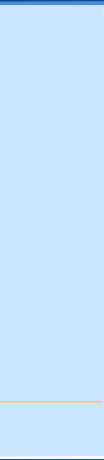
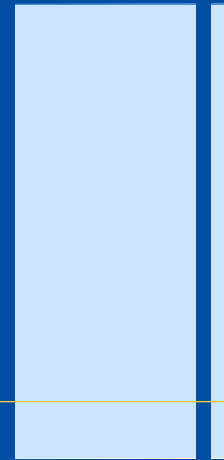
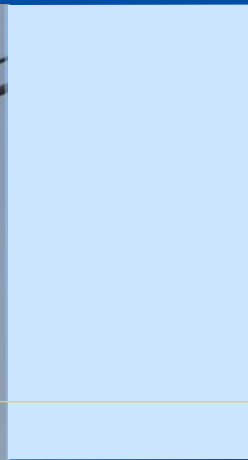


Kummler+Matter Ltd

Innovations in Overhead Contact System Constructions



Advantages of the trolleybus

- Low noise
- Zero-emission
- Better acceleration from bus stops
- Higher speeds on uphill
- Less vehicle maintenance
- Longer service life
- Energy recovery during breaking cycle
- Public image as means of transportation due to the OCL

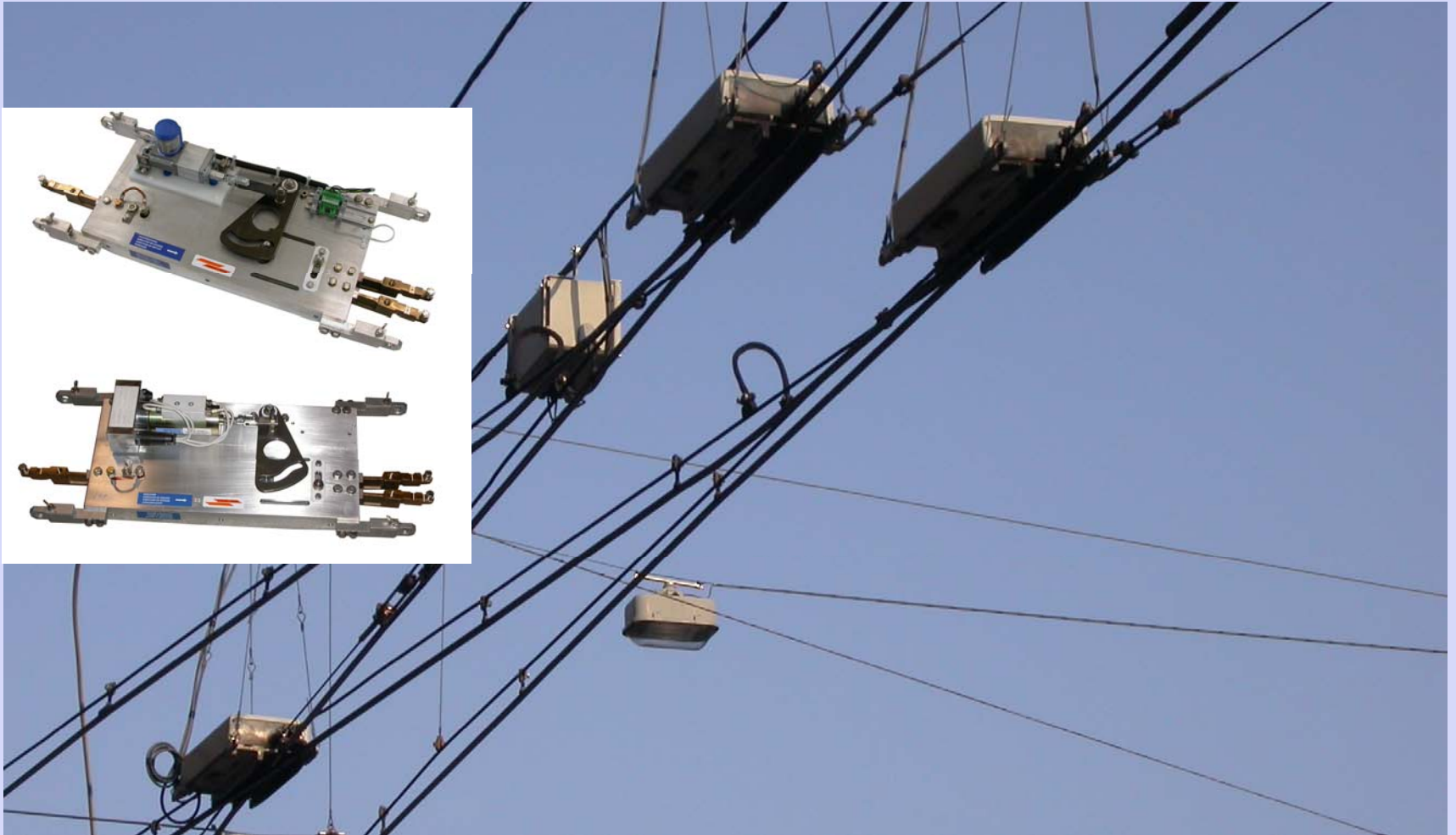
Mechanical trailing switch U99



Trailing switch U99: Advantages in the practice

- Speeds up to 50 km/h
- Less risk of dewirements
- Low noise / Teflon side runners
- 10° or 20° layout; copper-tube or cut-in type construction
- Rugged against impacts
- Low weight / Aluminium body and copper runners
- Simple maintenance
- Quick exchange of runners and connection pieces

