KOLEJOVÉ POHONY

Rope shunting device LTV-PV

TO OPTIMIZE RAILWAY SIDINGS

Rope shunting device LTV-PV

Purpose and basic description

The LTV-PV rope shunting device is designed for moving railway wagons during their loading and unloading on railway sidings, at liquid product stockyards and terminals. It is capable of moving and braking a set of wagons with a total weight of up to 1600 t, depending on local conditions. The tension in the towing rope is not constant but varies depending on the required function of the shunting trolley. The electrical switchboard with control system and the rope tensioning unit are integral parts of the device.

In the non-working position, the shunting trolley passes under the stationary wagons and, when moving to the working position, extends the arms with push pulleys to grip the wagon. Starting and braking of the set are controlled by a frequency converter.

A programming machine in the technological switchboard allows logical links to the existing technological equipment of the siding (filling nozzles and arms, track scale, etc.). The entire shunting technology can also be designed and implemented for explosion hazardous environments if required (EX version).

Basic technical data of LTV-PV:	
Max. tractive power*:	40 - 120 kN
Electric motor output:	7.5 kW, 11 kW, 15 kW, 22 kW, 30kW
Max.speed of trolley load less / loaded*:	0,9 m/s / 0,3 m/s
Max. weight of shunted set*:	up to 1600 t
Permissible slope of trackage:	max.5 ‰
Track:	shunting possible in arc and at adjusted crossing
Control:	from local box,control panel or remote control

*According to local conditions and user's requirements

Drive station

Is consists of welded travel frame, which through the use of anchor bolts is anchored to a concrete base where the main drive travels. The drive frame contains driving unit composed of three-phase airt-cooled electric motor and planetary gearbox, on the output flange of which the drive rope pulley is mounted.

Placed on a concrete base of driving station are pulleys, guiding driving rope to the return station, shunting trolley and return to the station.

The driving rope's tightening is effected using of **hydraulic unit** or **electric actuator**.

The arrangement of the main elements of the shunting system in the track always requires an individual solution. It depends mainly on the space available next to the track and the required performance.

The switchboard with control system can be located directly at the drive station on a reinforced concrete base or in a substation outside the track. Sensors are located in the track and on the trolley itself to ensure safe and accurate operation of the cable system.

A few examples of the arrangement are given below:

Fig.1) Shunting trolley with rollers + drive station in the track:

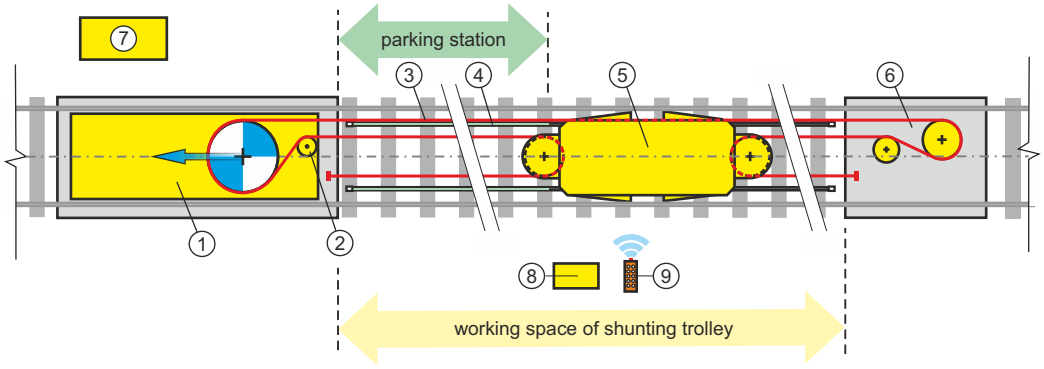
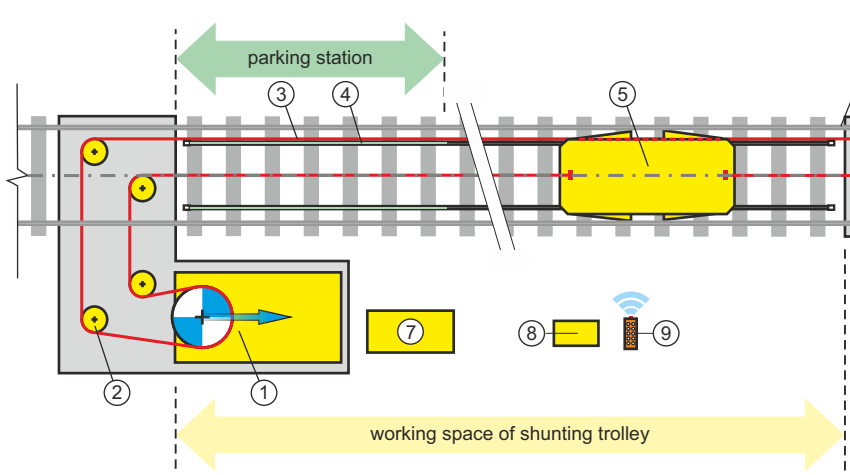
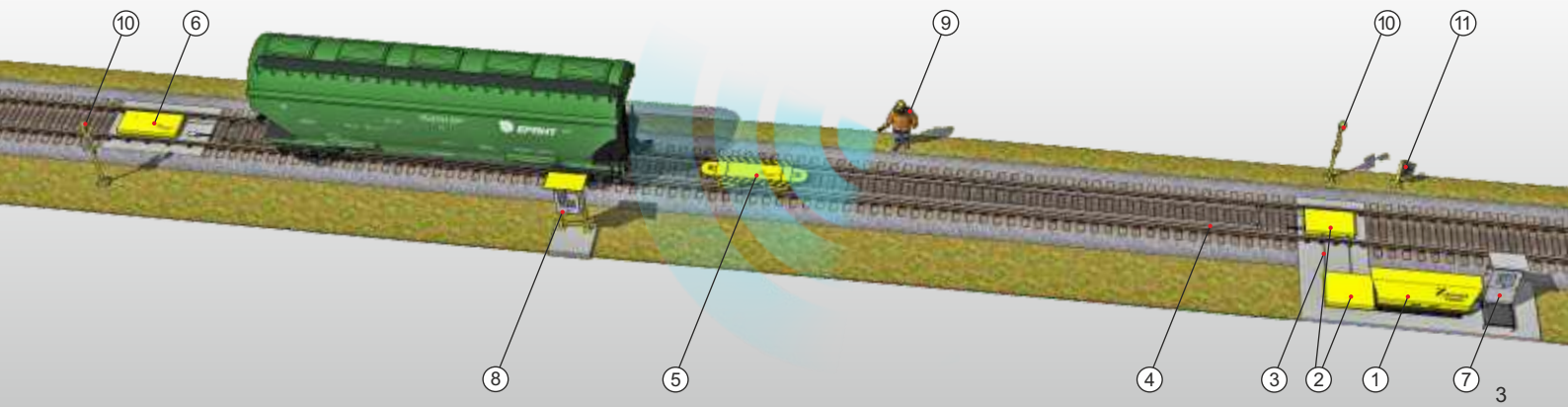


