning: The liniLED® LED strip and the liniLED® Cover do not go through, in each handrail profile comes a new LED strip and Cover.
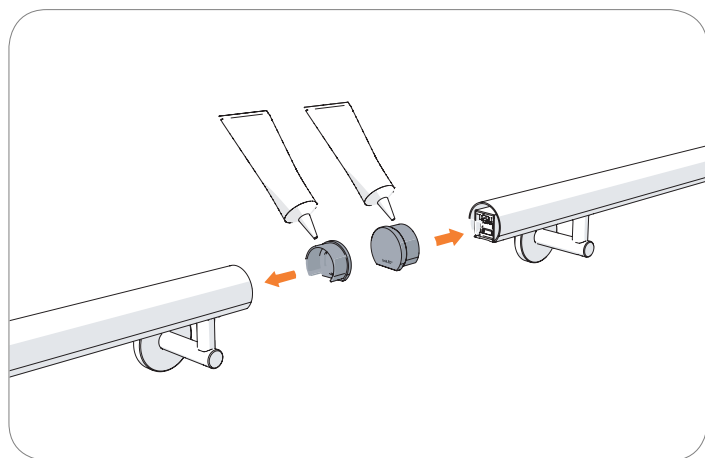
Place the end caps in the ends of the handrails.

⚠ **Temperature influences**
In case of large temperature fluctuations, expansion and retraction of the LED strip and covers should be taken into account. The expansion and contraction of the covers in the longitudinal direction of at least 5 mm at a   length of up to 1500 mm. Provide a clearance of 2.5 mm on both sides so this can be absorbed.

Cutting instructions LED strip

Determine where to cut the LED strip. This needs to be as close as possible before the end of the adapter or the end of the handrail. The LED strip cannot be cut at any position, but only at the specific cutting points. See the images for the correct cutting sections per type of the LED strips.
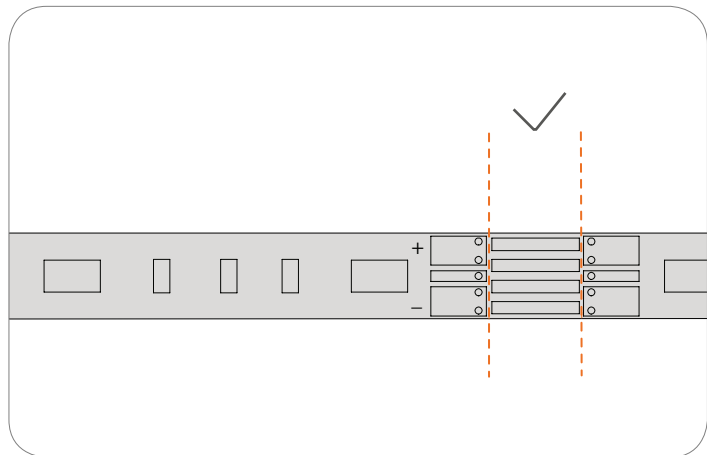
liniLED® Deco and Power White LED strip
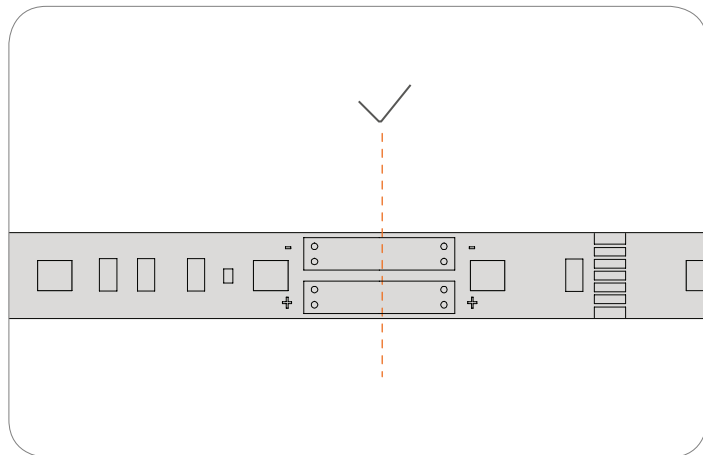
liniLED® Power Colour LED strip
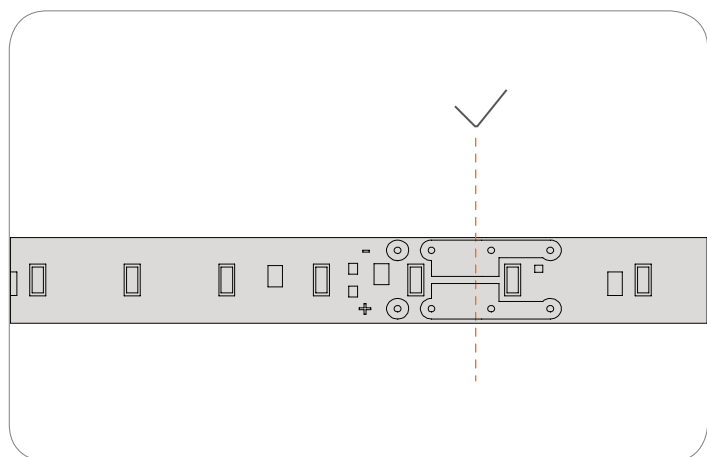
liniLED® High Power LED strip
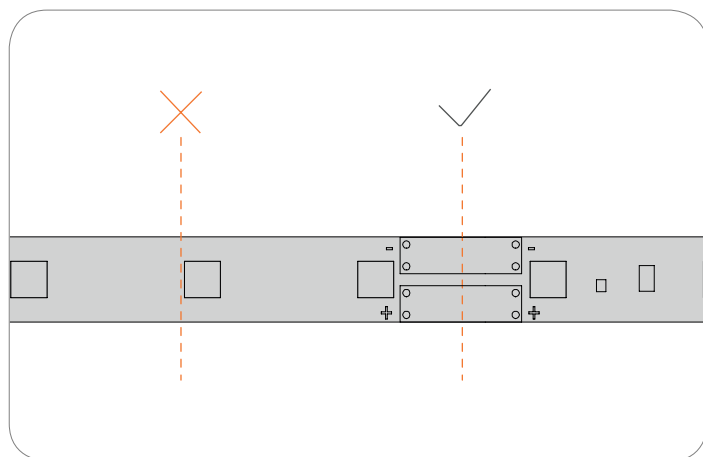
liniLED® Photon LED strip
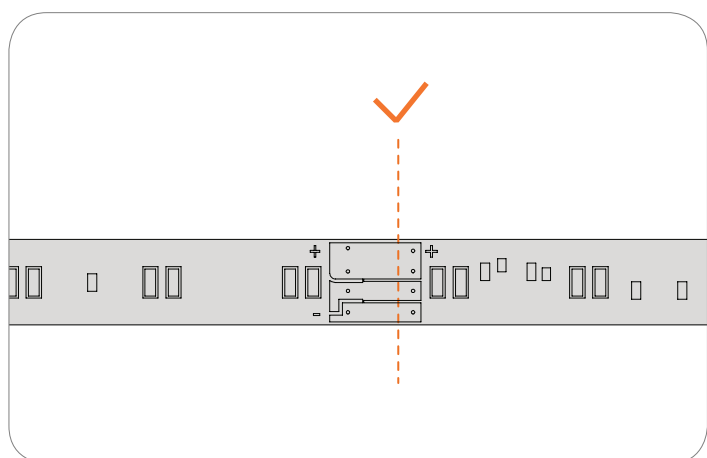
liniLED® Tunable White LED strip
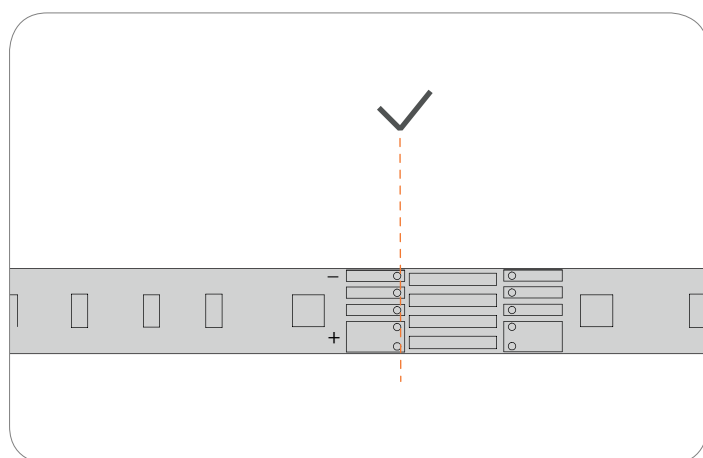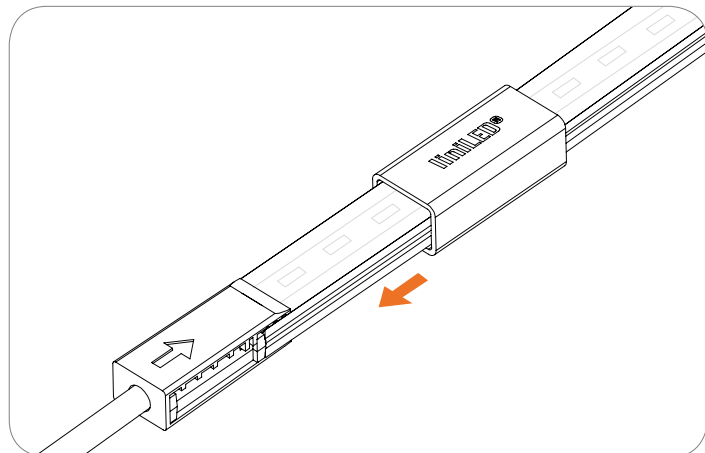

