Description

Welded switch is designed from two separate welds of half set of switches that are assembled into the compact unit by means of gauge bars to reach the final gauge. Such unit consists of stock rail of a construction rail profile (75C1), alternatively of a prescribed groove rail (60R1, 57R1 etc.), a guarding plate, a supporting plate and a sliding plate. In order to reach the continual running into the branch line, the switch is equipped with flexible switch rails which may be supplied as:

1. **welded switch rails** (switch rail + rail behind the switch rail)
2. **interchangeable switch rail** (the rail behind the switch rail connects to the switch rail with a diagonal cut)

For easier connection to the roadway, the crossing may be equipped with anti-slide filler plates in the shape of wedge. The heating may be designed as either a **chamber heating** (under the sliding plate) or a **stock rail heating** (under the rail head).

Use

- Tramway construction designed primarily for paving
- Tramway construction for urban rail transport

Benefits

- Two options of switch rail design
- High level of safety and collision-free running
- Quiet and smooth running
- Continuous operation in winter thanks to the heating
- The welded switch is designed for both running against the tip of the switch rail (take-off switch) and running along the tip of the switch rail (downhill switch)
Description

Block switch is designed from two separate, compact blocks of half set of switches that are assembled into the compact unit by means of gauge bars to reach the final gauge. Each half set of switches is designed from one piece of block of material, in which the grooves and the cavity for the switch rail are CNC machined. In the area behind the switch heel, the connecting rails are welded to the separate blocks. In order to reach the continual running into the branch line, the switch is equipped with flexible interchangeable switch rails with a diagonal cut. For easier connection to the roadway, the crossing may be equipped with anti-slide filler plates in the shape of wedge. The heating is designed as a stock rail heating (under the rail head).

Use

- Tramway construction designed primarily for paving
- Tramway construction for urban rail transport
- Tramway construction where high traffic load is expected
- Tramway construction where heavy operational conditions are expected

Benefits

- Easy replacement of the switch rails without any intervention to the surrounding superstructure
- High variability in different type of the superstructure (both groove and Vignole) with no need of transition rails
- High level of safety and collision-free running
- Optimal trajectory of running surfaces is guaranteed
- Quiet and smooth running
- Continuous operation in winter thanks to the heating
- Minimal maintenance requirements thanks to minimization of switch components
- Guaranteed identical building height of the switch with the rail type used
- The block switch is designed for both running against the tip of the switch rail (take-off switch) and running on the tip of the switch rail (downhill switch)
Description

Block common crossing is manufactured as a weld of block 310C1 with connecting rails 105C1 or 73C1. Aluminothermic welding is designed for the weld of the block with the rails. After the welding, the CNC machining ensures that the grooves are of high shape variability. For easier connection to the roadway, the crossing may be equipped with anti-slide filler plates in the shape of a wedge.

Use

- Tramway construction designed primarily for paving
- Tramway construction with deep and shallow grooves

Benefits

- High variability in the geometry and building dimensions
- Applicable to the crossing angle up to 70°
- High variability in the groove shape
- Applicable to both deep and shallow grooves
- High variability regarding the shape of the superstructure
Description

The common crossing with wear resistant interchangeable insert is manufactured as a weld of rolled intermediate block with connecting rails 105C1 or 73C1. Aluminothermic welding is designed for the weld of the block with the rails. After the welding, the CNC machining ensures that the grooves are of high shape variability. In the most stressed areas, the crossing is equipped with an interchangeable insert. This insert is secured against loosening with wedge pads, which are screwed to the intermediate block. For easier connection to the roadway, the crossing may be equipped with anti-slide filler plates in the shape of wedge.

