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A large, light gray, stylized 'T' graphic that serves as a background for the central text. It is composed of several concentric, rounded lines that form the shape of the letter 'T'.

SANDING DEVICES FOR RAIL VEHICLES  
**KOVA - 03D**

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## 2. The Advantages of KOVA-03D-I

- simple build-in system – the reducing cabinet is completely removed , possibly the reducing the block with all air hoses accessories, fittings, etc.
- simple way of adjusting of standardised amount of sand for each wheel individually , which fulfilled the TSI standards and it is applicable for a large spectrum of used sand grit
- Direct and easy maintenance access to all of the other devices
- High resistance to mechanical damage of the dosing device is thanks to the incorporated dosing unit into protective box in three dimensional modifications
- Operational independence of sanders for each wheel significantly increases the operating reliability safety of the drive vehicle and thus the whole system.

## 3. Nomenclature Standards and Definitions of Terms

The terminology used for the TS is in conformity with TNŽ 28 0001 and the terms used in the rail vehicle field.

## 4. General Data

### 4.1 Description and Use

The sanding device is a modern, environment-friendly system which, with its pneumatic concept, guarantees a high **operating reliability, eliminating** both one-shot sand discharge and continuous sand discharge in all the enabled and disabled sandboxes above the specified level, **which is an excessive sanding**. The sanding device ensures that the adhesion coefficient between the wheel and the rail is improved when the vehicle starts to both move and brake. By doing so it improves the active safety of the train set based on pulverizing the used sand granulate which forms so called sand pockets both on the wheel and rail, and these sand pockets are used in terms of the sanding effect by the train set wheel that follows braking without an anti-skid effect. The extensive tests in the International Union of Railways has proven that the sand pockets are so stable after the very first passing that even the tenfold pass brings no changes to the size of the spreading granulate or sand pocket.

The efficiency is dependent on the optimal quantity and quality of used sand - the required parameters are stated by the Commission Decision about the technical specification for interoperability no. 2006 / 679 / EC, 2006 / 920 / EC, as well as 2012/88 / EU and 2012 / 696 / EU as of 6 November 2012 regarding subsystems for the management and security of the trans-European rail system

The sanding status indication is not a part of the sanding device delivery and it is ensured by the Client in reference to the vehicle's control system.

Sanding systems type KOVA fulfil the TSI standards, i.e. the product is in conformity with the technical requirements of Commission Regulation (EU) no. 1302/2014 (TSI LOC and PAS). TRIBOTEC is a holder of Type Examination Certificate for systém KOVA, no. 3149/1/CB/16/RST/EN/0060, issued by the Certification Body No. 3149 authorized for the product certification (Výzkumný Ústav Železniční a.s.)

## 4.2 Operation and Design

The sanding device consists of a dosing unit built into a protection box with the possibility of electric heating connected to each sand container (sand container is determined by the type of vehicle and is not a part of sanding system) and the transport hose with a heated tube positioned in the rubber holder (silentblock) which is connected via a pin screwed to the metallic tubes holder, mounted to the drive chassis of the vehicle. The silentblock ensures springing-back of the sanding hose. The sand container may be blown by the hot air passing through the dispenser body into the sand container. The sanding tubes are heated by heating units throughout the vehicle is activated. The heating unit in the sanding tubes prevents from the formation of spherical rimes at the end of the tube by keeping the temperature of the sanding tube from 45 ° C to +55 ° C during the whole operation. The thermistor is used for both the dispenser and for the sanding tube.

The deliveries of sanding equipment also include overvoltage protection, reverse polarity and interference units, these elements are part of the heating units and ensure their automatic operation.

Electrically heated sanding tubes are among the most exposed components for their functional position. High resistance has been proofed, from both mechanical damage and in terms of electric reliability. Mounting sanding tubes mounted in silentblocks allows the adjustment of their positions in the three axes so that the flow of sand directed into the center of the rail head and the point of contact with the traversing wheel. Easy replacement when damage is a huge advantage. Heating dispensers with permanent blowing sand trays are standard.