liniLED® RGB LED strip

liniLED®

Placing the liniLED® LED strips Indoor

Follow the steps below if the handrails need to be **glued** or **welded** and the liniLED® Handrail will be installed **indoor.**
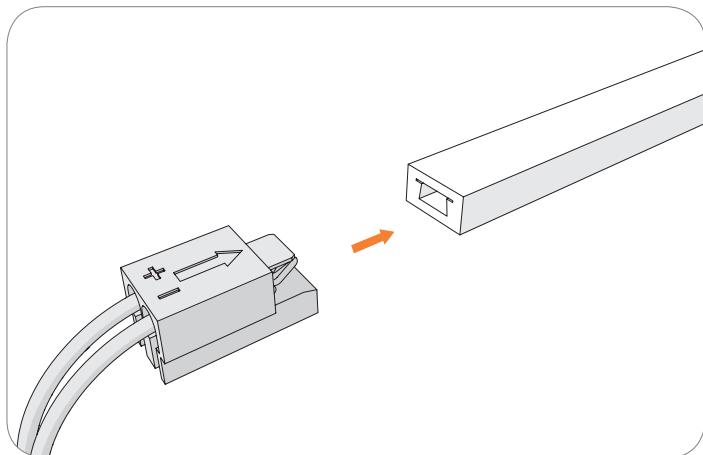
Gently insert the connector in the hollow chamber of the liniLED® Top LED strip.

⚠ The arrow on the connector needs to be placed in the same direction as the arrow on the liniLED® LED strip.
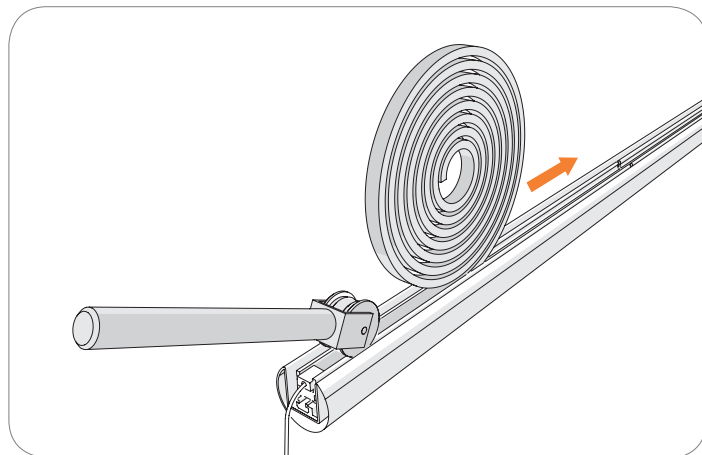
Gently push the liniLED® Top LED strip into the aluminium profile. Start from the position where you placed the connector. *

When reaching a **corner**, **adapter**, **expansion joint** or the **end of the handrail**, please follow procedure below:
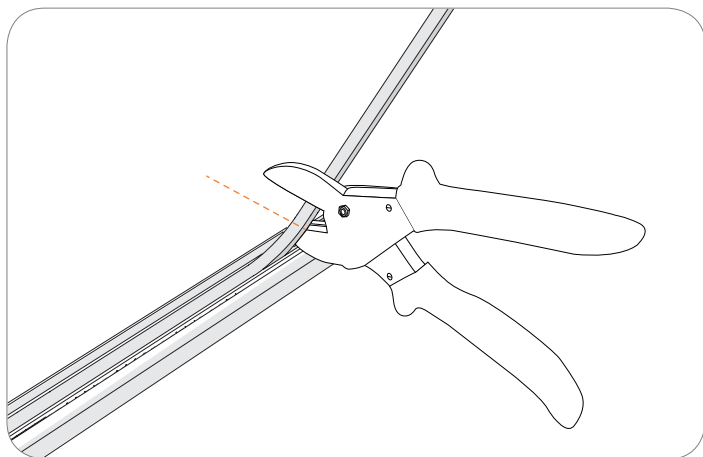
Cut the liniLED® Top LED strip. (The liniLED® LED strip cannot be cut at any position, but only at the specific cutting points, see **page 13** for the right instructions per LED strip)
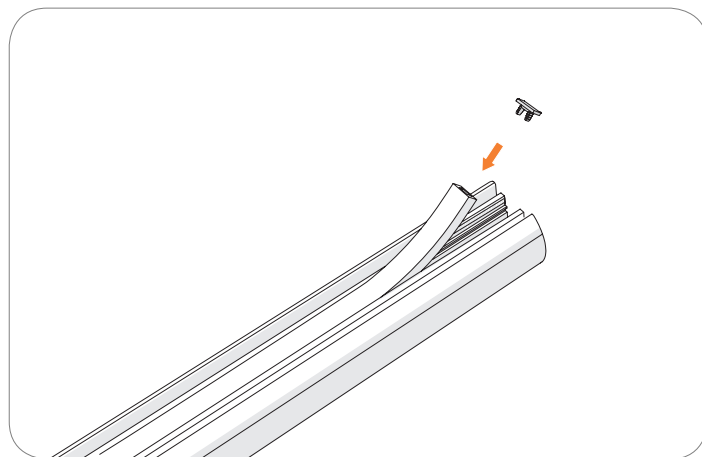
Place the end caps in the ends of the handrails and push the last part of the LED strip in the aluminium mounting profile.

* Maximum connection length:

Deco:	20 metres
Power:	10 metres
High Power:	10 metres
Photon 1200:	9 metres
Tunable White:	9 metres
RGB 160:	10 metres
RGB 240:	5 metres

Placing the liniLED® LED strips Indoor TW and RGB

Follow the steps below if the handrails need to be glued, the liniLED® Handrail will be installed indoor and if you use a Tunable White or RGB LED strip. ⚠ *For more information read the manual of the Top Connector Set TW or RGB.*
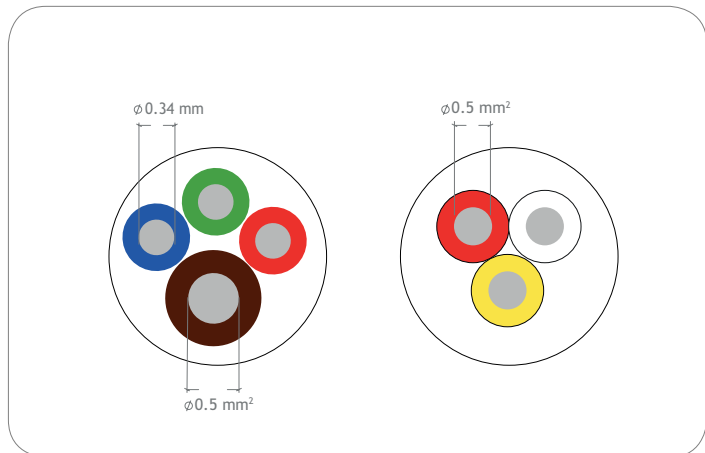
The liniLED® Tunable White and RGB LED strips can be used with the normal Connector Set.

Gently insert the connector in the hollow chamber of the liniLED® Top LED strip. ⚠ *See manual Top Connector Set TW or RGB*
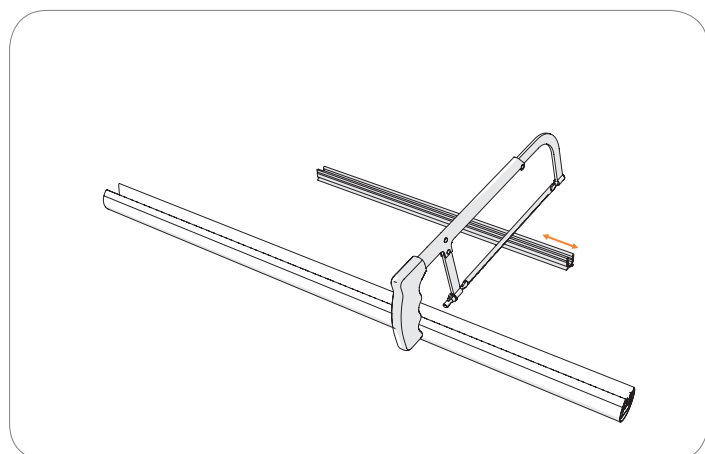
Cut 35 mm off the beginning of the aluminium mounting profile.
In case you want to add a wall support or ballusteradapter afterwards, execute the same steps as for an intermediate handrail.