Use

- Tramway construction designed primarily for paving
- Tramway construction with single and double crossings with deep grooves
- Tramway constructions where high traffic load is expected

Benefits

- Long service life thanks to the interchangeable insert from high resistant material
- Easy replacement of the insert without any intervention to the surrounding superstructure
- High variability in the geometry and building dimensions
- High variability in the groove shape
- High variability regarding the shape of the superstructure
Description

Point machine DT2 is designed for manual operation of the tramway switches and its forcing into the extreme positions. It enables the conversion from the operational mode into the self-resetting mode.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Specification Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch gauge</td>
<td>min 1000 mm</td>
</tr>
<tr>
<td>Switch rail opening</td>
<td>max 75 mm</td>
</tr>
<tr>
<td>Thrusting force</td>
<td>standard design – max 2,2 kN</td>
</tr>
<tr>
<td></td>
<td>design with shorter lever – max 4 kN</td>
</tr>
<tr>
<td>Moment necessary for manual operation</td>
<td>100-300 Nm</td>
</tr>
<tr>
<td>Max load of the cover</td>
<td>12 t for axle load</td>
</tr>
</tbody>
</table>

Use

- Downhill tramway turnouts
- Take-off tramway turnouts in depots
- Possibility of the installation into the tramway switches made of both grooved and railway profiles
- Installation between the sleepers

Benefits

- Good price
- Low noise level thanks to inbuilt damping device
- Long service life with minimal service and maintenance requirements
Description

Point machine DT4 is designed for manual operation of the tramway switches and its forcing into the extreme positions. It enables the conversion from the operational mode into the self-resetting mode.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge</td>
<td>min 1000 mm</td>
</tr>
<tr>
<td>Switch gauge</td>
<td>max 75 mm</td>
</tr>
<tr>
<td>Switch rail opening</td>
<td>standard design – max 2,2 kN</td>
</tr>
<tr>
<td></td>
<td>design with shorter lever – max 4 kN</td>
</tr>
<tr>
<td>Thrusting force</td>
<td>100-300 Nm</td>
</tr>
<tr>
<td>Moment necessary for manual operation</td>
<td>12 t for axle load</td>
</tr>
</tbody>
</table>

Use

- Downhill tramway turnouts
- Tramway turnouts in depots
- Installation into the slender bridge structures

Benefits

- Total height only 180 mm
- Installation without recessing under the foot of the switch
- Low noise level thanks to inbuilt damping device
- Long service life with minimal service and maintenance requirements
Description

Electromagnetic point machine DT10 is designed for automatic as well as manual operation of the tramway switches. Thanks to the integrated locking mechanism of the operating rod and switch rail position sensors it secures driving against the tip of the turnout with passengers.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge</td>
<td>min 1000 mm</td>
</tr>
<tr>
<td>Switch rail opening</td>
<td>32 - 70 mm</td>
</tr>
<tr>
<td>Operating force</td>
<td>5 kN</td>
</tr>
<tr>
<td>Trailing force</td>
<td>5 - 6 kN</td>
</tr>
<tr>
<td>Thrusting force of the spring mechanism</td>
<td>2 – 3,5 kN</td>
</tr>
<tr>
<td>Moment necessary for manual operation</td>
<td>150-300 Nm</td>
</tr>
<tr>
<td>Elektrohydraulic drive</td>
<td>600 – 700 V DC</td>
</tr>
<tr>
<td>Operation time</td>
<td>0,5 – 1,5 s</td>
</tr>
<tr>
<td>Max load of the earth box covers</td>
<td>12 t for axle load</td>
</tr>
</tbody>
</table>
| Temperature range                    | standard design: -20 ...... +60 °C  
                                 | on request: -40 ...... +60 °C      |

Benefits

- Robust design
- Waterproof
- Low noise level
- Non-destructive resistance against trailing
- Long service life with minimal service and maintenance requirements
- It is primarily designed for running against the tip of the tip of the turnout. The locking mechanism of the operation rods secures the switch rails in the extreme position against accidental operation.
Description