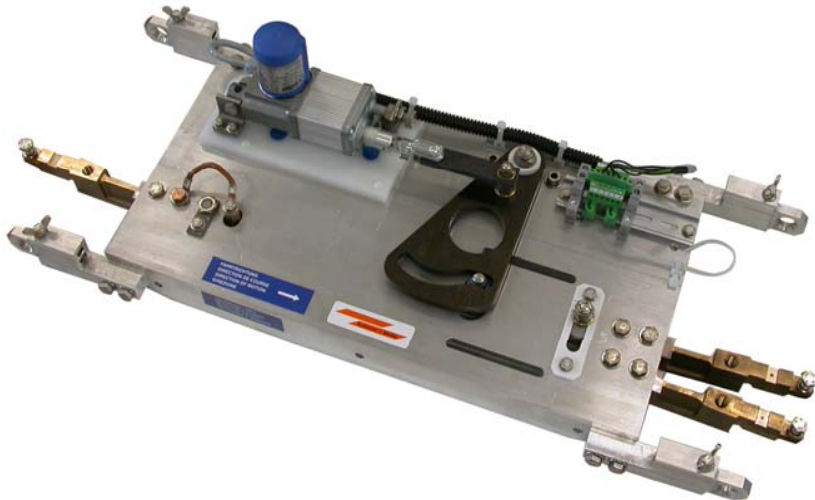
Switch U88



Benefits

- High speed of vehicles: 60 km/h
- Reliability against dewirements
- 10° or 20° layout / sym. or asym.
- Copper-tube or cut-in type construction
- All parts are easy and fast to change during service
- No adjusting necessary
- No risk of displacing during service
- Less dirt on drive parts
- Widely maintenance free
- Individual installations
- Low height
- Robust against mechanical shocks
- Less mechanical parts
- No springs, no spring breaks
- Identical drive for switches and crossing

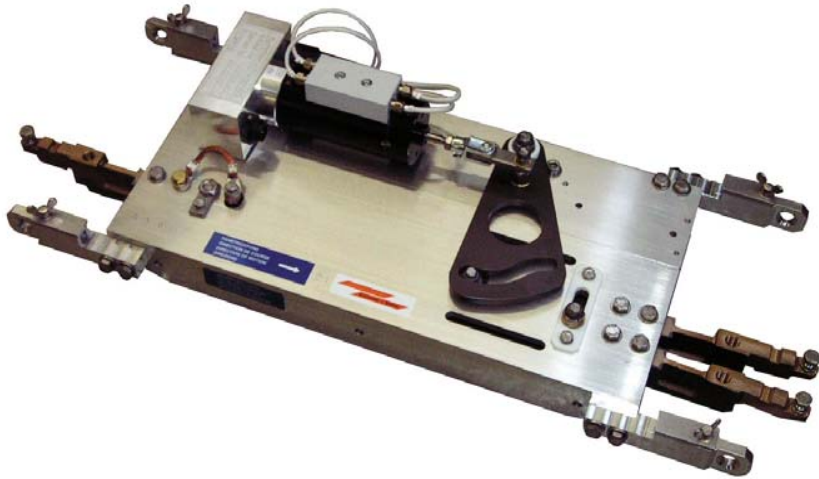
Switch U88 24VDC



Features

- High speed switch: 60 km/h
- 10° or 20° layout /symmetrical or asymmetrical
- Electrical switching in both directions
- Drive: 24VDC motors
- Limit switch: micro switches integrated in the motor
- Connection: screwed clamps
- Mechanical locking in each position

