



SANDING SYSTEM for trams

PZKV-01

CENTRAL LUBRICATION / HYDRAULICS

TRIBOTEC, spol. s r.o.
Košuličova 4, 619 00 Brno, Czech Republic
phone: +420 543 425 611, +420 543 425 631
fax: +420 543 212 328
e-mail: tc@tribotec.cz

www.tribotec.cz

APPLICATION

The sanding device for rail vehicles PZKV – 01 is a modern, **environment-friendly system, whose pneumatic principle ensures operational reliability.** The system is suitable for use especially in the vehicles which do not have the possibility to generate anti-skid signal. Sanding is important for braking and start-up and serves generally for the increase of the friction between the wheel and the rail. The effectiveness depends on the optimum quantity of sand, which is evenly distributed between the wheel and the rail. The pneumatic dispenser significantly reduces the consumption of sand in comparison with other mechanical systems. **The consumption is thus reduced by more than 70 %.**

The right and left sand bins are intended for mounting onto the floor inside the vehicle before its axle and serve in addition as the bases for the seats. The equipment can be routinely installed in the operated – existing bins (bases for the seats) and both sheet-metal and plastic feeders, which reduces the purchase price while preserving the function.

Besides the trams, the sanding device can be applied **also for other rail vehicles.**

DESCRIPTION AND DESIGN

The sanding device PZKV-01, Fig. 1, consists of 1 right and 1 left sand bin, which are, separately, connected via the sanding hoses to the wheels. The number of bins on the vehicle or train depends on the type of the tram.

Sand bin, Fig. 2

The sand bin (1) is made of stainless-steel sheet and the feeder (2) inserted in it is made of galvanized sheet. The feeder (2) consists of the funnel, whose slanting walls prevent the sand from clinging. The dispenser (4) is screwed to the funnel-shaped bottom.

The feeder (2) is fitted with the heater (3), which prevents the sand in the feeder from damping or freezing. In addition, the feeder (2) is fitted with a capacitive sensor, which signals when the level of sand drops below the set level. The blower (10) with the suction filter (9) is mounted on the bottom of the sand bin (1).

The volume of the feeder (2) is approximately 20 l. Sand is filled through the sieve of a mesh of 4 x 4 mm. The sand bin (1) is closed by the lid which also serves for fixation of the seat.

Dispenser, Fig. 2

The body of the dispenser (5) is manufactured as a casting with air duct which begins in the flange and ends in the discharging hollow. The brought pressure air comes out from the nozzle (6) and pushes the sand from the bottom of the funnel over the spillway edge to the discharging hollow, which is connected with the discharging pipe via a hose. The spillway edge at the same time prevents spontaneous emptying of the feeder (2) when the device is off. By shifting the setting screw (7) in the groove of the body (5) it is possible to set the nozzle (6) of the dispenser (4) so that the discharged sand quantity corresponds to the optimum amount.

Blower, Fig. 2

The blower (10) is designed as the pressure air source for the transport of sand in the sanding device for rail vehicles. It is designed as rotational, lamellar and dry-operating - it must not be lubricated. The blower (10) is equipped with suction filter (9). The supply voltage is 24 V DC, the current consumption 7.5 A, the maximum current consumption up to 10 A.

The equipment works in the temperature range –30 °C to +60 °C.

Accessories

- a) rubber sanding hose (Fig. 1, Pos. 5) of an inner diameter of 19 mm
- b) discharge pipes (Fig. 1, Pos. 3, 4)

SPREADING MATERIAL

The function and performance of the equipment depends on the spreading material. It is recommended to use lake sand with a minimum content of SiO₂ at least 50% weight, without metallic, earth and humic particles and various bonds. Sharp, solid grains, max. size 3 mm, grains smaller than 0.5 mm should be as few as possible, the optimum size of the grain is 2 mm.

PERFORMANCE

During the performance, the quantity of the supplied sand depends on the sand grain size and on the adjustment of the control nozzle approx. 1 L/min. The actual consumption depends on the time of slip of the wheel.

CONTROL

Electrically controlled sanding devices are functional after the switch-on of the control of the vehicle. The sanding device is controlled by means of the button located on the panel in the driver's cabin with the possibility of parallel connection of the impulse of anti-skid protection from the traction drive regulator.

If the control system used in the vehicle enables automatic control of sanding devices, sanding is controlled according to the commands of the anti-skid protection and it is provided by the respective bogie regulator.

If the control is manual, the sanding devices are put into operation by pressing the SLIDE – SKID button.