Put the aluminium mounting profile back in position and tighten the hex screws. You have now created some space to install the IP65 housing.
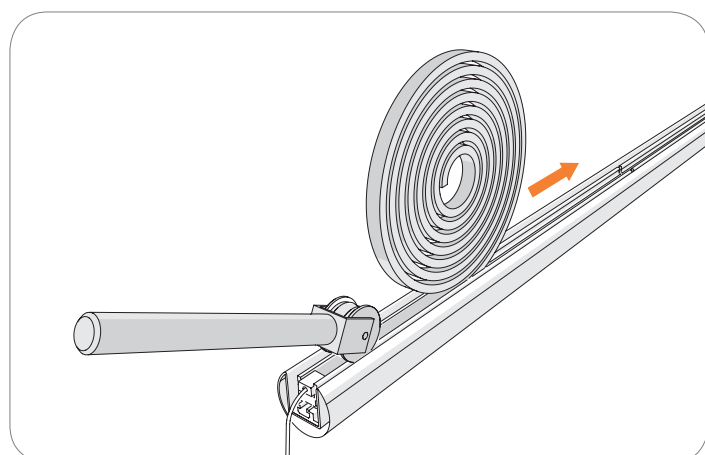
Gently push the liniLED® Top LED strip into the aluminium profile. Start from the position where you placed the connector. *
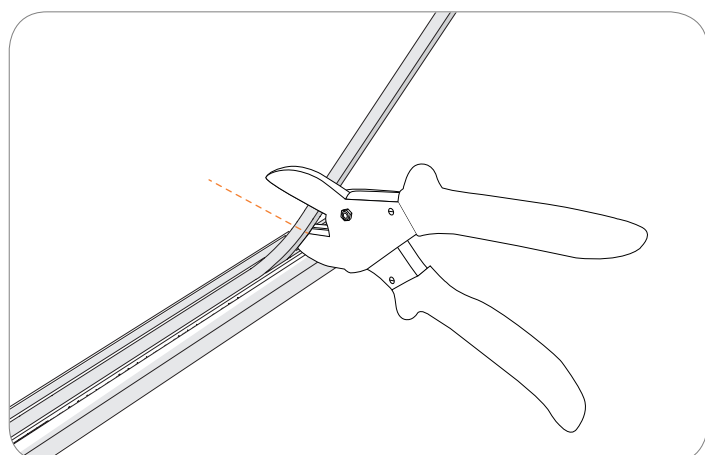
Cut the liniLED® Top LED strip. (The liniLED® LED strip cannot be cut at any position, but only at the specific cutting points, see **page 13** for the right instructions per LED strip) Place the End Cap at the end of the LED strip.

liniLED®
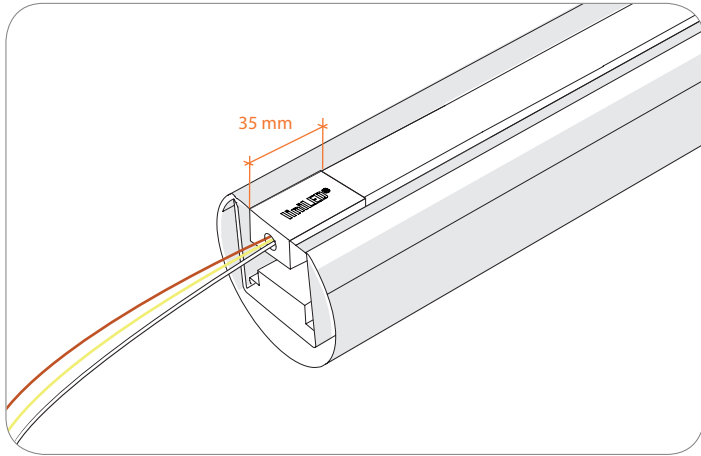
TW ledstrip: Remove 35mm from the aluminium profile to provide space for the connector in the Handrail. Next, strip the cables up to the connector.
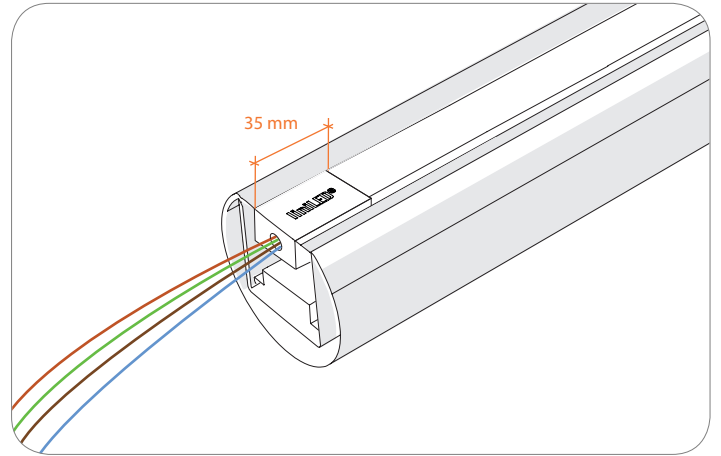
RGB ledstrip: Remove 35mm from the aluminium profile to provide space for the connector in the Handrail. Next, strip the cables up to the connector.
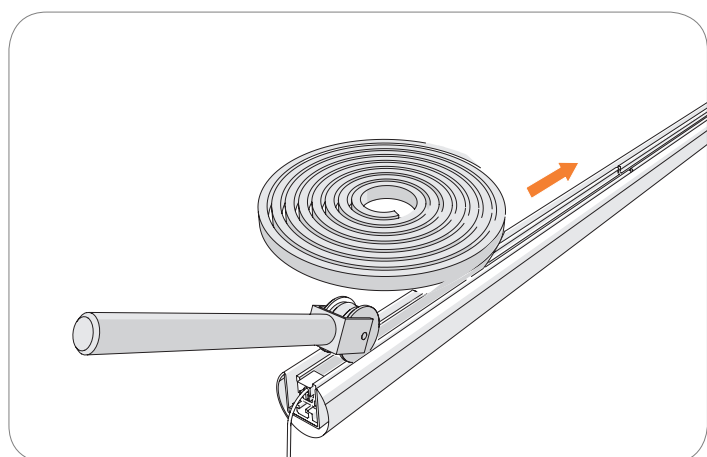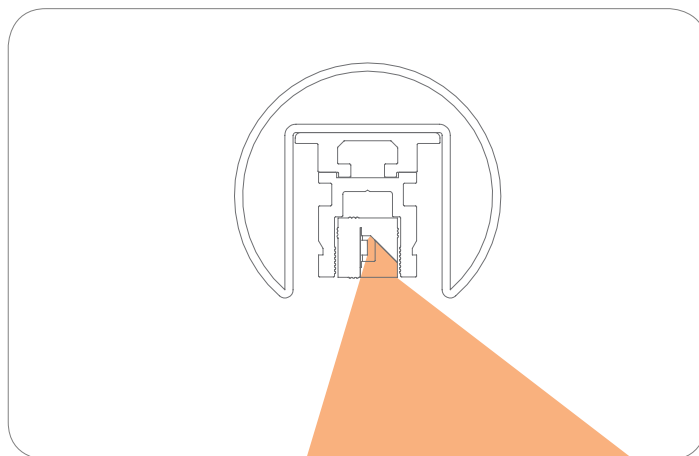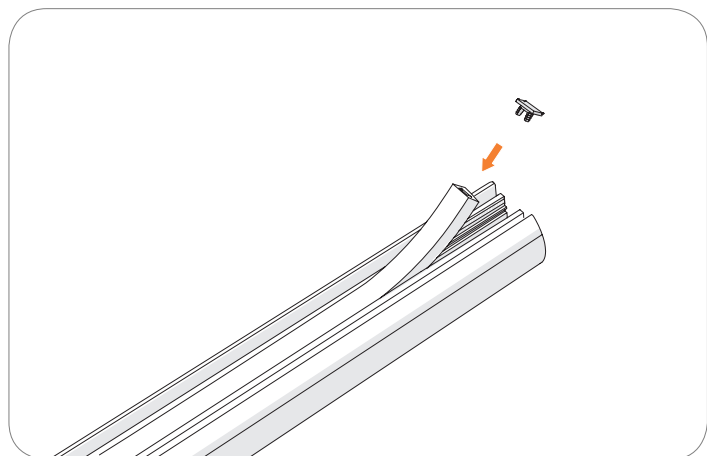
Follow the steps below if you use a liniLED® Side LED strip. The liniLED® Side LED strip. The liniLED® Handrail 48.3 is the only Handrail where you can use the liniLED® Side LED strips. ⚠ *For the right installtion read the manual of the Side Connector Set.*
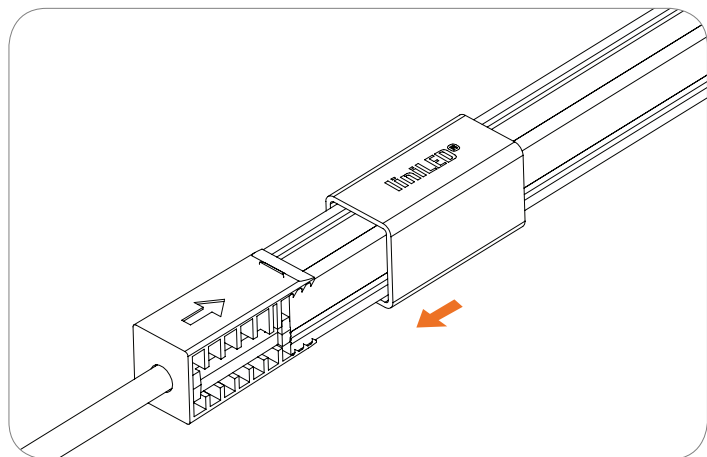
The liniLED® SIde LED strips has to be connected with the liniLED® Side Connector set.

