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## Sicat SRD

Movable overhead conductor rail for depots

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The Sicat® SRD movable overhead conductor rail for depots provides electrically powered rail vehicles with the necessary operating current for entering and leaving the depot. During maintenance work, the overhead conductor rail can be swung to one side and earthed, thereby ensuring simple and safe access to the vehicles.

This considerably simplifies the procedures for roof-level maintenance work, the lifting of the train with lifting cylinders and any crane work in the vicinity of the track.

### Features

- The release for the start of maintenance work based on the five safety rules
- Identification of the moving process and moving range by visual and audible signals
- Control of the overhead conductor rail functions by means of local control panels located alongside the maintenance tracks, as well as from the central control cabinet
- Soft start and stop of moving process due to integrated converter on the motor gear unit

# Design and functionality

The movable overhead conductor rail for depots consists of three main components made by Siemens:

- Overhead conductor rail comprising standard contact line components
- Drive train with motor gear unit
- Central and local operation and control of the overhead conductor rail using Simatic technology

## Overhead conductor rail

The overhead conductor rail is attached to the beams of the maintenance halls by means of special customer-specific adapted cantilevers. Depending on the distance between the hall structure and the track, additional fixing brackets may be required to attach the cantilevers.

The transition from the conventional catenary system outside the depot to the overhead conductor rail is implemented by means of a transition element. At that point, usually in the depot entrance area, the conductor rail becomes a permanent installation. In an overlap area the overhead conductor rail can be electrically and mechanically connected or disconnected when the electric rail vehicle enters or leaves the maintenance track. During the maintenance work the overhead conductor rail is electrically isolated by means of disconnectors. An earthing switch with entry monitor ensures safe earthing (design in accordance with SIL 1 requirements). The mechanical disconnection is achieved by moving the overhead conductor rail away from the vehicle.

Further information on the Sicat SR overhead conductor rail system can be found in the relevant product information.

## Drive train

By default, every third support point is motor-operated. In order to optimize the forces occurring in the moving process and to achieve a long product service life, an integrated converter enables soft start and stop of the moving process. An integrated engine brake ensures that the overhead conductor rail remains securely in the respective end position.

## Control system

The control system for the overhead conductor rail comprises the following components:

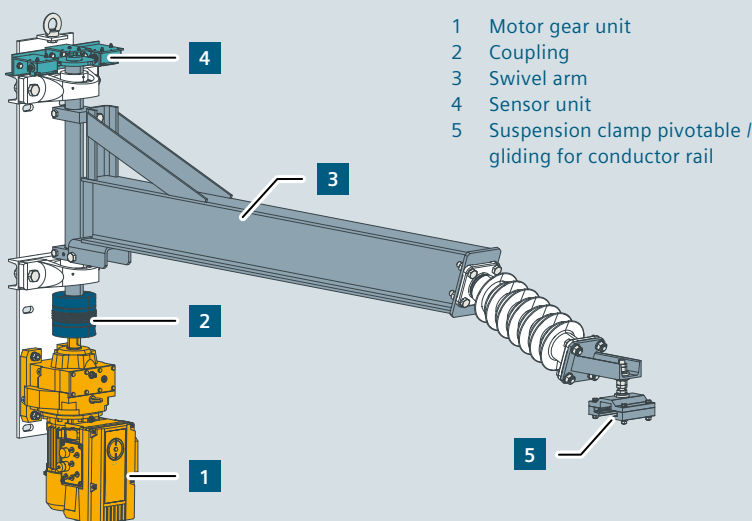
- Central control cabinet with Simatic S7-1500 CPU and Simatic Touch Panel
- Local operator units
- AS-i bus system (design in accordance with SIL 1 requirements) for communication between the components

The overhead conductor rail can be moved away from each track by means of a corresponding local operator unit. In addition, it can be controlled from the central control cabinet.

All moving processes may only be performed when the respective section of conductor rail is switched off and earthed. The time required for moving the conductor rail in each direction is about 10 seconds. The moving process takes place in four phases (see graphic below).

## Central control

One central Simatic S7-1500 CPU controller, accommodated in a central control cabinet near the track, is provided



- 1 Motor gear unit
- 2 Coupling
- 3 Swivel arm
- 4 Sensor unit
- 5 Suspension clamp pivotable / gliding for conductor rail

Movable support incl. suspension clamp



### Phase 1

- Overhead conductor rail is in „In Rail Position“
- Overhead conductor rail is live



### Phase 2

- Overhead conductor rail is in „In Rail Position“
- Overhead conductor rail is deenergized and safely earthed



### Phase 3

- Overhead conductor rail moves from the „In Rail Position“ to the „Out Rail Position“
- Vehicle current collector must be lowered



### Phase 4

- Overhead conductor rail is in „Out Rail Position“
- Maintenance work may be carried out when green signal lamp lights up

Phases of the moving process

for each track. In this central controller the signals are collected from the local operator units. As an option, the values of the voltage transformers and the light signal control can also be read in.