### 4.2.1 Operation Description

The operation of the sanding device is based on the vehicle's pneumatic system in two possible settings:

**Sanding device setting 1** for vehicles with a speed up to 140 km.h<sup>-1</sup>. The sanding device employs the compressed air source built in the vehicle. The compressed air reservoir intended for sanding is connected to a filter with water separator and, consequently, a solenoid valve which intermediates the sanding control. In the already operating vehicles, use is made of the original control valve which is absolutely convenient for the system. The control can be integrated in the vehicle system in the automatic mode, manual mode, or combination of both.

**Sanding device setting 2** for vehicles with a speed starting from 140 km.h<sup>-1</sup> upwards. The pneumatic system in the reducing block downstream from the control solenoid valve is branched, and the pressure reducing valves in the second branch are set to a higher pressure to increase the amount of sand supplied under the wheels. After the sanding is started, the compressed air of 8 bar to 10 bar (according to the vehicle type) controlled by the pressure

reducing valve enters the dispenser to drive the sand out into the conveying hose and, further, into the sand pipe. The sand is blown out through the heated sand pipe circumferentially between the wheel and the rail. Simultaneously with activated sanding, the compressed air controlled by the parallel pressure reducing valve is driven directly into the dispenser's discharge chamber to act as a booster for the sand flowing into the conveying hose and, further, into the sand pipe. The booster shortens the time delay between the sanding activation instant and the action of sand below the wheel to eliminate the adverse factor of a long and articulated discharge piping (conveying hoses).

#### **4.2.2 Metering Device – Dispenser**

The dispenser body is made as a cast of aluminium alloy as per ČSN 42 4384 with an air channel that starts in the flange and ends in the discharge box. The cast has reinforced the impact wall so that no abrasive wear takes place in the channel work area and the dispenser's life exceeds 20 years. The supplied compressed air comes out of the nozzle to drive the sand from the channel bottom via the spill baffle and through the dispenser's outlet hole into the discharge chamber and, further, into the conveying hose and sand pipe.

The spill baffle simultaneously prevents self-emptying of the sand box and excessive sanding in the case of a faulty pneumatic system.

#### **4.2.3 Sanding – Spreading Material**

The used sand crucially influences the operation and performance of the sanding device. Dried quartz (foundry) sand as per ČSN 72 1200 with the parameters below must be used for sanding:

- medium grain size of 0.82 mm
- grain size ranging from 0.3 mm – 1.6 mm
- content of SiO<sub>2</sub> higher than 95 %
- must be up to  $0,6 \pm 0,2 \%w$
- recommended grain size 1.2 mm – 1.6 mm

#### **4.2.4 Performance, Setting, Operation, and Efficiency**

The amount of supplied sand under the wheel is set in accordance with Commission Decision for TSI power = 400 g / 30 + 100 g / 30 for speed up to 140 km / h and 140 km / h on the power of 650 g / 30 + 150 g / 30 s. Dosing amount of sand is constant throughout the sanding. The amount of sand is set by adjusting the pressure reducing valves in combination with the metering jet dispenser. The valves are secured after the adjustment so the excessive sanding will not occur. Control of the whole system in a two-speed sanding is done automatically by the electric impulse from the control system of the vehicle, when the speed reaches 140 km / h solenoid valve (ie. speed) transfer the air system in the dosing block on the second branch and the sanding is increased to standard amount. The automatic shifting back to the first branch will be done again when the speed decrease to 140 km / h. Sanding effect increases the coefficient of friction between the wheel and rail. In operation, when there is a gradual wear of the wheel

profile and its subsequent re-profiling and change the diameter of wheels, can be done in a simple manner the new orientation of the discharging tube and that the flow of sand beneath the wheel optimized.