Electrohydraulic point machine DT6 is designed for automatic as well as manual operation of the tramway switches. Thanks to the integrated locking mechanism of the operating rod and switch rail position sensors it secures driving against the tip of the turnout with passengers at speed max 15 km/h.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge</td>
<td>min 1000 mm</td>
</tr>
<tr>
<td>Switch rail opening</td>
<td>35-75 mm</td>
</tr>
<tr>
<td>Operating force</td>
<td>5 kN</td>
</tr>
<tr>
<td>Trailing force</td>
<td>ca. 4 kN</td>
</tr>
<tr>
<td>Thrusting force</td>
<td>250 – 300 Nm</td>
</tr>
<tr>
<td>Elektrohydraulic drive</td>
<td>3x400 V AC / 0,55 kW</td>
</tr>
<tr>
<td></td>
<td>1x230 V AC / 0,55 kW</td>
</tr>
<tr>
<td></td>
<td>600 V DC / 0,4 kW</td>
</tr>
<tr>
<td></td>
<td>24 V DC / 0,4 kW</td>
</tr>
<tr>
<td>Operation time</td>
<td>0,9 – 1,2 s</td>
</tr>
<tr>
<td>Max load of the earth box covers</td>
<td>12 t for axle load</td>
</tr>
</tbody>
</table>

Benefits

- Good price
- Waterproof point machine with oil filling
- Low noise level
- Total height only 180 mm
- It enables the installation into the tram track with no need of point machine recess
- Non-destructive resistance against trailing
- Long service life with minimal service and maintenance requirements
**Description**

Electrohydraulic point machine DT7 is designed for automatic as well as manual operation of the tramway switches. Thanks to the integrated locking mechanism of the operating rod and switch rail position sensors it secures driving against the tip of the turnout with passengers. The point machine meets the SIL3 security integrity level.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge</td>
<td>min 1000 mm</td>
</tr>
<tr>
<td>Switch rail opening</td>
<td>32 - 100 mm</td>
</tr>
<tr>
<td>Operating force</td>
<td>5 kN</td>
</tr>
<tr>
<td>Trailing force</td>
<td>7,5 – 10 kN</td>
</tr>
<tr>
<td>Thrusting force of the spring mechanism</td>
<td>1,8 – 3 kN</td>
</tr>
<tr>
<td>Moment necessary for manual operation</td>
<td>150 - 300 Nm</td>
</tr>
<tr>
<td>Elektrohydraulic drive</td>
<td>3x400 V AC / 0,55 kW</td>
</tr>
<tr>
<td></td>
<td>1x230 V AC / 0,55 kW</td>
</tr>
<tr>
<td></td>
<td>600 V DC / 0,4 kW</td>
</tr>
<tr>
<td></td>
<td>24 V DC / 0,4 kW</td>
</tr>
<tr>
<td>Operation time</td>
<td>0,9 – 1,2 s</td>
</tr>
<tr>
<td>Max load of the earth box covers</td>
<td>12 t for axle load</td>
</tr>
</tbody>
</table>

**Benefits**

- The lowest point machine available on the market
- Total height only 180 mm (outer earth box included) – the machine does not get below the rail foot
- Waterproof
- Low noise level
- Possibility of the installation into the tramway switches made of both grooved and railway profiles
Description

Manual point machine DT9 is a self-resetting machine with lockable setting rods and switch rail position sensors. It is primarily designed for areas with public transport against the tip of the turnout with the speed up to 15 km/h while the possibility of multiple trailing in self-resetting mode is required. DT9 enables manual operation of tramway switch rails. The point machine meets the SIL3 security integrity level.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge</td>
<td>min 1000 mm</td>
</tr>
<tr>
<td>Switch rail opening</td>
<td>36 - 75 mm</td>
</tr>
<tr>
<td>Thrusting force of the spring mechanism</td>
<td>1.3-3.1 kN</td>
</tr>
<tr>
<td>Thrusting force of the trail mechanism</td>
<td>3.5 – 4.5 kN</td>
</tr>
<tr>
<td>Moment necessary for manual operation</td>
<td>150-300 Nm</td>
</tr>
<tr>
<td>Induction sensor power supply</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Max load of the earth box covers</td>
<td>12 t for axle load</td>
</tr>
</tbody>
</table>