The Simatic Touch Panel on the central control cabinet offers a wealth of information:

- Position of the movable overhead conductor rail
- Position of the switches and disconnectors in the track area
- Emergency stop monitoring for the controller of the movable overhead conductor rail
- Fault monitoring
- Information about the safety monitoring
- Information on the drive units
- Information on the locking system

Additionally, the overhead conductor rail can be operated by means of the touch panel.

#### Local operating unit as standard operating level

In operation, the movable overhead conductor rail is controlled by means of local operator units which also display the key states for the operation. As a rule, the number and positioning of the operator units is determined on a system- and customer-specific basis. The operator must be able to view the track and the respective section of overhead conductor rail from the operator unit.

In addition, an emergency stop switch is fitted to all motorized supports. When this button is pressed, no further movement of the overhead conductor rail is possible and the shifting process is immediately stopped. The emergency stop button automatically locks itself in the off position.

#### AS-i bus system

The AS-i (Actuator-Sensor Interface) bus system provides

communication between the controller, sensors, actuators and drives with an effective and powerful bus system in accordance with the EN 50295 and IEC 62026-2 standards that links all sensors and actuators at the lowest field level to the higher-level control. This eliminates the need for expensive parallel cabling.

The AS-i bus system is designed for the overhead conductor rail application in accordance with the SIL 1 requirements.

## Safety concept

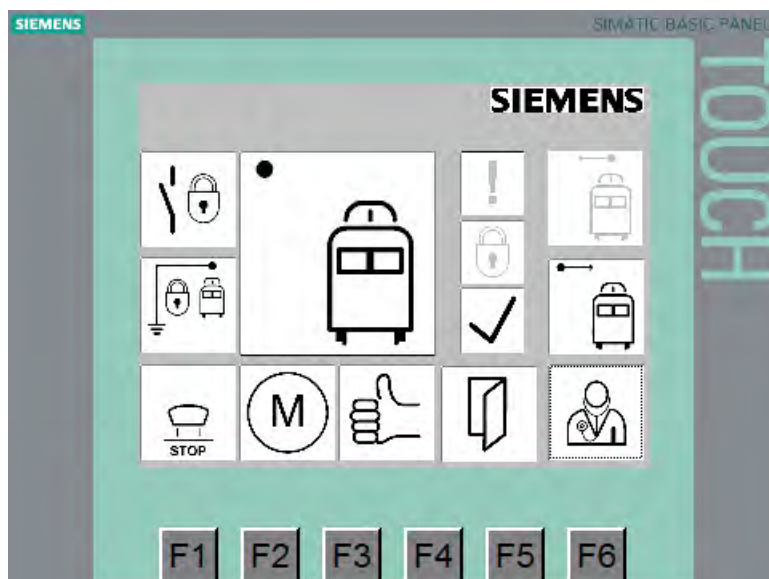
The safety concept is based on the five safety rules according to EN 50110. The following safety-related components and systems are an integral part of this safety concept:

- Locking concept for protection against operator errors and for ensuring a safe working environment
- Earthing of the overhead conductor rail by means of a earthing switch with entry monitor (design in accordance with SIL 1 requirements)
- Emergency stop pushbutton on each conductor rail support fitted with a motor
- AS-i bus system (design in accordance with SIL 1 requirements)
- Visual and audible status signaling
- End position switches for safe shutdown of the motors at the end of the shifting process
- Integration into an overall safety concept for the depot (e.g. with regard to crane position and train lifting gear)

#### Signaling

A signaling system is fitted to all motorized support points. A green and red lamp as well as a flashing light and buzzer indicate the states of the shifting process.

Signaling by means of an LED strip light along the conductor rail is possible as an option.



Main view on the Simatic Touch Panel with customer-specific adaptations (example)

Local operator unit (example)



# Tests

The components of the overhead conductor rail, as well as the contact line, disconnectors, earthing switches and switch drive are mechanically and electrically type-tested.

For further information please refer to the corresponding product information.

# References



Metro Mekka, Saudi Arabia



Depot entrance, Ipswich / Brisbane, Australia



Villeneuve, Switzerland

To date, the movable overhead conductor rail has been implemented in the following projects:

- Brisbane, Australia
- Delhi, India
- Doha, Qatar
- Mekka, Saudi Arabia
- Ural Locomotives, Russia
- Olsztyn, Poland
- Stockholm, Sweden
- Villeneuve, Switzerland

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