## 5. Climatic and Geographical Conditions

The structure and design allow the traffic in the climatic conditions defined for a mild climate as per EN 50125-1 with the following parameters:

- air temperature class outside of vehicle .....-40°C to +40°C  
for a max. period of 6 h the temperature can drop to.....-33°C
- the range of railway line altitude ..... A 1 (up to 1,400 m above sea level)
- external moisture content ..... annual average of relative humidity  $\leq 75\%$   
continuously for 30 days a year
- max. relative humidity outside of the vehicle .....100%
- max. absolute humidity present in tunnels.....30 g/m<sup>3</sup>
- raining intensity according to Class 5K3 of ČSN EN 60721-3-5..... 6 mm.min<sup>-1</sup>
- max. wind velocity ..... 35 m/s<sup>-1</sup>, exceptionally up to 50 m/s<sup>-1</sup>
- max. relative humidity inside the vehicle .....80%
- max. absolute humidity inside the vehicle ..... 13.75 g/m<sup>3</sup>
- max. snow layer height above the tread of the rail..... 140 mm
- max. water level height above the tread of the rail.....50 mm

## 6. Working Conditions

The sanding devices located in the area below the rail vehicle body. The dispenser is bolted to the sand box, the conveying hoses, sand pipes and their holders are located on the vehicle bogies. The sanding device is exposed to vibrations in vertical, transverse, and longitudinal direction in conformity with ČSN EN 61373 (the components placed in the engine compartment and below the vehicle body of Category 1, Class B, and the components installed to the undercarriage of Category 3) and it operates reliably in the environment with action of dust, sand, pebbles, el. conductive particles, water, salt, and snow. The pressure reducing valves and filtering unit are also protected with a sheet metal case situated under the rail vehicle body.

## 7. Technical Essentials of Order

The following must be stated in the technical part of the sanding device order:

- a) the designation of product delivery according to the key for the order, see Annexes of relevant modular parts (if order is itemized using the key for the order, see Annexes)
- b) valid TS

- c) special requirements (e.g. the requirement for a different paint system, or different preservation or packaging requirement than as stated in the TS, usage of foreign language, length)

Examples:

*Sanding device type of KOVA – 03D – 4 – 1 – 3 – 1 – 1 – 1 – 1 – 0 – 2 – 1,*

*System accessories – additional information: K – 4/2, 4/1.5*

*L – 4/2, 4/1/5, 4/1, 4/3*

*M – 4*

*N – 8/2*

*manufactured according to TS no. 425082157/11.*

The following must be stated in the technical part of the order (demand) for spare parts:

- name and type of component
- serial number and year of manufacture of the original device
- spare part drawing name and number (by the Spare Parts Catalogue)
- the required paint with RAL shade
- required preservation and packaging method
- special requirements

The information on the spare parts to the sanding device are given in the Spare Parts Catalogue to such sanding device which will be included by the vehicle manufacturer into the vehicle's Spare Parts Catalogue.

## 8. Basic Technical Data

If not stated otherwise, the basic technical data of the sanding device are stated at the rated supply voltage.

### 8.1 Basic technical data

The basic technical data are given for one sander and sand quantity of 400 g / 30 s + 100 g / 30 s for the speeds up to 140 km/h<sup>-1</sup> (setting 1) and for one sander and sand quantity of 650 g / 30 s + 150 g / 30 s for the speeds equal to and higher than 140 km/h<sup>-1</sup> (setting 2).

#### For the supply voltage of 24 V

|                                 |                                 |
|---------------------------------|---------------------------------|
| Supply voltage                  | 24 V DC +25% -30%               |
| Max. current drain of dispenser | 1.25 A each, 2.1 A each         |
| Max. current drain of sand pipe | 1.25 A each, 2.1 A each         |
| Dispenser's heating unit        | 24 V, 30 W, 1.25 A, 50 W, 2.1 A |
| Sand pipe heating unit          | 24 V, 30 W, 1.25 A, 50 W, 2.1 A |
| Ingress protection              | IP 65                           |
| Ambient temperature range       | -30°C + 60°C                    |
| Sand box volume                 | by the vehicle type             |