INSTALLATION

The sand bins with the dispenser (Fig. 1) are mounted to the floor by means of four M10 screws. The orientation of the right and left bin is front-facing. The sanding hose (Fig. 2, Pos. 5) shall be mounted to the hose connection (Fig. 2, Pos. 8) of the right and left bin and secured by means of the hose clamp. The other end of the sanding hose (Fig. 2, Pos. 5) shall be fixed to the right and left discharge pipe (Fig. 1, Pos. 3, 4) by means of the union. The correct function depends on the position of the hose. On principle it is necessary to keep the minimum angle of decline of the hose 30°. The total length of the hose (Fig. 1, Pos. 5) must not be more than 1.5 m, but it must have the possibility of free movement at turning of the bogie. The minimum bending radius of the hose is 100 mm.

The discharge pipes (Fig. 1, Pos. 3, 4) shall be mounted on the holders so that the bevelled end of the pipe is oriented tangentially to the point of contact between the wheel and the rail at a distance of approximately 80 mm from the rail and 40 to 50 mm from the wheel.

The electrical connection of the sanding device system shall be provided by means of copper wire conductors (cross section of the wires at least 1.5 mm²). For the drive of the blower and for the heater there is used the voltage 24 V DC.

MAINTENANCE

Regular inspection and maintenance of the entire sanding system is necessary for its trouble-free and reliable operation on the vehicle.

The check of tightness of the connection of the blower and the dispenser shall be performed in six-month intervals. The setting of the discharge pipes in dependence on the wear and tear (reduction in the diameter) of the tram wheel, attachment of the sanding hoses and their possible mechanical damage shall be checked continuously.

The check of the suction filter of the blower shall be performed after approximately 1,000 hours of operation of the blower. Replacement is necessary after two years of operation of the vehicle within the preventive maintenance inspection (after 120 000 km).

It is recommended from time to time to empty the bin completely and remove the remaining stuck sand.

LIST OF SPARE PARTS

Parts for regular consumption

- suction filter of the blower (Fig. 2, Pos. 9)

Parts for accidental failure

- blower (Fig. 2, Pos. 10)
- heater (Fig. 2, Pos. 3)
- sanding hoses

TECHNICAL PARAMETERS

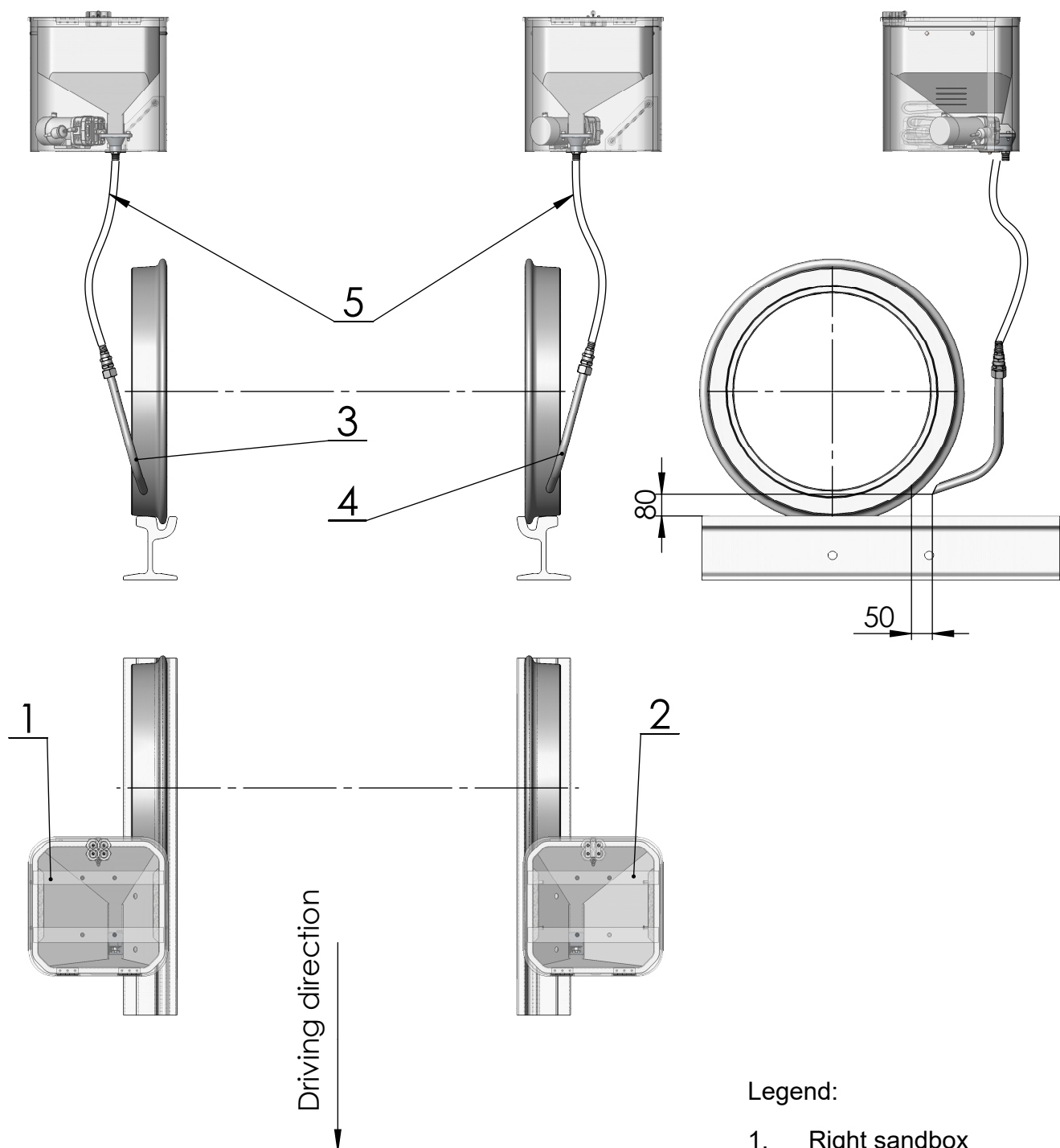
Volume of the feeder		20 dm ³
Blower	maximum pressure	0.06 ÷ 0.1 MPa
	maximum performance	80 l / min
Supply voltage		24 V DC +25% - 30%
Max. current consumption		10 A
Heater		24 V, 50 W
Range of ambient temperatures		- 30 to + 60 °C