Cut 35 mm off the beginning of the aluminium mounting profile. In case you want to add a wall support or ballusteradapter afterwards, execute the same steps as for an intermediate handrail.

Gently push the liniLED® Side LED strip into the aluminium profile. Start from the position where you placed the connector. *
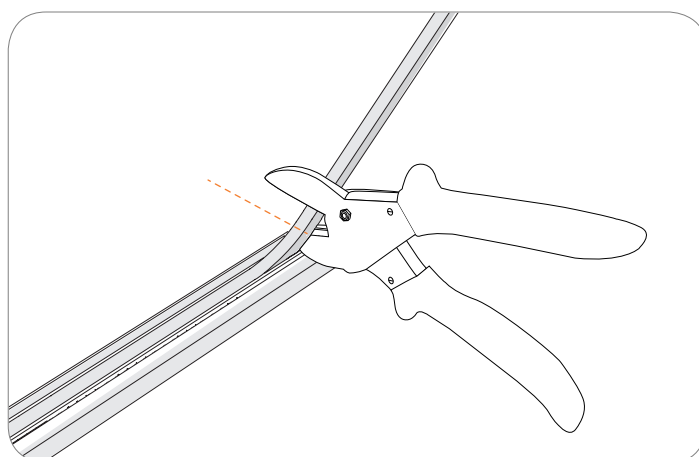
Cut the liniLED® Top LED strip. (The liniLED® LED strip cannot be cut at any position, but only at the specific cutting points, see **page 13** for the right instructions per LED strip) Place the End Cap at the end of the LED strip.

Make sure you place the liniLED® Side LED strip with the PCB above for the right light output. (Product code: 12134)

liniLED®

Follow the steps below if the handrails need to be **glued** or **welded** and the liniLED® Handrail will be installed **outdoor**. For this step you wil need two IP65 Connector sets.
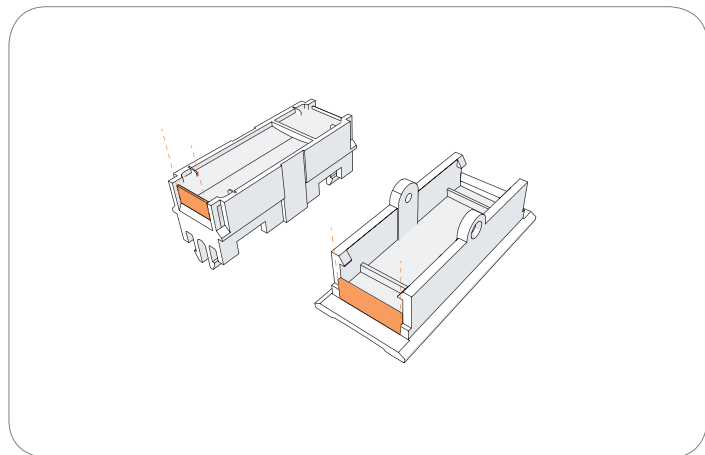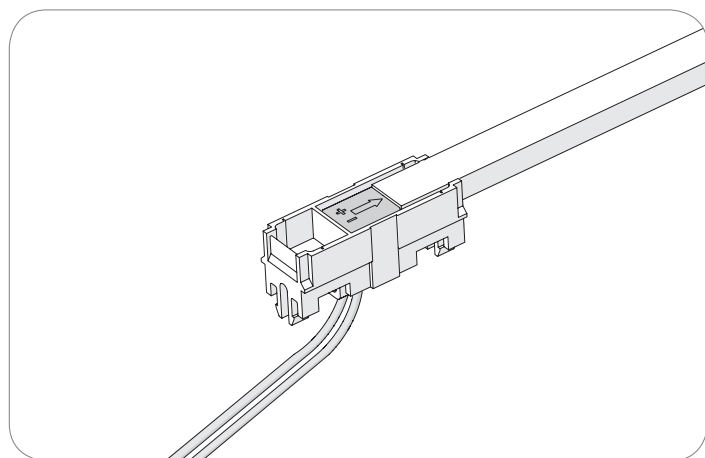

Before placing the liniLED® LED strip in the IP65 Connector set, you first need to remove the dams from the bottom and top of the IP65 Connector set. Use a sharp knife and cut the sides.
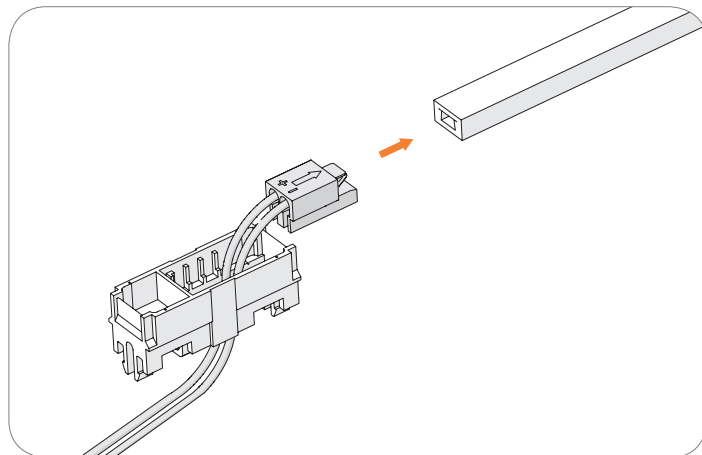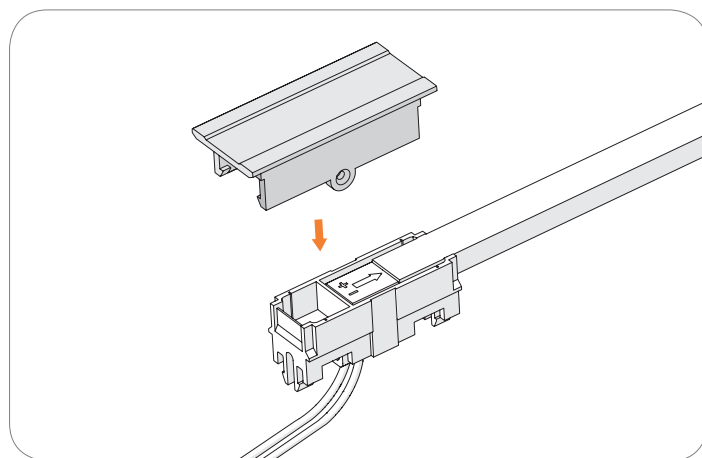

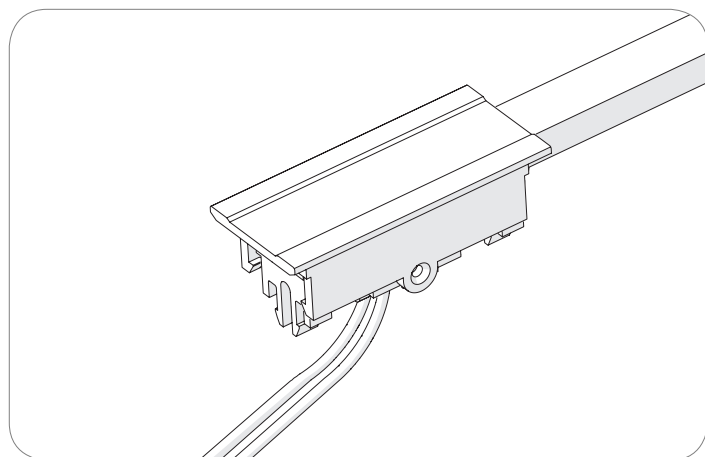Genty insert the first IP65 Connector in the hollow chamber of the liniLED® LED strip.

⚠ The arrow on the connector needs to be placed in the same direction as the arrow on the liniLED® LED strip.

Place the Connector and the liniLED® LED strip in the IP65 Housing.

Push the cap of the IP65 housing on the bottom until you hear a 'click'.


