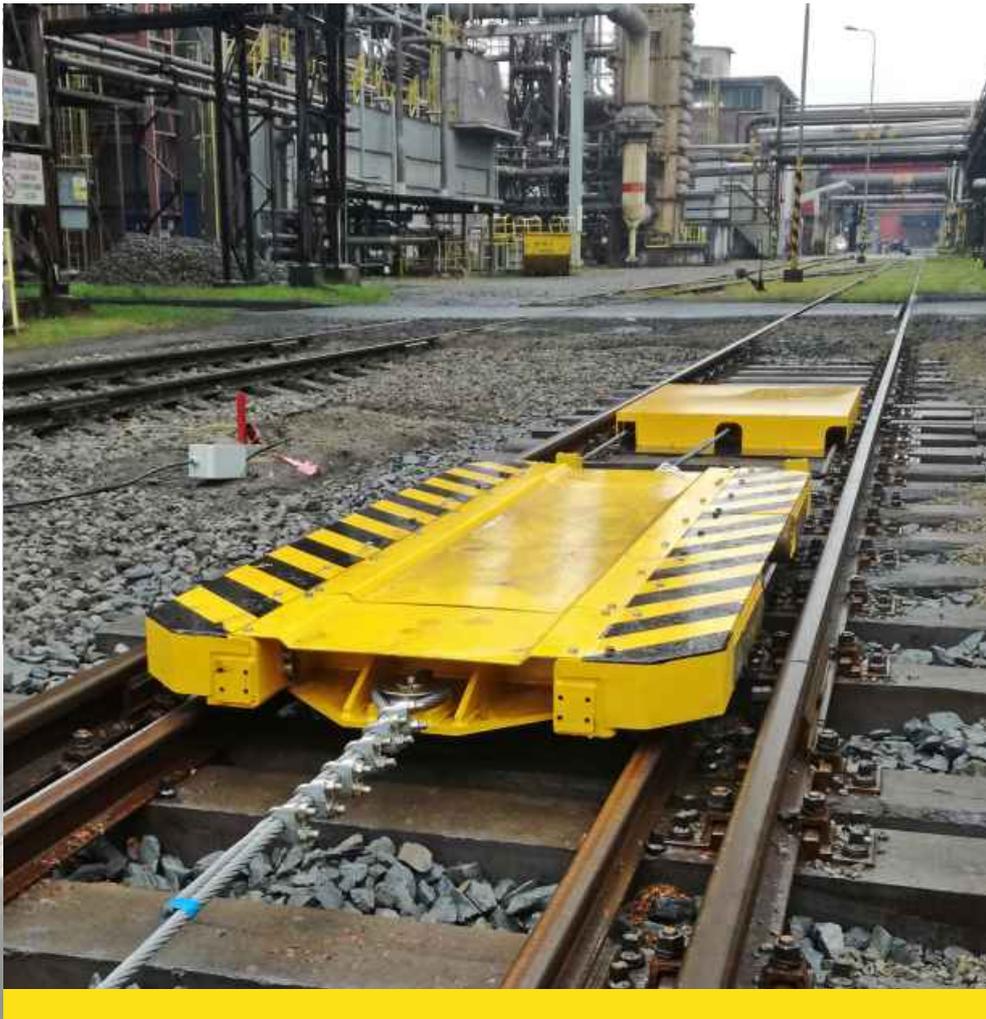


## Rope Shunting Device **LTV-PV**



## Rope Shunting Device LTV-PV

### Determination and Basic Description

The LTV-PV rope shunting device is designed to move railway wagons when loading and unloading them on railway siding and terminals. It is able, according to local conditions, to move and brake a set of wagons with a total weight of up to 2000 t. The rope shunting device is made up of basic units namely a driving station, a return station, a shifting carriage that is pulled along its own narrow-gauge track by steel rope. The prestressing in the tensioning rope is not constant, but varies depending on the desired function of the shifting carriage.

An integral parts of device are the electric distributor with a control system and a tensioning aggregate of the rope. The moving trolley in the inoperative position is moving under the wagons and opens the arms with the pushing pulleys to catch the wagon. Starting and braking are controlled by the frequency converter. The automation programmer allows logical connections to existing technology (filling nozzles and arms, track weight, etc.). LTV-PV is also able to work in an arc and in modified crossings.

The all technology of the shunting device can be designed and implemented in the area with explosion hazard.



### Basic Technical Data LTV-PV:

The Maximum towing force*:	40 - 120 kN
The omlinal output:	7.5 kW, 11 kW, 15 kW, 22 kW, 30kW
The maximum carriage speed with load / without load*:	0,2 m/s / 0,5 m/s
The maximum weight of the shifted set*:	up to 2000 t
The track slope:	up to 3 ‰
The track:	shifting in the arc and at the adjusted crossings
The operating:	from local cabinet, operators panel or remote control

\* Depending on the local conditions and needs of the user

### Driving Station

It consists of a welded frame that is anchored on the concrete foundation by the anchor bolts and inside is moving drive frame. In the drive frame is mounted a compact drive unit consisting of a 3-phase air-cooled electric motor and a planetary gearbox, on whose output flange the rope drive wheel is mounted.