Switch U88 600VDC



Features

- High speed switch: 60 km/h
- 10° or 20° layout /symmetrical or asymmetrical
- Electrical switching in both directions
- Drive: 600VDC solenoids
- Limit switch: electronic control unit
- Connection: pre-assembled cables (distribution box)
- Mechanical locking in each position

The electronic switch controls UEC und SWICON



Switch controls K+M

Common combinations switch controls – switches

■ Control



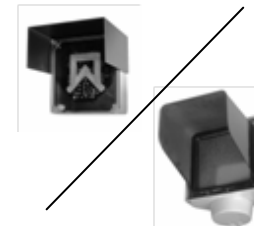
UEC93

■ Switch



U88 600V

■ Display



~~SWRV or Matrix~~



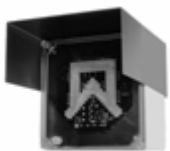
SWICON UEC24



U88 24V



~~SWRV or Matrix~~



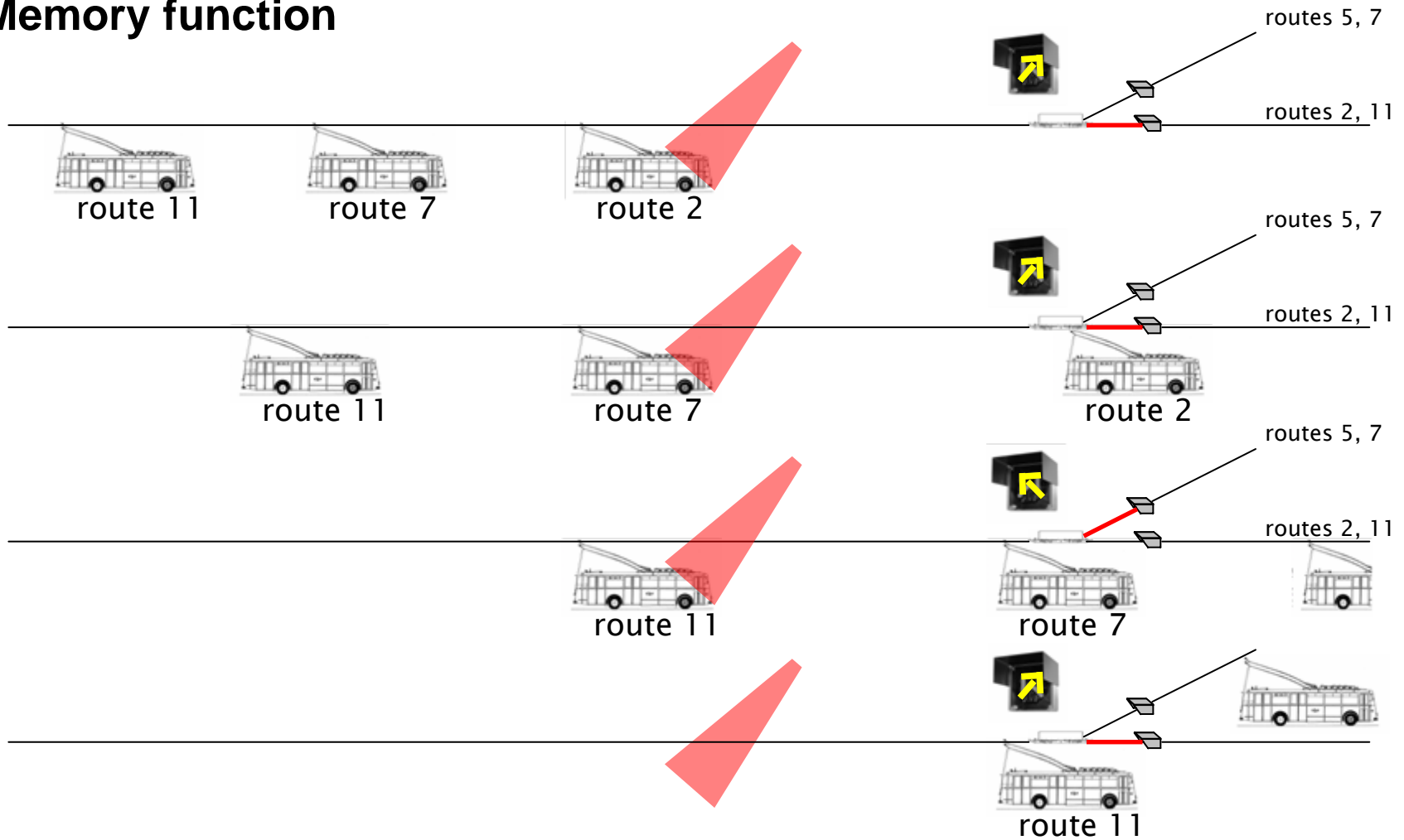
SWICON A



U88 24V

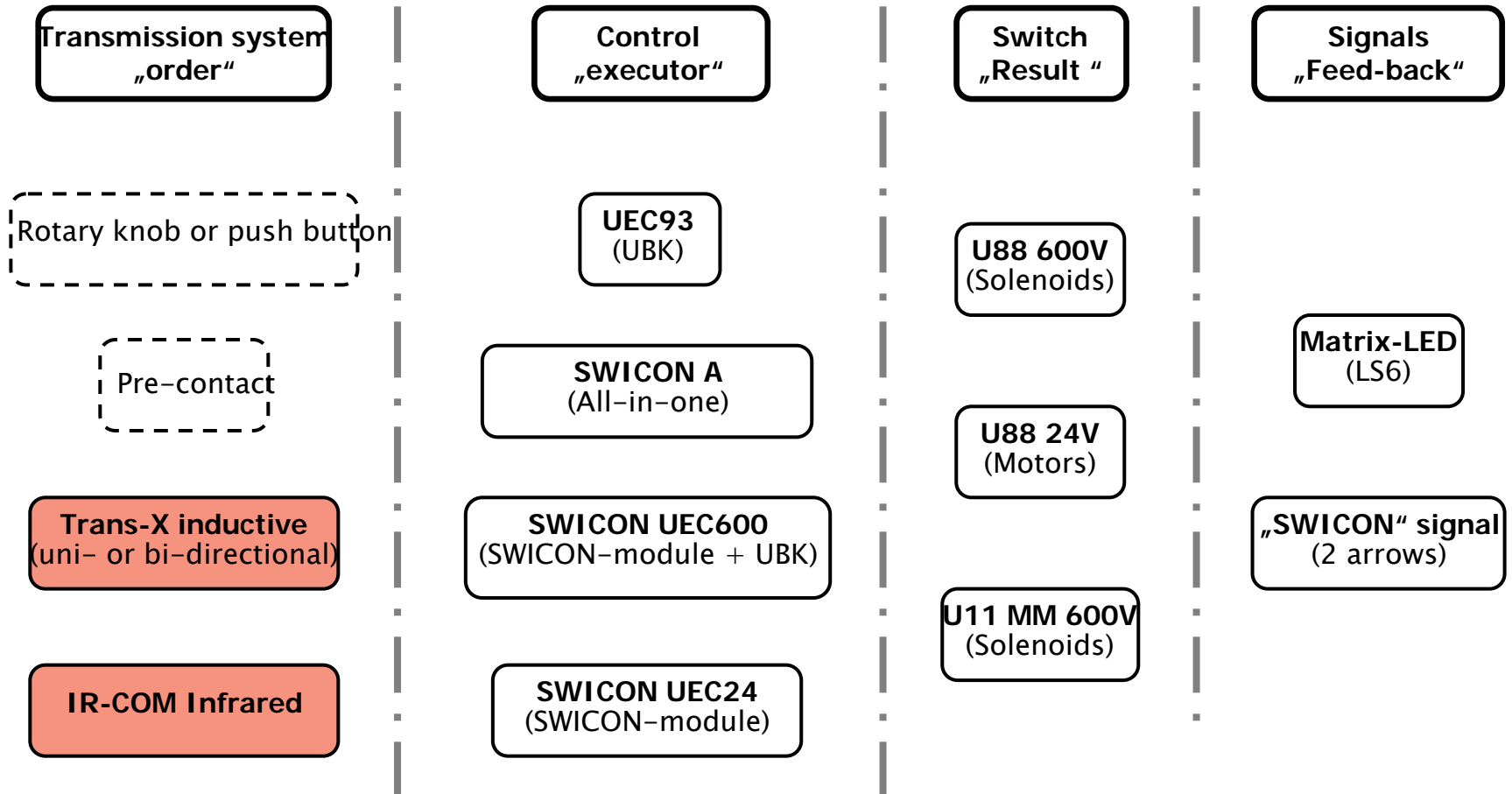
Switch controls K+M

Memory function



Transmission systems K+M

Overview



Transmission Systems K+M : Trans-X

Vehicle side:



Modul
Trans-X



Box Trans-X

Isolating transformer



Terminal



Sending coil on pole

Switch control (fix) side:



Module Trans-X



Contact wire antenna

- Inductive transmission < 20kHz
- Reach: ½ m ... 1 m
- Bi-directional

Transmission Systems K+M : IR-COM

Vehicle side:



IR-transmitter



Unit



User terminal

Switch control (fix) side:



IR-receiver

- Infrared transmission
- Reach: > 50 m
- Insensitive to electrical disturbances

The synthetic contact wire suspension

Suspension in tangent

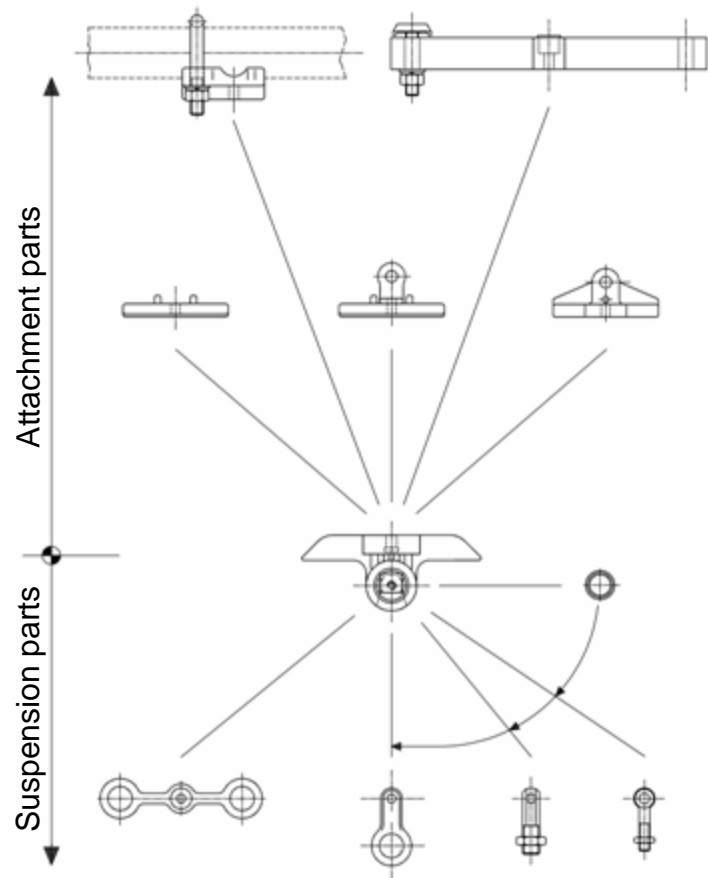


Suspension in curves

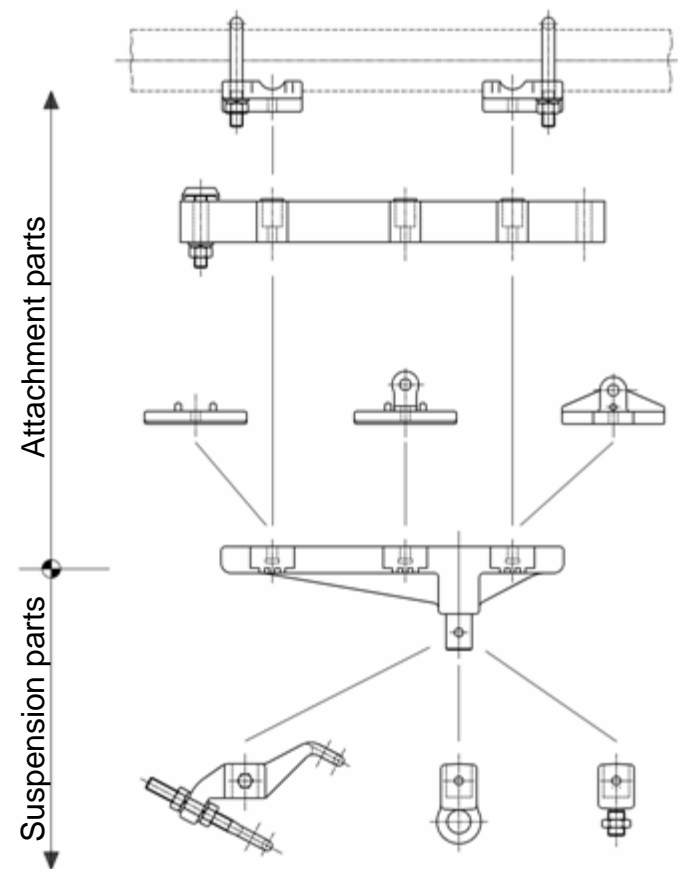


Modular parts

For line insulator type 1



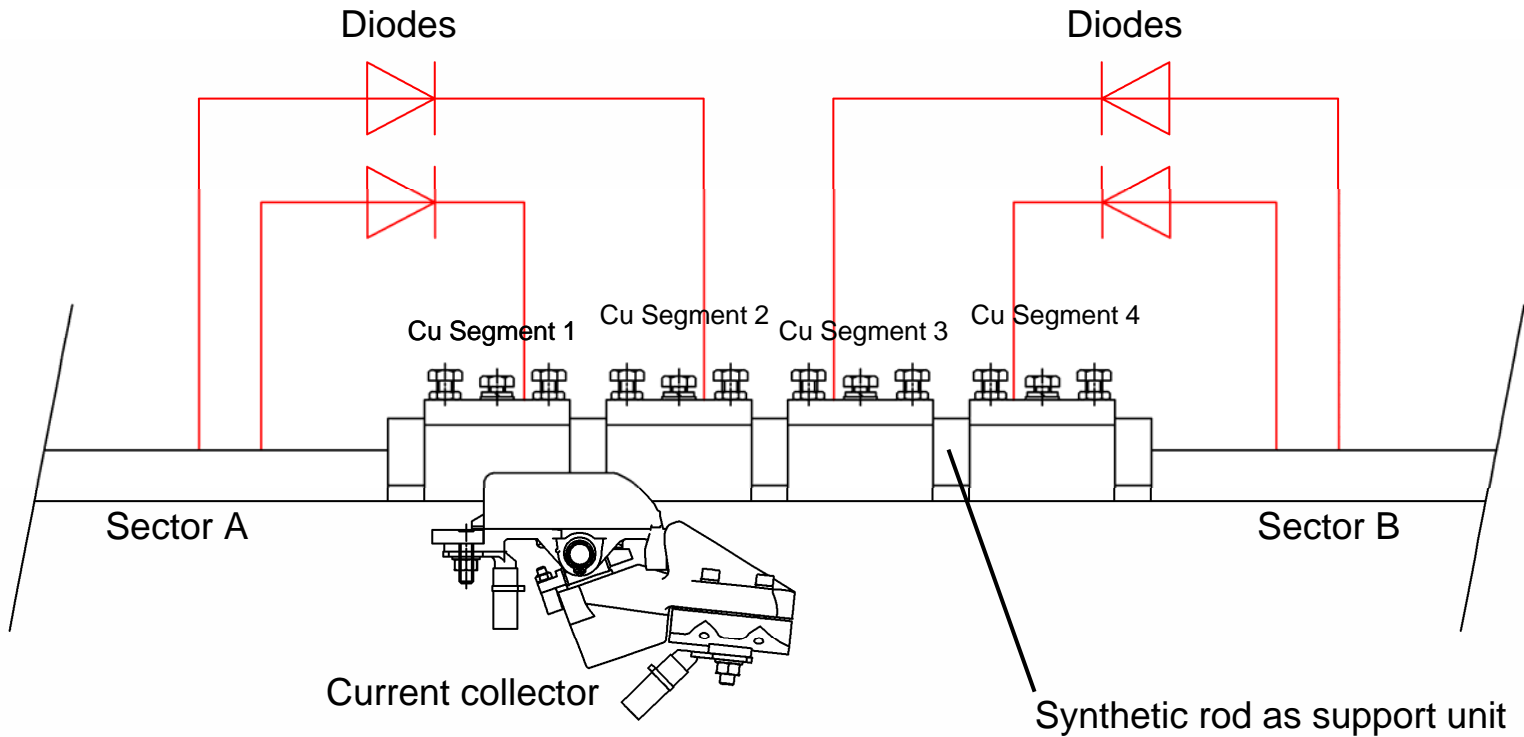
For line insulator type 2



Section insulator for ETB type ALCO



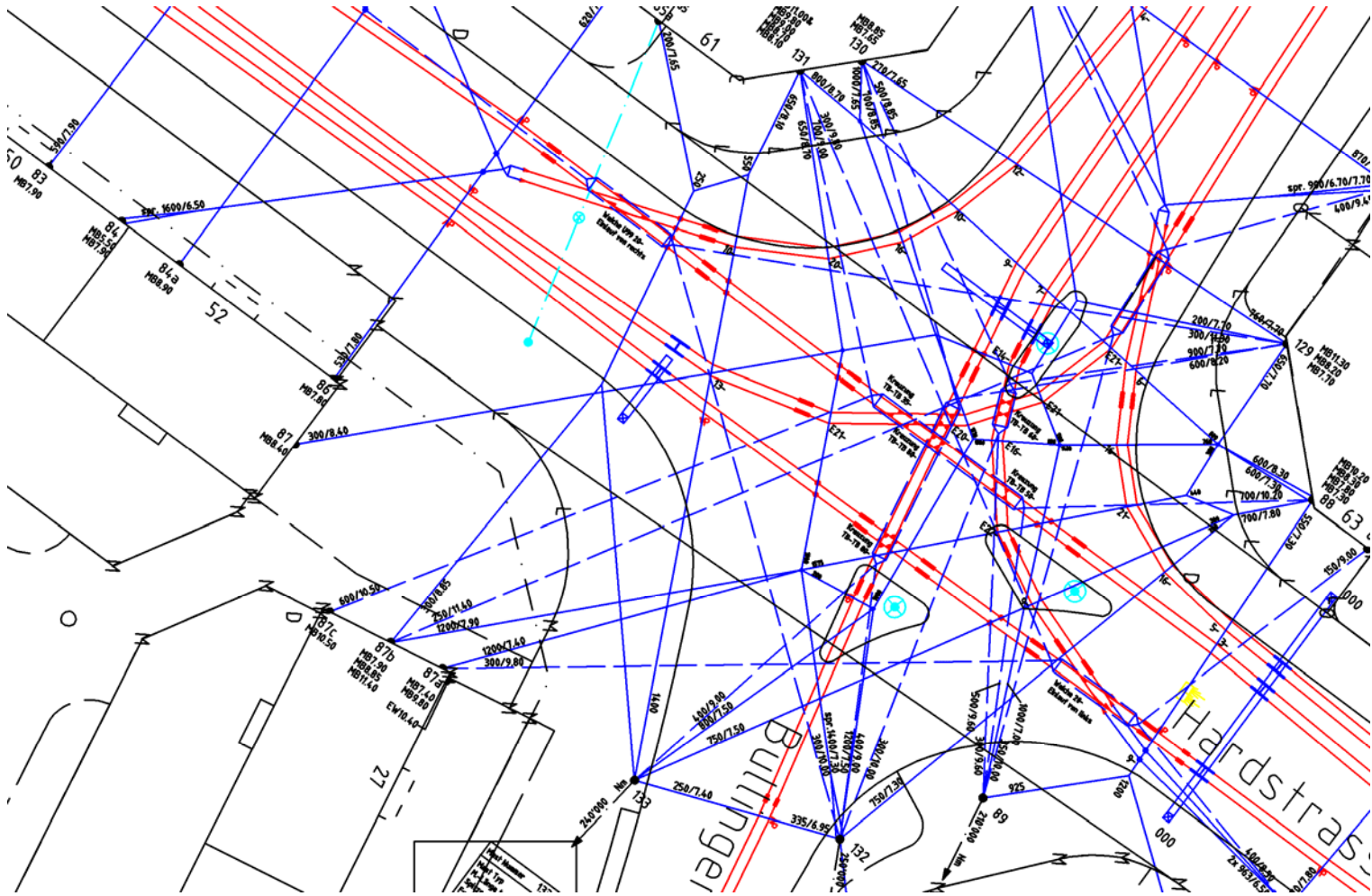
Functional diagram of section insulator for ETB type ALCO +



Advantages of section insulator for ETB type ALCO +

- Electrical separation of two sectors at all times
- Can be travelled by trolleybuses with full acceleration
- No interruption of the power supply for the trolleybus
- Very suitable for:
 - Driveaway from stops
 - Driveaway from traffic lights
 - Uphill
- More flexibility in the design of OCS
- Better for drivers

Planning



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