APPENDICES

Fig. 1 – Sanding device


Fig. 2 – Sand bin

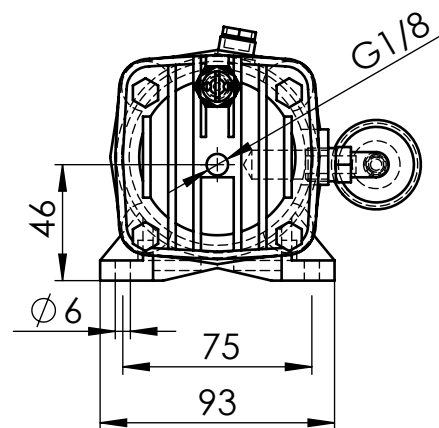
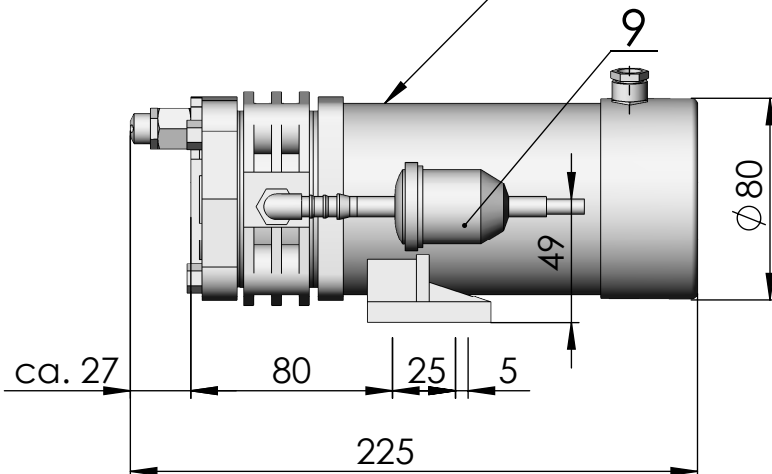
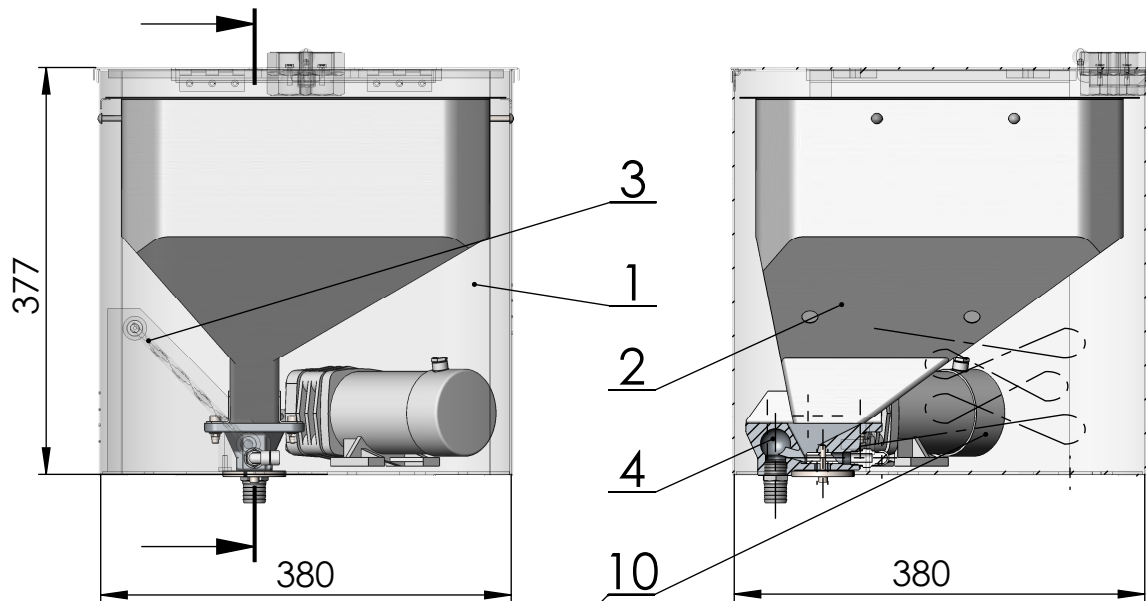
Fig. 3 – Wiring diagram