|  |                             |   |
|--|-----------------------------|---|
| Compressed-air reservoir volume  |                             | by the vehicle type   |
| Air pressure   | Range                       | 0,6 MPa ÷ 1 MPa   |
|  | Working pressure in sanding | 0,04 MPa ÷ 0,3 MPa  |
| Air consumption - sanding  |                             | 52 dm <sup>3</sup> /min / 1 sander  |
| Air consumption - blowing  |                             | 2 dm <sup>3</sup> /min / 1 sander   |
| Sand quantity up to vehicle speed 140 km/h <sup>-1</sup>   |                             | 400 g / 30 s + 100 g / 30 s   |
| Sand quantity for vehicle speed above 140 km/h <sup>-1</sup>   |                             | 650 g / 30 s + 150 g / 30 s   |
| Instantaneous sand metering quantity   |                             | 18 g / 1 s / 1 sander   |
| Sanding device activation time   |                             | do 0,2 s  |
| Remaining time to the full sanding   |                             | do 0,3 s  |
| Sanding device weight (without sand, sand box, parts of el. conductors), that is the weight of sanding device with accessories |                             | approx. 20 kg   |
| Noise emission   |                             | sanding device does not represent a source of notable noise   |
| Service life   |                             | 20 years  |
| Reliability  |                             | Verified by service life test. The inspection found that no component had required any replacement after 10 years of operation. |

#### For the supply voltage of 48 V

|  |                             |   |
|--|-----------------------------|---|
| Supply voltage   |                             | 48 V DC +25% -30%   |
| Max. current drain of dispenser  |                             | 0.6 A each, 1 A each  |
| Max. current drain of sand pipe  |                             | 0.6 A each, 1 A each  |
| Dispenser's heating unit   |                             | 48 V, 30 W, 0.6 A, 50 W, 1 A                                |
| Sand pipe heating unit   |                             | 48 V, 30 W, 0.6 A, 50 W, 1 A                                |
| Ingress protection   |                             | IP 65   |
| Ambient temperature range  |                             | -30°C – +60°C   |
| Sand box volume  |                             | by the vehicle type   |
| Compressed-air reservoir volume  |                             | by the vehicle type   |
| Air pressure   | Range                       | 0,6 MPa ÷ 1 MPa   |
|  | Working pressure in sanding | 0,04 MPa ÷ 0,3 MPa  |
| Air consumption- sanding   |                             | 52 dm <sup>3</sup> /min / 1 sander                          |
| Air consumption - blowing  |                             | 2 dm <sup>3</sup> /min / 1 sander                           |
| Sand quantity up to vehicle speed 140 km/h <sup>-1</sup>   |                             | 400 g / 30 s + 100 g / 30 s                                 |
| Sand quantity for vehicle speed above 140 km/h <sup>-1</sup>   |                             | 650 g / 30 s + 150 g / 30 s                                 |
| Instantaneous sand metering quantity   |                             | 18 g / 1 s / 1 sander                                       |
| Sanding device activation time   |                             | do 0,2 s  |
| Remaining time to the full sanding   |                             | do 0,3 s  |
| Sanding device weight (without sand, sand box, parts of el. conductors), that is the weight of sanding device with accessories |                             | up to 20 kg by the vehicle type                             |
| Noise emission   |                             | sanding device does not represent a source of notable noise |
| Service life   |                             | 20 years  |



|             |  |
|-------------|--|
| Reliability | Verified by service life test. The inspection found that no component had required any replacement after 9 years of operation. |
|-------------|--|