Benefits

- Robust design
- Waterproof
- Low noise level
- Possibility of the installation into the tramway switches made of both grooved and railway
- After the trailing, it assures safe return of the switch rails into its final position of the operation
- Long service life with minimal service and maintenance requirements
Roller chair VS-1

Roller chair VS-1 is designed to reduce the switch retaining force of the tramway switch rails from railway rails (profile 49E1). It significantly facilitates manual operation of the switches and as for the self-resetting turnouts, it assures safe return of the switch rail into its original position after the trailing.

Drainage system

It is designed to drain the rainwater and dirt from the rail grooves. Preferably it is installed in front of the turnout and therefore it protects the area around the switch rails from the dirt.

Double and triple signalling device

- possibility of signalling up to 3 directions
- high visibility at direct sunlight
- low operating costs thanks to the LED light source
- modern design
- polycarbonate body with UV radiation resistance
- increased resistance to vibration and temperature fluctuations
- degree of protection IP55
- operational voltage 24 V DC
Description of the switch control box RK-EOV

Switch control box RK-EOV secures the processing of different kinds of track signals, operating, blocking, deblocking of the switch and it ensures the communication with internal and superior system including signalization of direction and blocking on the signalling device. It also allows the control of tramway switch heating and archiving the selected data into the timeline for further evaluation. The remote access is secured by the GPS module.

The operator panel

Operator panel is designed for the manual control of the turnout and for changing of selected parameters. The panel screen enables the online monitoring of the situation of all controlled components in the system.
Description

The electronic system Rail_RC1 is a new generation device designed to transmit the control commands and operational information between mobile device and peripheral fixed equipment used in the city and suburban tramway and trolleybus transport. The binary multiprocessor equipped systém exploits progressive possibilities of the satellite navigation and the both-way radio communication at a distance up to 150 m.

- bidirectional data transmission within band 868 MHz
- multidirectional connection at distance 100 until 150 m
- standardized communication boundaries RS232, RS485, USB, IBIS, digital I/O ports
- compact transmitter equipped with vacuum pad holders can be situated onto the front glass screen or onto the instrumental panel
- illuminated color display screen 4,3” with a touch screen
- direct power supply from the board network of the traction vehicles and the fixed equipment 12/24VDC

PORTABLE PART OF THE DEVICE

1. Výstup RAIL-RC
2. Palubní rozvod trakčního vozidla
3. Přijímač RAIL-RC
4. Expander I/O portů RAIL-RC
5. Elektrická fičor akční dálkově ovládaný výhybky

Block diagram of the RAL_RC1 System

Benefits

- high operational reliability
- software configurability of the system
- operational data recording and archiving (BLACK BOX function)
- easy installation of the mobile device into the board system
- no need of cable wiring and ground excavation works during the installation
- modular design – optimization of the extent of the supplies, extension of already installed systems
Description

Remote control of the RAIL_RC System is a centralized remote control, as a software extension of operated receivers of the RAIL_RC device, provides individual data communication between each receiver (tramway turnouts) and functional Internet server via secure protocol. The implementation of this extension does not affect the operating functions of the RAIL_RC System.

Block diagram of the remote control system

Benefits

- unlimited depth of the records of archived events
- unattended data collection (transport and technical information in real time) from all operated switch control boxes integrated into RAIL_RC System without the necessity of operator’s personal visit
- the basic construction module of the dispatching system for transport organization, the preference of public transport vehicles or optimization of service operations according to the actual workload of the track superstructure and switch operating mechanism
- automatic detection and notification of the failures of RAIL_RC System (defects on external and internal turnout sensing system) including the possibility of remote control analysis
- statistical information on traffic density, switch operating mechanism workload and the presence of atypical phenomena
- remote update of the software in case of change in the transport or traffic system organization