Fig. 2) Shunting trolley without rollers + drive station outside the track:



1) Drive station
2) Transmission pulleys
3) Pulling rope
4) Inner running track
5) Shunting trolley
6) Return station
7) Switch cabinet
8) Local control cabinet
9) Remote control / operator
10) Light and sound signalling
11) Dwarf semaphore (option)

Fig. 3) Layout diagram of the LTV-PV rope shunting system: shunting trolley with pulleys + driving station parallel to the track.



The return station

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

The pulleys ensure that the rope is guided to the shunting trolley (and back) where it is terminated by means of the lashing, eyelet and rope clamps.

The structure of the return station is also protected by a steel cover.

Inner track and pull rope

The shunting trolley uses its own running track inside the track to run under the wagons. Its rails are attached in the working space of the track directly to wooden sleepers or to so-called false steel sleepers placed on or between concrete sleepers. The running track has a lowered section on one side and creates the so-called trolley parking position. In this position, a locomotive can also pass over the shunting trolley.

The unlubricated steel wire rope is designed according to EN 12385-4 with a diameter according to the design load. In the track, the moving branch of the rope is supported by sliding elements that reduce wear on the rope and keep it clean."

Control

The shunting device is operated as standard by means of a local control box located in a clear position next to the track, or from a control panel in the operator's room. Another option is remote control using a radio set. In this way, the operator can operate the wagons from any location on the line. The service control point is the switch cabinet itself, which is used only for maintenance and repair purposes.

Capturing the wagon's wheelset

The tension in the conveyor rope is not constant, but varies depending on the required function of the shunting ctrolley. In the working position, the shunting ctrolley extends the push pulleys and these roll down the wheelsets of the wagon after the wagon has been caught. When the required handling has been completed, the operator commands the tension on the conveyor rope to be reduced and the push pulleys to be retracted. The trolley is then able to drive under the wagons.

In the working area of the shunting trolley, the pulling and returning rope branch is guided and supported by a system of sliding plates and closed profiles in order to reduce wear and tear on the rope.

The course of the shunting

- The shunting locomotive moves a set of wagons into the shunting device area.
- The operator disconnects the set from the locomotive so that it can perform other tasks.
- The operator uses a local box or remote control to move the shunting trolley under the wagon wheelset and extends the trolley arms. This grips the wheelset on both sides.
- Moves a single wagon or set of wagons to a designated location.
- After the wagons have been loaded, the operator shall transport the wagons by the same procedure to the place where the shunting locomotive takes over.

▲ *Return station with steel cover*

▲ *Inclined rope pulleys in a curve*

Extended trolley LTV-PV for tippers

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