### For the supply voltage of 110 V

|  |  |                    |
|--|--|--------------------|
| Supply voltage   | 110 V DC +25 % -30 %   |                    |
| Max. current drain of dispenser  | 0,3 A / ks, 0,46 A / ks  |                    |
| Max. current drain of sand pipe  | 0,3 A / ks, 0,46 A / ks  |                    |
| Dispenser's heating unit   | 110 V, 30 W - 0,3 A, 50 W - 0,46 A   |                    |
| Sand pipe heating unit   | 110 V, 30 W - 0,3 A, 50 W - 0,46 A   |                    |
| Ingress protection   | IP 65  |                    |
| Ambient temperature range  | -40 °C +60 °C  |                    |
| Sand box volume  | by the vehicle type  |                    |
| Compressed-air reservoir volume  | by the vehicle type  |                    |
| Air pressure   | Range  | 0,6 MPa ÷ 1 MPa    |
|  | Working pressure in sanding  | 0,04 MPa ÷ 0,3 MPa |
| Air consumption - sanding  | 52 dm <sup>3</sup> /min / 1 sander   |                    |
| Air consumption - blowing  | 2 dm <sup>3</sup> /min / 1 sander  |                    |
| Sand quantity up to vehicle speed 140 km/h <sup>-1</sup>   | 400 g / 30 s + 100 g / 30 s  |                    |
| Sand quantity for vehicle speed above 140 km/h <sup>-1</sup>   | 650 g / 30 s + 150 g / 30 s  |                    |
| Instantaneous sand metering quantity   | 18 g / 1 s / 1 sander  |                    |
| Sanding device activation time   | do 0,2 s   |                    |
| Remaining time to the full sanding   | do 0,3 s   |                    |
| Sanding device weight (without sand, sand box, parts of el. conductors), that is the weight of sanding device with accessories | up to 20 kg by the vehicle type  |                    |
| Noise emission   | sanding device does not represent a source of notable noise  |                    |
| Service life   | 20 years   |                    |
| Reliability  | Verified by service life test. The inspection found that no component had required any replacement after 9 years of operation. |                    |

## 8.2 Basic Technical Data for Components

**Solenoid valve** (the valve is not part of the sanding device delivery, it is the vehicle's part)

Pressure working range ..... 0 bar – 10 bar  
 Supply voltage ..... 24 V / 48 V / 110 V

### Filter with water separator

Pressure working range ..... 0 bar – 17 bar  
 Filtering element ..... 5 µm  
 Weight ..... 0.2 kg  
 Flow rate ..... 18 dm<sup>3</sup>/s<sup>-1</sup>

## **Pressure reducing valve**

Pressure working range .....0 bar – 8 bar  
Weight ..... 0.3 kg

## **heating unit to heat the sand pipe**

Rated voltage.....24 V / 48 V / 110 V  
Heating output..... 30 W / 50 W  
Weight ..... 0.7 kg

## **heating unit to heat the dispensing apparatus**

Heating output.....30 W / 50 W  
Weight .....0.7 kg

## **High-pressure hose DN8 (for the distribution of air)**

Pressure .....300 bar  
Weight ..... 0.2 kg / 1 running m

## **Conveying hose (for the distribution of sand)**

Pressure ..... 10 bar / 120°C  
Weight ..... 0.45 kg / 1 running m

# **9. Technical Requirements**

## **9.1 Surface Finish**

The surfaces must be prepared for the application of primers according to ČSN EN ISO 8501-1, Preparation grade of steel substrate A Sa 2<sup>1/2</sup>. The priming shall be performed using a polyester powder paint for external application, dark gray – glossy RAL 7024 – dry film thickness 60 µm.

All the non-painted parts have a corrosion-protection surface finish corresponding to the ingress protection they are placed in.

The requirement for color finish (RAL), alternatively, for a different paint system and special surface finish of the non-painted parts must be stated in the Contract of Purchase.

## **9.2 Data on Product**

The dispenser (one piece in a set) of the sanding device is fitted with a mounted manufacturer's data plate in the Czech language with permanently legible information:

- a) full manufacturer's name and manufacturer's trade mark
- b) product type
- c) year and month of manufacture
- d) serial number
- e) dispenser's heating unit output [W]
- f) supply voltage [V]
- g) ingress protection IP
- h) weight [kg]

The data on the plates are in Czech language. The data plate parameters of the sanding device must correspond to the parameters stated in the TS. The requirement for data plate bearing a text in a foreign language must be placed in the Contract of Purchase.

All the plates must be visible and well legible without the need for device disassembly and they must be positioned so that they are correctly oriented.

### **9.3 Patent Purity**

The Manufacturer guarantees the Client that the Client's application of this product according to these TS will not cause any infringement of the third party's patent rights.

