ELECTRIFICATION INFRASTRUCTURE SOLUTION

CLEVER CANTILEVER

EASY INSTALLATION AND MAINTENANCE FOR METRO AND MAINLINE APPLICATIONS

PRODUCT SHEET

CLever was designed by Alstom through its in-house OCS Centre of Excellence for electrification products based in Lecco (Italy). An innovative cantilever for metro and main-line railway electrification offering high adjustability, easy installation and maintenance.

HIGHLIGHTS

- Fully compatible with various basic designs
- Reduce installation time by up to 40%
- Homologated by Network Rail in the United Kingdom
- CLever is compliant with EN 50119
- Fully recyclable product
- Aluminium components improving the handling to increase safety and efficiency of installation
- European Patent - EP 14306631.4

DESIGN BENEFITS

- Reduced number of components
- Modularity improved to reduce spare parts
- Low aerodynamic resistance
- Fast installation and easy regulation
- Registration bracket fully adjustable
- High compression stability
- Lower deflection (as opposed to round tube)
- Mechanical resistance optimised for the application
- Avoids wrong installation
- Closed section to avoid dust, water, ice and grit deposit

GENERAL DESCRIPTION

Purpose

CLever is an innovative cantilever for railway electrification, developed for 750 V, 1,5 kV, 3 kV, 25 kV transport networks. CLever was designed to deliver reliable performance for speeds up to 300 km/h. This innovative cantilever solution benefits from Alstom's extensive experience in the field of electrification systems and component manufacture.

CUSTOMER BENEFITS

High adjustability & reduce weight

CLever allows for high adjustability, both horizontally and vertically, addressing a large number of configurations with the reduced number of parts. The tube and main parts are made of aluminum alloy, seamless and with a cross section designed to reduce the weight and increase the mechanical strength.

Easy installation & maintenance

CLever is an innovative modular cantilever, it reduces installation time by up to 40%. The reduced number of connections allows for easy and fast installation. CLever also offers reduced encumbrance for use at bridge approach spans. The interchangeability of the parts lead to significantly easier maintenance and reduced material stock.

Sustainable solution

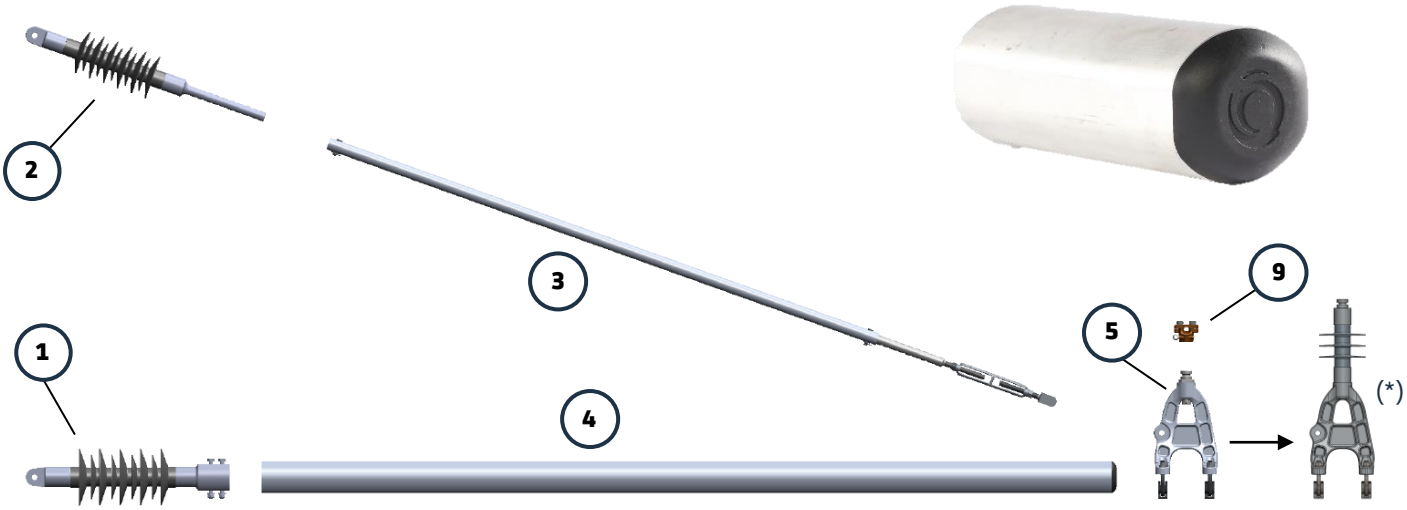
Alstom have strong commitment to ensuring Eco-Design requirements are integrated with the core design processes. CLever has undergone a full Life Cycle Assessment, studying its environmental impacts over a full life cycle. An option exists to manufacture the cantilever using fully recycled Aluminium.