The end result of the IP65 Housing.
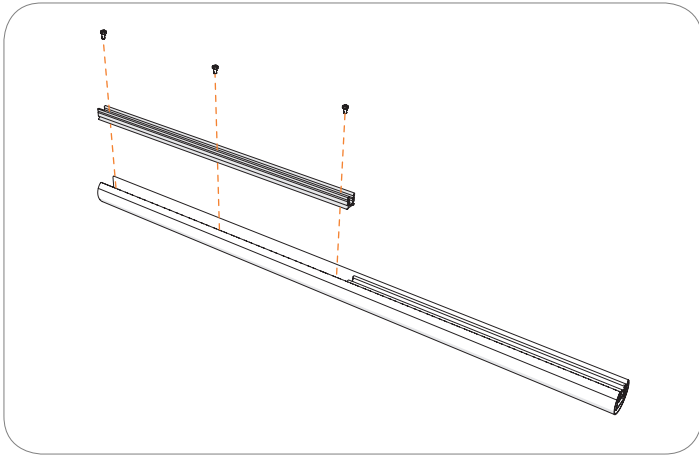
Before you can place the liniLED® LED strip, the aluminium profile needs to be cut first. Remove the first aluminium profile by turning the three hex screws counterclockwise.
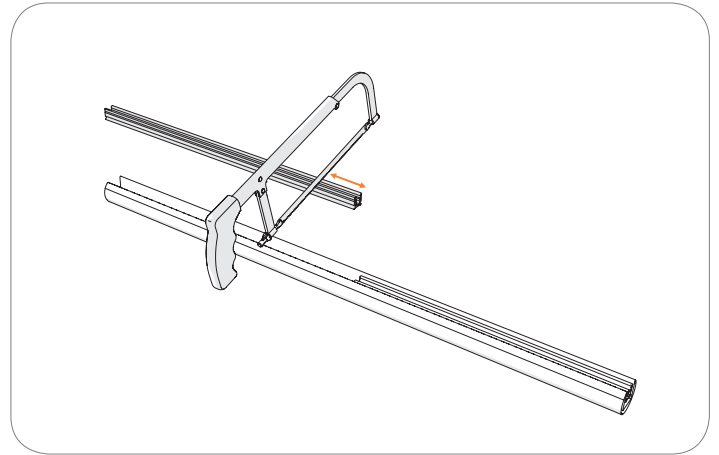
Cut 65 mm off the beginning of the aluminium mounting profile. In case you want to add a wall support or ballusteradapter afterwards, execute the same steps as for an intermediate handrail.
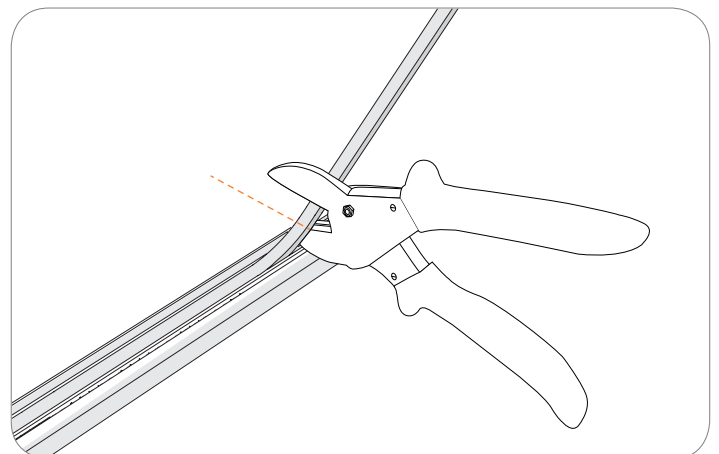
Replace the aluminium mounting profile and tighten wit the hex screws. You have nog created space to place the IP65 Housing.
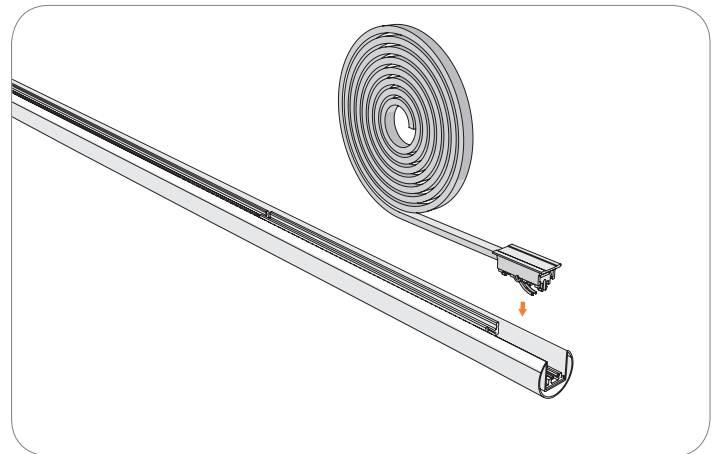
Push the cap of the IP65 housing on the bottom until you hear a click.
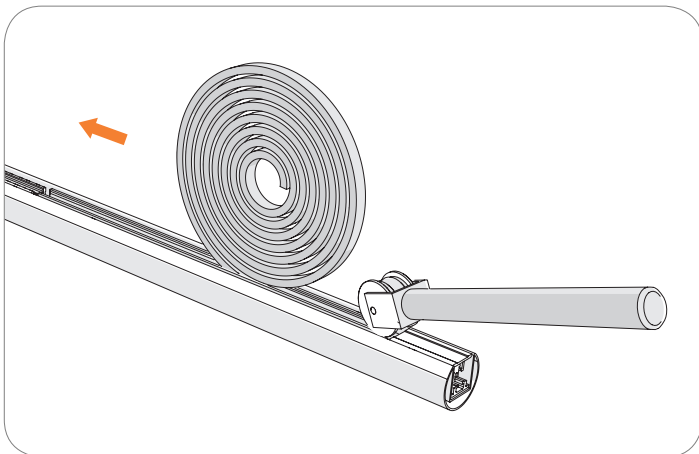
Gently push the liniLED® LED strip in the aluminium profile. Start from the position where you have placed the IP65 Connector.
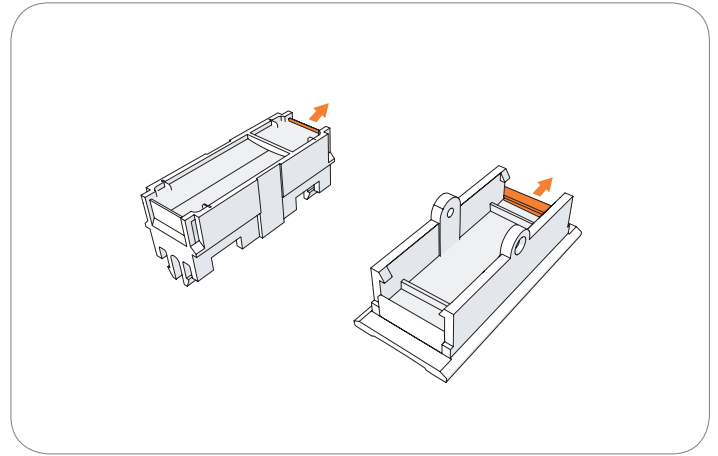
Cut the liniLED® Top LED strip. The liniLED® LED strip cannot be cut at any position, but only at the specific cutting points.

Please note that the liniLED® LED strip should be cut at least 60 mm before the adapter or the end of the handrail.
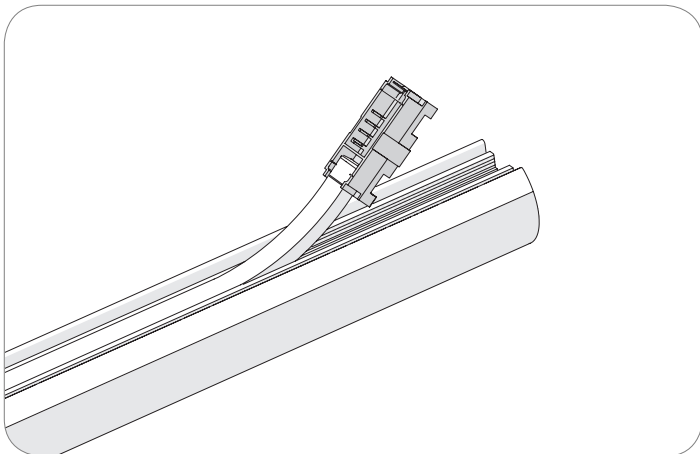
⚠ See **page 13** for the right instructions per LED strip!
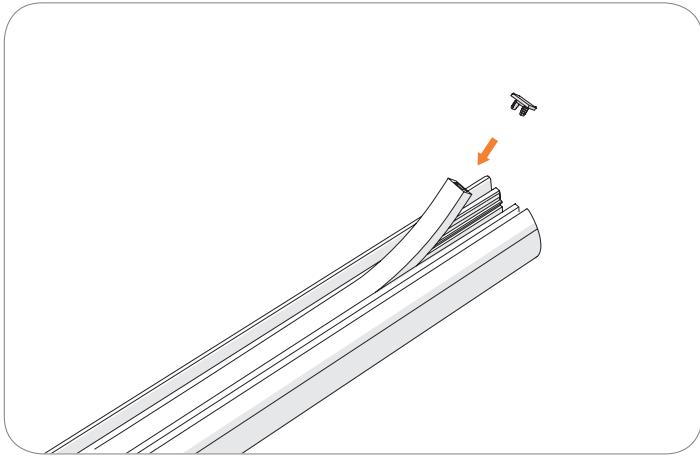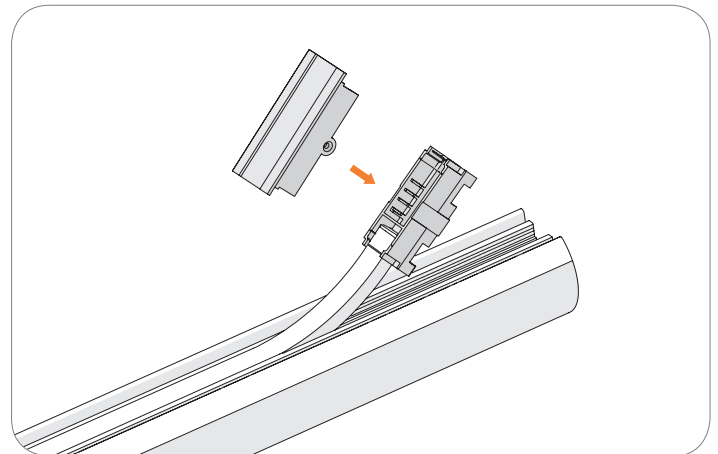
liniLED®

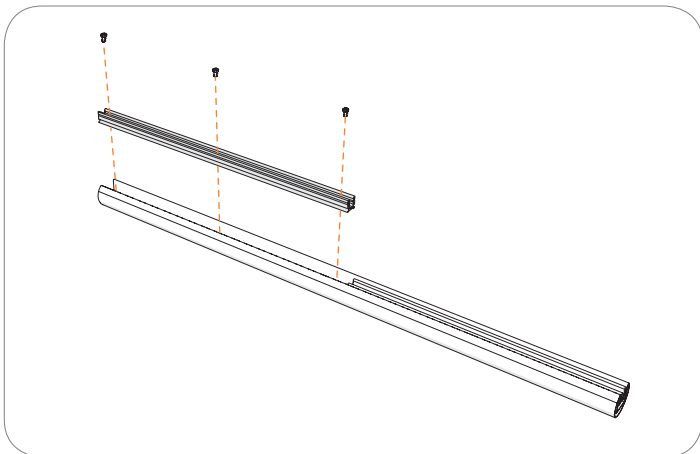Place the liniLED® End Cap in the hollow chamber of the liniLED® LED strip.