## **10. Manufacturing Requirements**

### **10.1 Inspection of Materials, Semi-products, and Components**

Only such materials that the component type, quality and processing methods are in compliance with the relevant manufacturing documents can be used for the manufacture of the sanding device. Deviations from the approved documents leading exclusively to the product's improvement shall be negotiated between the Manufacturer and Client in writing. Other deviations are not permissible.

All the materials used for the device are fire-resistant or self-extinguishing and when in contact with fire they do not generate any toxic or carcinogenic products.

The satisfactory quality of materials, semi-products and components shall be verified by the Manufacturer's own inspection authorities in collaboration with the Client's representative according to the data stated in the manufacturing details and requirements specified in these TS or, alternatively, the orders within the applicable directives.

The Client is entitled to inspect the manufacture of the sanding device and its components at the Manufacturer's site without prejudice to the statutory provisions on the responsibility for damages.

## 10.2 Dimensions and Deviations

The sanding device is manufactured according to the technical documents in conformity with these TS. The dimensions, limit deviations, surface roughness, and surface finish of the components must correspond to the data stated in the relevant applicable manufacturing documents. Inspection shall be carried out by the Manufacturer's own inspection authorities.

## 10.3 Welding

What applies to all the welding jobs is ČSN EN 15085-1 to -5 Railway applications – Welding of railway vehicles and components, and the ČD Regulation V95/5 AMENDMENT No. 1 Welding regulation for railway vehicles, their units and components. The sanding device's weldments are ranked into the certification level CL 1 (in case only the weld type classes CP A, CP B or CP C1 are present in them) or CL2 (in case the weld type classes CP C2 or CP C3 are present in them) as per ČSN EN 15085-1 to -5 and ČD V 95/5 AMENDMENT No. 1. The welding contractor must have a valid certificate under ČSN EN ISO 3834-2.

This certificate must be issued by the independent certification body with accreditation in the Czech Accreditation Institute (CAI):

- for the welding process as per ČSN EN 45011, SKP 35.00 or subgroup 35.20 and 35.50;
- for the quality systems as per ČSN EN ISO/IEC 17021 for NACE 30.20 or for repairs 33.17.1 as per the standards of ČSN EN ISO 9001 series, including the welding process as per ČSN EN ISO 3834-2 and ČSN EN 15085-2.

The Client reserves the right to execute, within the first part of the acceptance procedure, a customer's audit of the Quality Assurance System focused on special processes (welding, bonding, varnishing).

## 11. Testing

For test purposes, the following definition is made for a so called normal environment as per ČSN EN 50125-1:

Temperature ..... +25°C ± 5°C  
Relative humidity..... < 85%  
Ambient air pressure..... 84 kPa – 107 kPa

### 11.1 Single Process Test

The test is performed by the Manufacturer of each sanding device on a test rig according to Id. no. ZS001, the Test Report on the Single Process Test is elaborated for the test containing, apart from the readings, the data below:

- a) manufacturer's name
- b) type of device
- c) year of manufacture and serial number
- d) accordance of the main dimensions with drawings, check for completeness
- e) trial operation for a period of 3 x 30 s
- f) insulation condition (voltage test)
- g) the delivery of a new sanding device shall be substantiated with the splashing water tightness test completion report – on condition the box is the part of the delivery
- h) date, signature of responsible Quality Dpt. worker, stamp

After the Single Process Test has been completed and the Test Report on the Single Process Test is elaborated, the pressure reducing valves are sealed.

## **11.2 First Fitting-to-Vehicle Test**

This test is used to verify the fitting of the sanding device into the specific vehicle type, to optimize the length of conveying hoses, to check the setting of sand pipes, to verify the assembly technology and training of the Client's workers. The Manufacturer's professional workers shall carry out the example assembly of the sanding device into the first vehicle at the Client's site (*it is not a part of the delivery*) during which they will make the Client's workers familiar with the required procedures, adherence to the specified technology, including the application of fixtures and equipment necessitated by the assembly under simultaneous observation of the safety and quality criteria. Verification is done during the first assembly to see if the sanding device meets all the conditions to be easily and quickly fitted into the vehicle and if no undesirable interference exists with the other parts of the vehicle.