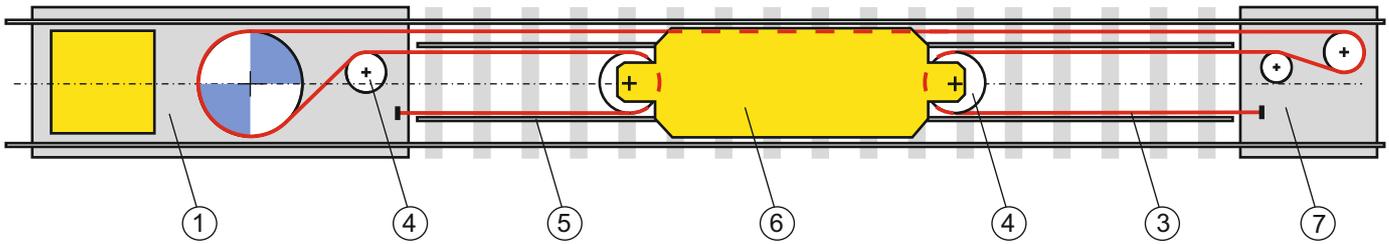
On the concrete foundation of the drive station are mounted pulleys guiding the driven rope to the return station and to the shunting carriage or anchoring the end of the rope.

Tensioning of the rope is carried out by means of a hydraulic unit or by means of an electric actuator.

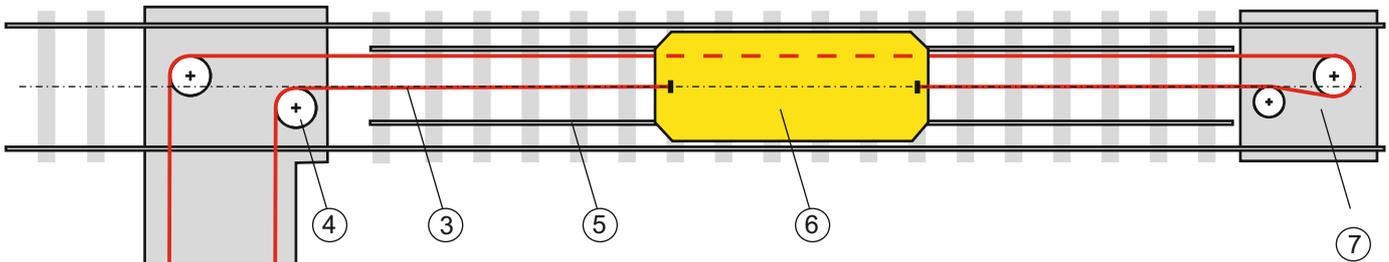
The arrangement of the main elements of the shunting device in the track requires an individual solution. It depends mainly on the available space by the track and on the required performance. The control cabinet can be located directly by the drive station or at a substation outside the track. In the track and on the carriage itself sensors are located for safe and accurate operation of the device.

Here are some examples of layouts:

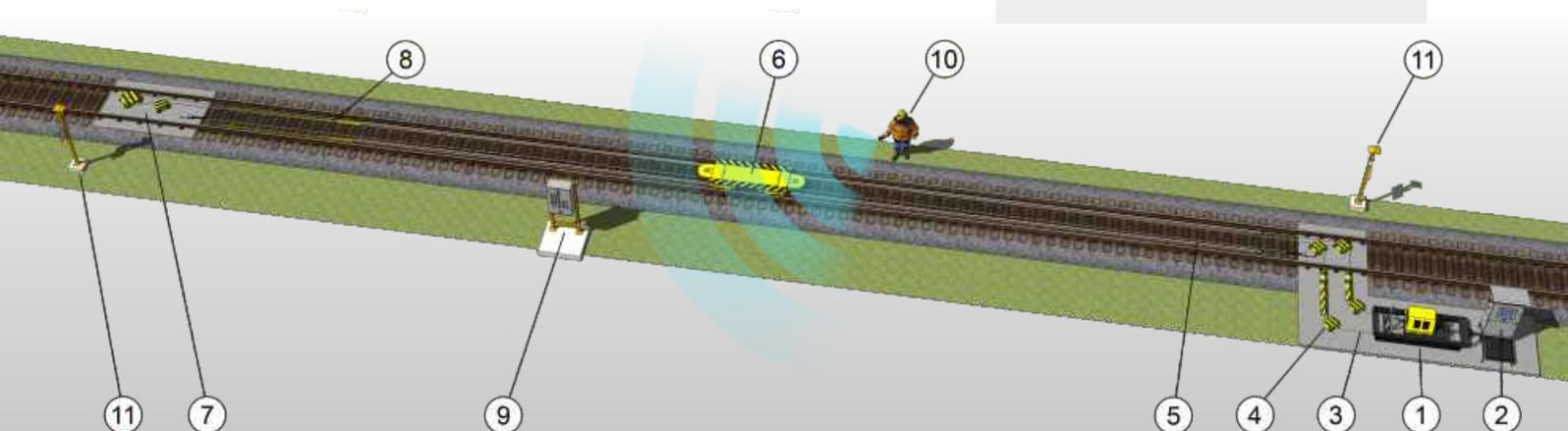
**Fig. 1)** Layout diagram of the rope shunting device LTV-PV: Shunting trolley with rollers + drive station inside the track.