Take the second IP65 housing. Remove the dams from the bottom and top of the IP65 Connector set. Use a sharp knife and cut the sides.

Place the liniLED® LED strip wih the liniLED® End Cap in the IP65 Housing.
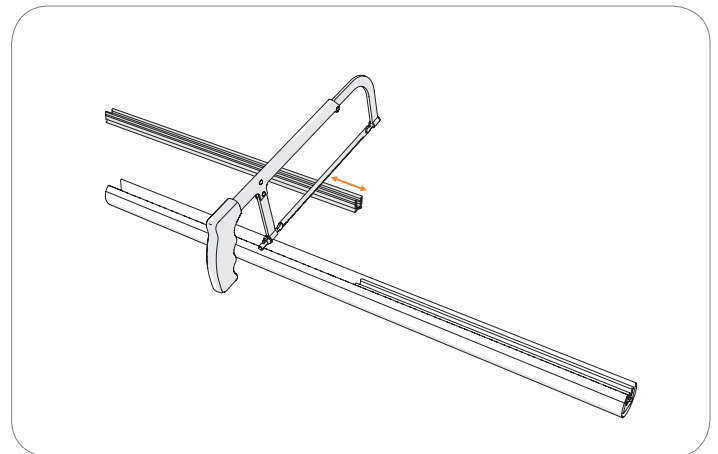

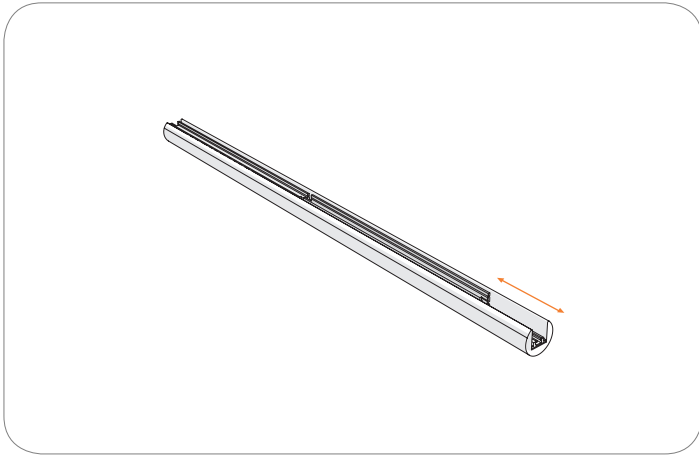Push the cover on the IP65 housing until you hear a 'click'.

In order to place the housing, you need to create space first. Remove the aluminium profile by turning the three hex screws counter-clockwise.

⚠ In order to remove the liniLED® LES strip should be taken out of the profile first.

Cut off 65 mm from the aluminium mounting profile (For RGB and Tunable White cut 35 mm) In case you want to add a wall support adapter or baluster adapter at a later stage, please take the same steps as for an intermediate handrail part. (See page 9)

Put the aluminium mounting profile back in position and tighten the hex screws. You have now created some space to install the IP65 housing.
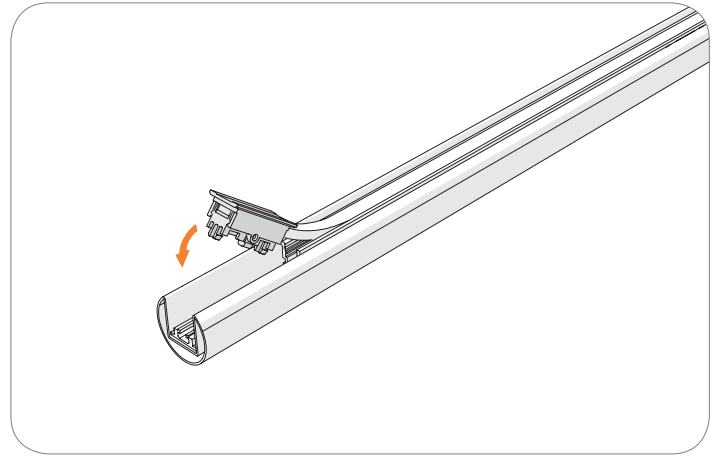
Push the IP65 housing on the aluminium basic profile until you hear a 'click'. The liniLED® Handrail is now IP65.
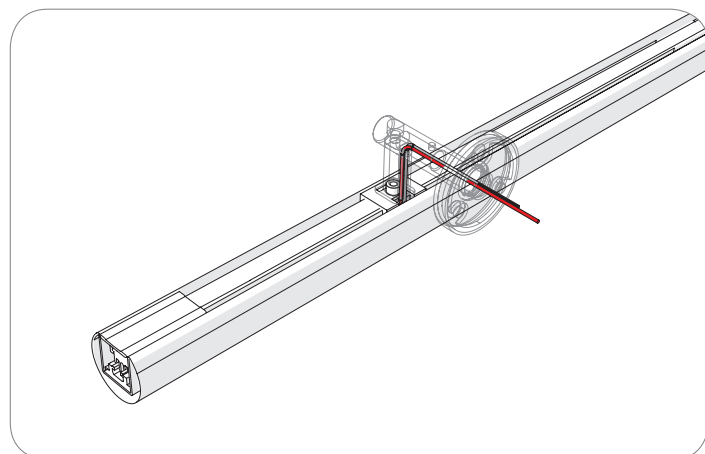
Handrail supports and/or baluster adapters