## **11.3 Test with Sanding Device Fitted to Vehicle**

The fitting of the sanding device to the vehicle shall be followed by the sanding device operation test. Measurement shall be made for the quantity of sand supplied by the individual sand pipes, correct adjustment of the sand pipes, and correct device installation with regard to the adherence to the vehicle running profile. Further testing shall be carried out for compressed air supply system leakage – tightness must be proven for a period of 10 minutes – air leakage is prohibited. A report must be compiled from the sanding device test after it has been fitted to the vehicle and this report must be archived for a period of 10 years with the manufacturer that performed the device installation, any copy of this report shall be submitted to the vehicle keeper.

## **12. Scope of Supply**

The scope of supply contains the entire packaged KOVA-03D sanding device set or the modular parts of the sanding device (if it is ordered by items) in conformity with the order, including the accompanying documents attached externally to the goods in accordance with Article 19 of these TS.

## **13. Spare Parts**

The spare parts marked according to the Spare Parts Catalogue must be ordered by means of a separate Contract of Purchase.

The Manufacturer guarantees that the required spare parts will be delivered for a period of 10 years from the date the warranty period had expired. When installed, the spare parts are of such quality that they will in no way impair the quality of the whole system.

The Manufacturer recommends that the spare parts given and marked in the Spare Parts Catalogue are stored as permanently accessible spare parts for each 20 operated sanding devices.

## **14. Preservation**

The sanding device is packaged as per Article 18. All the parts are preserved in such a way that, under the storage conditions as per Article 21, the sanding device can be stored for three months from the date of dispatch. In case of longer storage in the extent of a maximum of 6 months from the date of dispatch, the sanding device must be checked visually and, if required, recover its preservation coating.

## **15. Packaging**

The sanding device set, including the accompanying documents as per Article 19, is packed in a cardboard container (box) or in a wooden box, coated with plastic foil, and taped.

## **16. Accompanying Documents**

The accompanying technical documents supplied with the delivery are in Czech language. The requirement for both the delivery of documents in a different language and the delivery of any further documents must be stated in the Contract of Purchase.

### **16.1 Documents Supplied Together with the First Delivery**

- 1) Description and Operation and Maintenance Manual to the sanding device
  - 1 x copy in the printed form
  - 1 x in electronic editable form on CD (the electronic version will contain no signatures)
- 2) The Spare Parts Catalogue for the sanding device with representation, part number, and consumption of spare parts for three-year operation

- 1 x copy in the printed form
- 1 x in electronic editable form on CD (the electronic version will contain no signatures)
- 3) Declaration of Product Conformity as per ČSN EN ISO/IEC 17050-1
  - 1 x original in the printed form
- 4) Single Process Test Protocol
  - 1 x original in the printed form
  - 1 x in electronic form on CD

The documents shall be controlled, i.e., a minimum of one submitted print shall be kept under the Contractor's control for the entirety device's life.

## **16.2 Documents Supplied with Each Sanding Device**

- 1) Dispatch list
  - 1 x copy in the printed form (see Annex no. 11)
- 2) Quality and completeness certificate
  - 1 x original in the printed form
- 3) Process Test Protocol
  - 1 x original in the printed form
- 4) IOJ Acceptance Report as per ČD V 6/1
  - 1 x original in the printed form

## **16.3 Documents Supplied for Design and Construction Work on Vehicles**

- 1) Mutually agreed technical specifications
  - 1 x original in the printed form for all the organizations listed in the Approval Certificate of the TS
  - 1 x in electronic editable form on CD for the customer (the electronic version is without signatures).
- 2) Outer contour 3D models of the selected parts of the sanding device (STEP, IGES)
  - 1 x in electronic form on CD

## **16.4 Further Documents**

If the customer requires the supplied documentation in other language than Czech and for the supply of further documents, must be these requirements stated in the Contract of Purchase.