Legend:

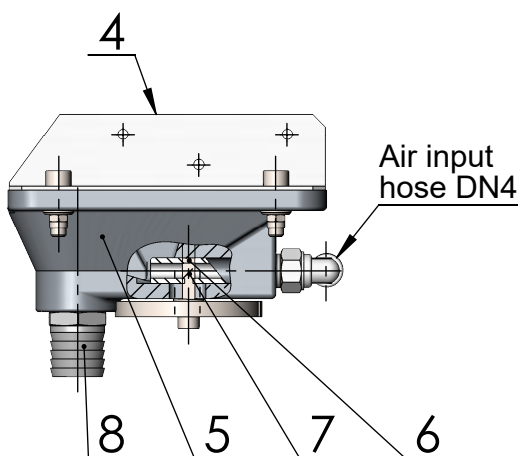
- 1. Right sandbox
- 2. Left sandbox
- 3. Right sanding nozzle
- 4. Left sanding nozzle
- 5. Sanding hose

Name	Sanding system	 Košuličova 4 Brno www.tribotec.cz +420 543 425 611
Type	PZKV - 01	

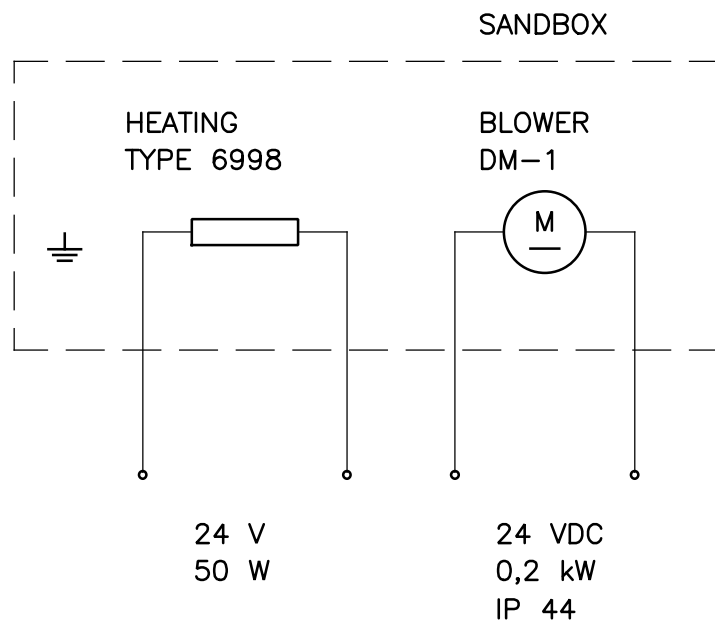



Legend:

1. Sandbox
2. Sand hopper
3. Heating 50W, 24V
4. Dispensing unit
5. Dispenser
6. Jet
7. Adjusting screw
8. Hose connection D20
9. Suction filter
10. Blower
 - max flow: 80l/min
 - max pressure: 0,06±0,1MPa
 - supply voltage: 24VDC
 - power input: 0,15kW
 - netto: 3,7kg
 - IP covering: IP44



Name	Sandbox	TriboTec s.r.o. Košuličova 4 Brno www.tribotec.cz +420 543 425 611
Type	PZKV - 01	



Name	WIRING DIAGRAM	 s.r.o. Košuličova 4 Brno www.tribotec.cz +420 543 425 611
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