This chapter explains how to insert the handrail supports and baluster adapters in the handrail.
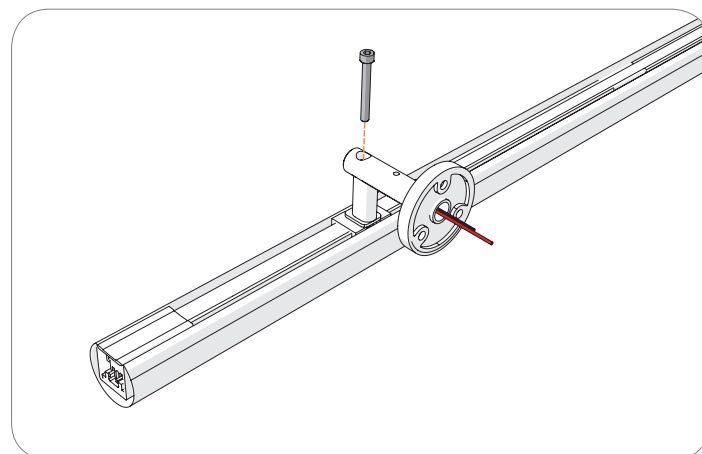*We recommend placing one adapter per metre.*
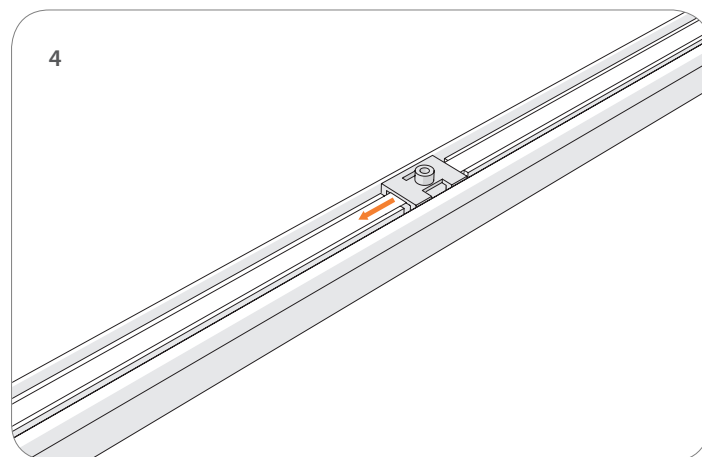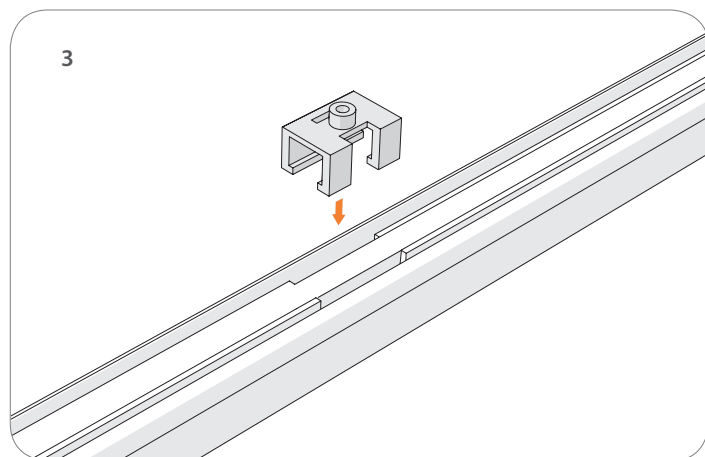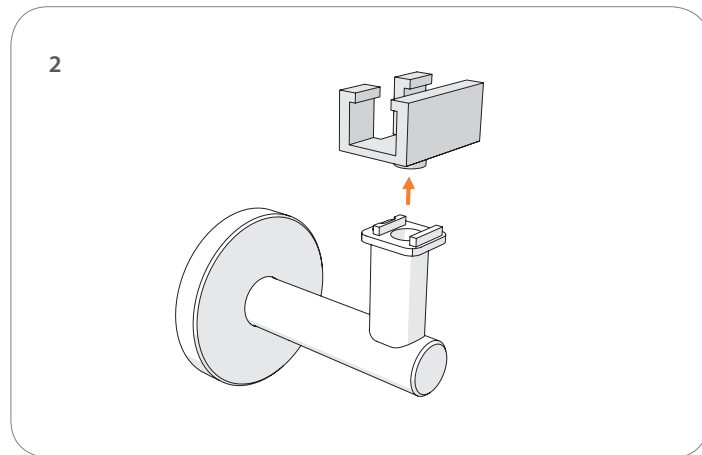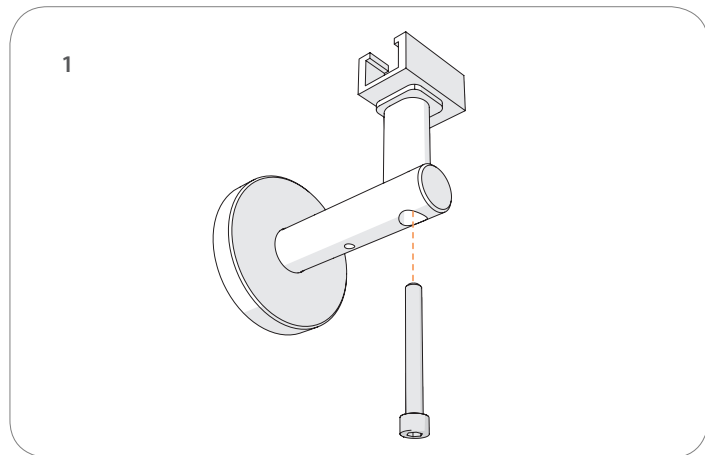
Place the clamp on the aluminium profile and slide the adapter to the desired position

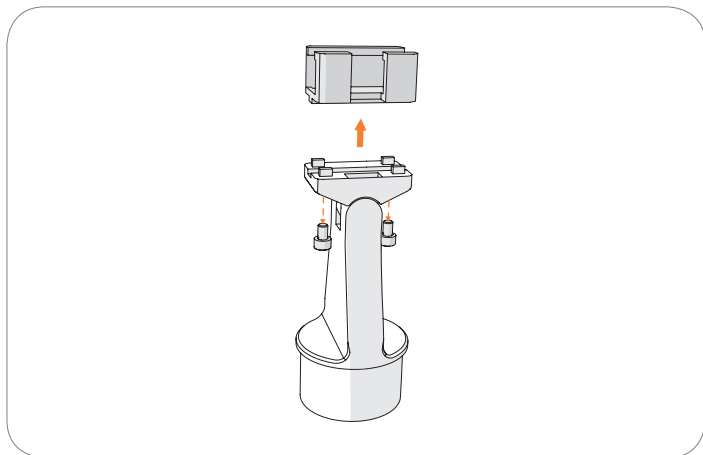**Is the adapter the transit to your power supply?   Yes = 1   or   No = 2**

1 | Pull the wires through the clip first and then through the axes of the stainless steel handrail carrier. **24 V DC**
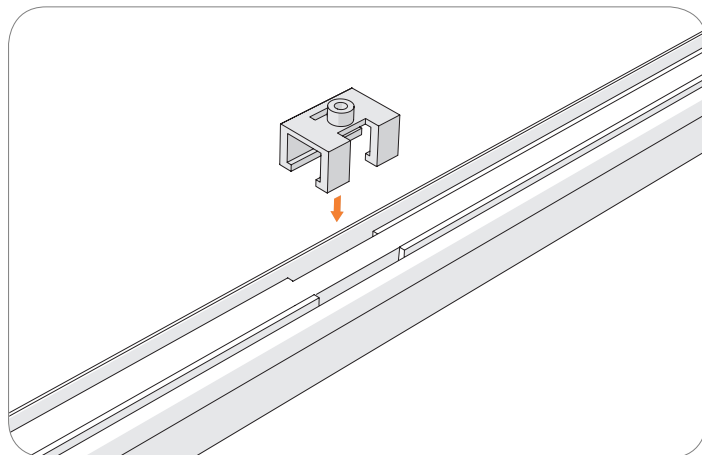
2 | Turn the hex bolt clockwise, using a Metric Allen Key No. 5 to fix the handrail support to the aluminium profile. Connect the cable to the connection from the wall. **24 V DC**
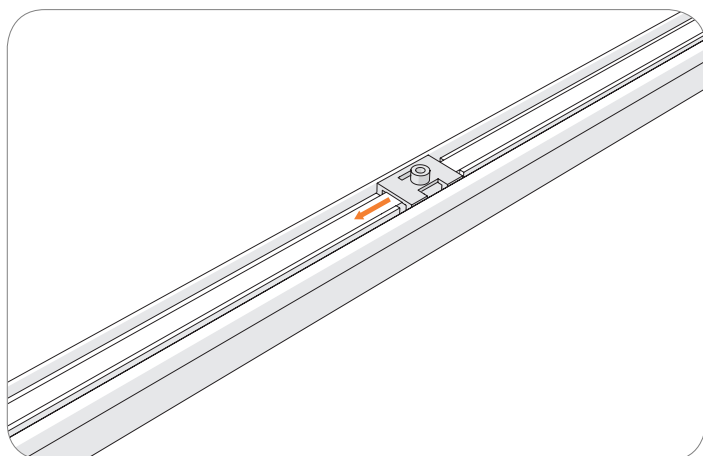
Placing the Baluster Adapter

Remove the clamp from the baluster adapter.

Slide the clamp of the baluster adapter over the aluminium mounting profile of the handrail.
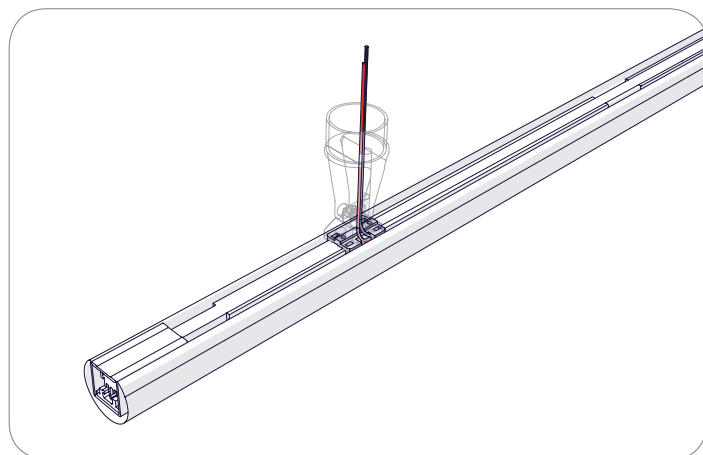

Slide the clamp to the desired position.

Is the baluster adapter a transit to your power supply?

Yes   **Go to step 1**
No   **Go to step 2**

1 | Pull the cables through the clamp first and then through the baluster adapter.
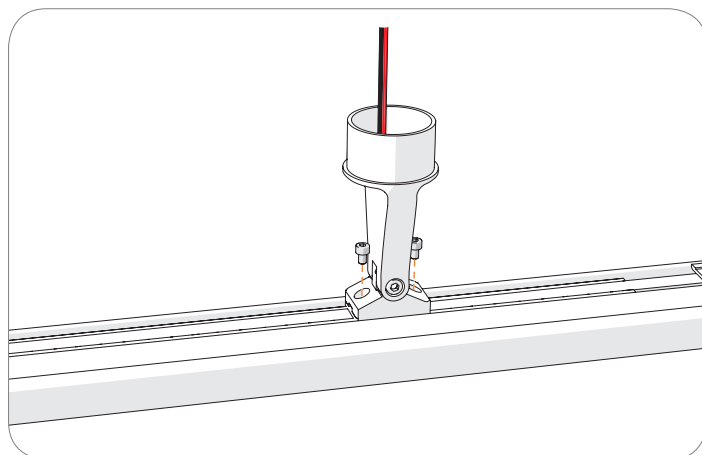
2 | Fix the baluster adapter onto the clamp. To tighten the clamp, turn the hex bolts in the baluster adapter clockwise using a Metric Allen Key No.5.