A renowned know-how

Alstom, through its Lecco site, has developed the CLever assembly and components based on existing proven electrification products. The site benefits from certifications by AFNOR: ISO 9001, ISO 14001 and OHSAS 18001, regarding the design and manufacturing of bus bars, accessories for LV-MV-HV electrical lines, components and systems for electrification, traction, and low voltage protection and control equipment.

Alstom Lecco Products/Alstom CLever Cantilever/EN/09.2021 - Photo credits: ©ALSTOM 2021 – CLever™

CLEVER CANTILEVER

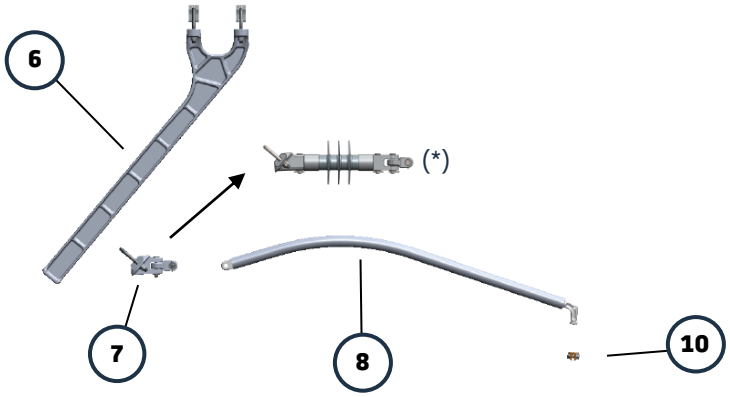


MULTIPLE FEEDING VOLTAGES

CLever solution addresses 750 V, 1,5 kV, 3 kV, 25 kV new build and renewal projects for metro & main line railways.

Note (*): For the 3kV option:

- The insulation of the cantilever is moved away from the mast
- There is a double steady arm option

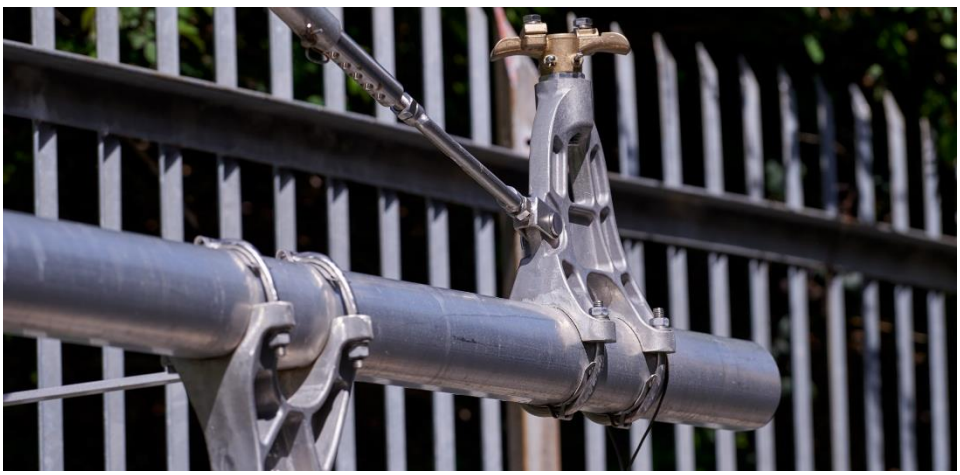


COMPONENTS

1	Beam insulator
2	Tie rod insulator
3	Tie rod
4	Horizontal beam
5	Messenger wire support
6	Registration bracket
7	Steady arm attachment
8	Steady arm
9	Messenger wire clamp
10	Contact wire clamp

INSTALLATION CHALLENGE

Component count	10 (typical cantilever has 20+ components)
Min. Encumbrance	160mm, capable of dealing with different project situations
Pre-Assembly time	15 mins, minimal set up required
Installation time	5 mins, based on study done in UK with 2 linesman
Registration time	4-7 mins, based on study done in UK with 2 linesman



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