**Fig. 2)** Layout diagram of the rope shunting device LTV-PV: Shunting trolley without rollers, drive station perpendicular to the track.



**Fig. 3)** Layout diagram of the rope shunting device LTV-PV: Shunting trolley with rollers + driving station parallel to the track.



- 1) Driving station
- 2) Switchgear
- 3) Tow rope
- 4) Transfer rollers
- 5) Inner carriageway
- 6) Shunting carriage
- 7) Return station
- 8) Parking position of the carriage
- 9) Local control cabinet
- 10) Operator with remote control
- 11) Light and sound signaling

### Return Station

The return station consists of a welded frame with rope pulleys and rope anchoring (in the case of a "three-rope system", the rope is firmly anchored to the concrete foundation of the return station).

The pulleys ensure that the rope is led to the shunting carriage. The construction of the return station is also protected by a steel cover.

### Travel Track and Tow Rope

For the moving the trolley under the wagons is determined own inside travel track. Its rails are attached in the workspace of the track directly to the wooden sleepers or to the so-called false steel sleepers. The running track has a lowered section on one side and creates the parking position of the trolley. In this position, the locomotive may also be driven over the parking carriage.

The non-lubricated steel rope is designed according to STN EN 12385-4 with a diameter according to the design load. In the track, the moving branch of the rope is supported by rollers or sliding plates, which reduce the wear of the rope by abrasion and keep it clean.

### Control

The shunting device is controlled by a local control box located in a clearly position near the track or by the control panel in the operating room. Another option is radio remote control. The operator can thus manipulate the railway wagons from any point on the track. The service control place is the cabinet itself, which serves only for maintenance and repairs.

### Catching the Wheelsets of the Wagon

The prestress in the towing rope is not constant but changes depending on the desired shifting function. In the working position, the trolley pushes out the arms with pushing rollers and they catch the wheelset. After the shifting wagons is over, the operator's command will reduce the prestress of the rope and the push rollers stack away. The device is then able to drive under the wagons set.

### The Course of the Shift

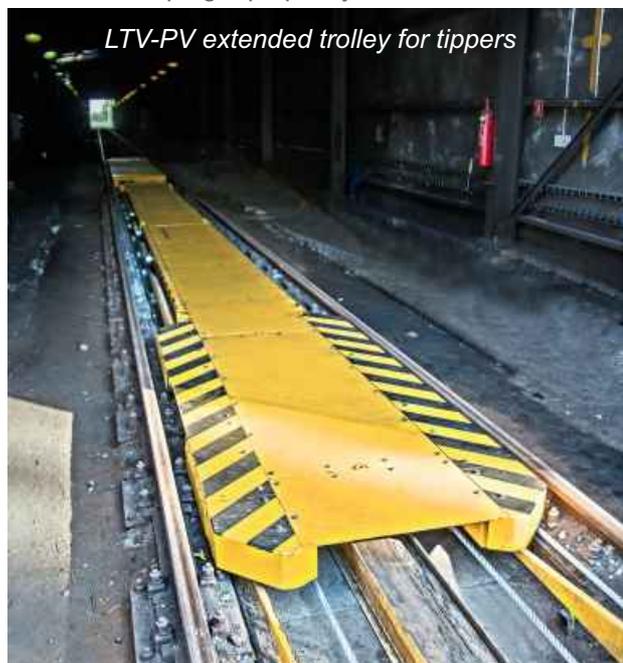
- The locomotive brings the set of wagons into the device area.
- The operator disconnects the set from the locomotive that can perform other tasks.
- Operator using a local cabinet or remote control moves the shunting trolley under the wheelset and pulls out the trolleys arms. So the arms with pulleys grabs the wheels of the wagon from both sides.
- Trolley moves a single wagon or the set to a designated location
- After loading the wagons, the operator carries the set in the same way to the place, where the locomotive it takes over.



▲ Return station with protective cover



▲ Sloping rope pulleys in an arc



LTV-PV extended trolley for tippers