⚠ The clamp can twist up to 55º to one side. Verify if the angle baluster adapter can reach the correct angle prior to fixing it.

liniLED®

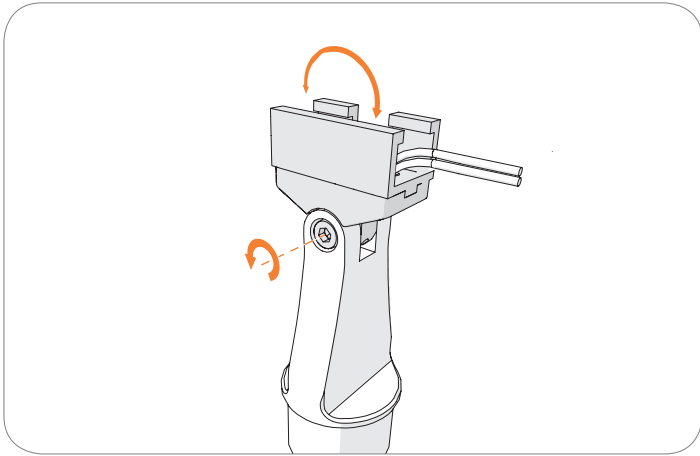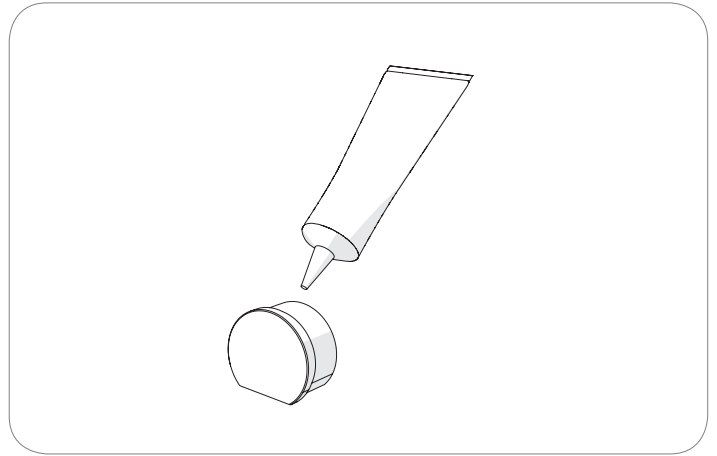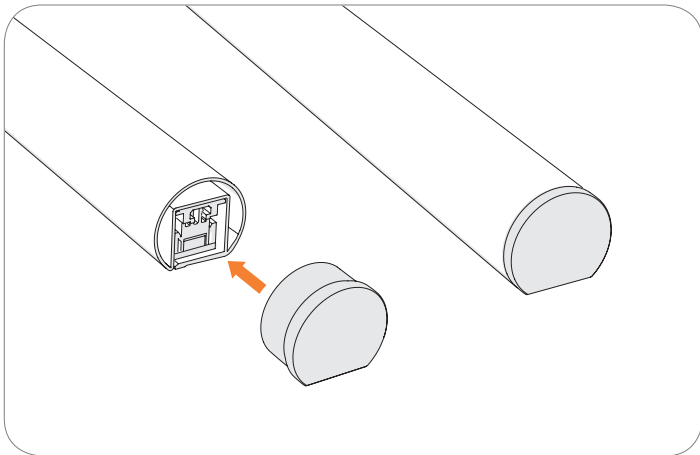If the handrail is tilted, rotate the support of the liniLED® Handrail. Turn the hex bolt counterclockwise. Rotate the clamp and tighten the hex bolt clockwise again.

Degrease the end cap before applying glue on the contact surface.

Insert the end cap into the end of the handrail.
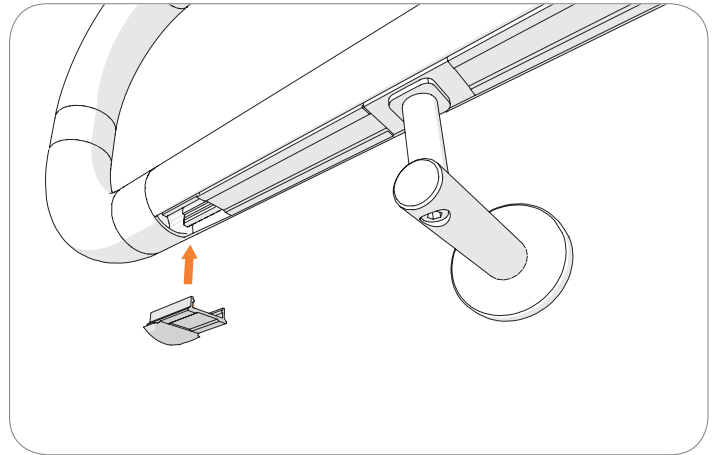
When the liniLED® Handrail merges into a round tube, you can finish it with the plastic transition profile. Press the transition profile on the aluminium profile. You will hear a 'click'.
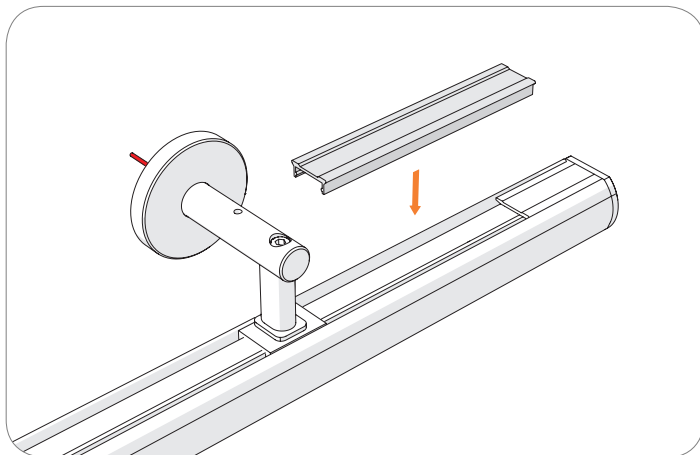
Secure the liniLED® LED strip by using the cover. Close the open spaces between handrail supperts with a cover. Cut te covers to the right size and push them over the aluminium mounting profile.
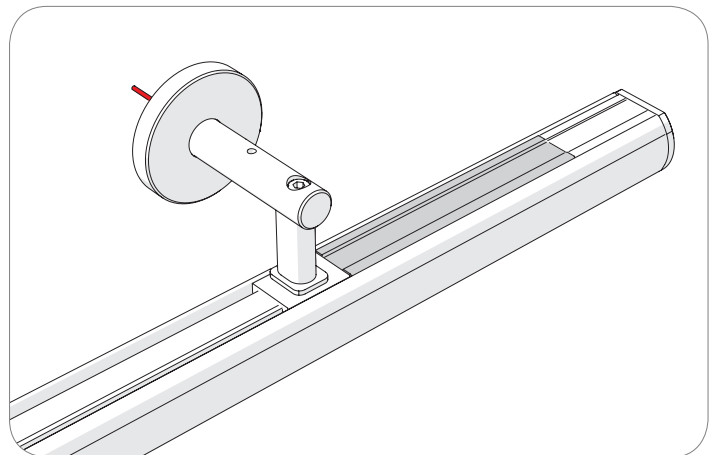
Symbols

CE — Manufacturer's declaration that the product meets the applicable EC directives.

RoHS — Restriction of Hazardous Substances (RoHS): product complies with the RoHS directive and each homogeneous material does not exceed the limits for the materials mentioned under the RoHS directive (Pb, Hg, Cd, Cr6+, PBB and PBDE).

IP40 — Protected against ingress of solid foreign objects ≥ 1.0 millimetres. Not-protected against ingress of water.

IP65 — Dust-tight, no ingress of dust. Protected against water jets (Jet of 12.5 l/min at a distance of 2.5 metres from any direction).

IK10 — Protected against impact energy of 20 joules.

III — Electrical appliance class III: this product is designed to be supplied from an extra-low voltage (≤ 60.0 V DC or ≤ 42.4 V AC).

AISI 316 — Very high quality stainless steel type 316.

AISI 316L — Very high quality low carbon stainless steel type 316.

UV — Product is resistant against ultraviolet (UV) light or sunlight. Non-UV resistant products can degrade or discolour fast when exposed to UV light.

CLEANING — Product can be cleaned with normal cleaning agents as specified in the datasheet under 'chemical compliances'.

FROST — This product can be stored and used below 0 degrees Celsius. Verify the minimum storage and operation temperature in the datasheet or manual for the lowest temperature allowed.

— This product needs to be disposed of separately from normal household waste so it can be recycled. Verify the IP rating for proper use.

Disclaimer

The published information is checked to be as accurate as possible, however Triolight B.V. or any reseller of liniLED® cannot be held liable for any damages resulting from misprints, errors, modifications or outdated information. No legal rights can be derived from this document. Triolight B.V. reserves the right to modify the information without informing the customers. Please check for the latest version on www.liniLED.com. This product should not be used in applications, devices or systems where incorrect operation of the product may result in personal injury (includes emergency lighting) without written permission from the board of Triolight B.V. If nevertheless used in such applications, devices or systems Triolight B.V. cannot be held liable for any resulting injury. liniLED® is a registered trademark of Triolight B.V.

liniLED®