## **17. Transportation**

The packaged sanding device must be positioned in the transport vehicle in such a way as to eliminate the possibility of mechanical damage due to vibrations and weather effects during transportation. Slings must not make any damage to the surface of the sanding device. Loading and unloading should be carried out with care.

## **18. Storage**

When storing the sanding device, the Client is obliged to store the sanding device in a dry, closed space protected from dust and atmospheric impacts as well as aggressive fluids or gases which can cause damage to the paint and induce corrosion. The Client is responsible for storage after delivery. In case of longer storage, a check must be made on the condition of paint each 6 months and recover it if needed. The sanding devices cannot be put to stacks. When storing, ČSN 63 0001 and ČSN 64 0090 standards must be observed.

## **19. Installation**

The sanding device must be installed into the rail vehicle professionally under the observance of safety regulations. The Client guarantees that the sanding device is to be installed into the vehicle in a professional and proper manner. The sanding device's installation into the vehicle must be free from any infringements of the provisions of ČSN 28 0312 and UIC 505 -1 depending on which of the regulations is applicable to the vehicle.

The DN 8 air hoses which interconnect the entire system are installed to the vehicle undercarriage so as the hoses can move freely in reference to the vehicle body. The minimum bending radius of the hose is 120 mm. The pipe is mounted in such a manner that the bevelled end points tangentially to the place of the wheel's contact with the rail at a distance of 50 mm to 70 mm from the wheel and 80 mm to 110 mm from the head of the rail. The electrical connection of the solenoid valves and heating units shall be carried out by the Client according to the wiring diagram. Cable interconnection with conductor cross-sectional area of min. 1.5 mm – as per ČSN EN 50343 point 5.5. The electrical wiring of the heated sand pipes and heated dispensers shall be carried out in accordance with the Technical Instruction for Wiring of Heated Sand Pipes and Heated Dispensers.

## **20. Operation and Maintenance**

The sanding device in service is inspected, operated, and maintained in conformity with the Description and Operation and Maintenance Manual elaborated by the sanding device's manufacturer and the Manual shall be incorporated by the Client into the maintenance instruction for the entire vehicle.

Periodical maintenance and inspections of the system is essential for reliable and trouble-free vehicle operation. All the pneumatic circuit joints shall be checked for tightness and the sand pipes for adjustment at one month interval while the mechanical damage to the conveying hoses shall be inspected visually on a continuous basis during the daily servicing and directing the sanding tubes under the wheels.



## **21. Safety, Hygiene and Environmental Impacts**

### **21.1 Safety**

The sanding device manufactured, installed, operated and maintained in compliance with the elaborated technical documents meets the requirements for the safe operation in the rail vehicle.

### **21.2 Hygiene and Environmental Impacts**

Thorough maintenance of the sanding device according to the elaborated technical documents supplied by the manufacturer of this device will prevent undesirable leakage of sand even in long-term operation.

### **21.3 Recycling**

For the manufacture of the sanding device are used recyclable materials. To terminate this device's service life, its user has to adhere to the applicable legislation (including the associated legislation) and public notices which regulate the disposal of wastes. The materials used in the product do not have any waste-related hazardous properties both during and after the termination of the product's operation and they can be treated as Waste Category "O".

## **22. List of Cited and Associated Standards and Regulations**

|                    |  |
|--------------------|--|
| ČSN ISO 9223       | Corrosion of metals and alloys. Corrosion aggressiveness of atmospheres. Classification  |
| ČSN ISO 8501-1     | Preparation of steel surfaces before application of painting materials and similar products – Visual assessment of surface cleanliness – Part 1: Levels of corroding and stages of preparation of steel substrate without coat and steel substrate after complete removal of preliminary coats |
| ČSN EN ISO 12944-5 | Painting materials – Anticorrosion protection of steel structures with protective painting systems – Part 5: Protective paint systems  |
| ČSN EN 60721-3-5   | Classification of environment conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 5: Ground vehicle installations   |
| ČSN EN 60529       | Rates of protection – guard (protection – IP code)   |
| ČSN EN 60077-1     | Railway applications – Electric equipment for rolling stock – Part 1: General service conditions and general rules   |

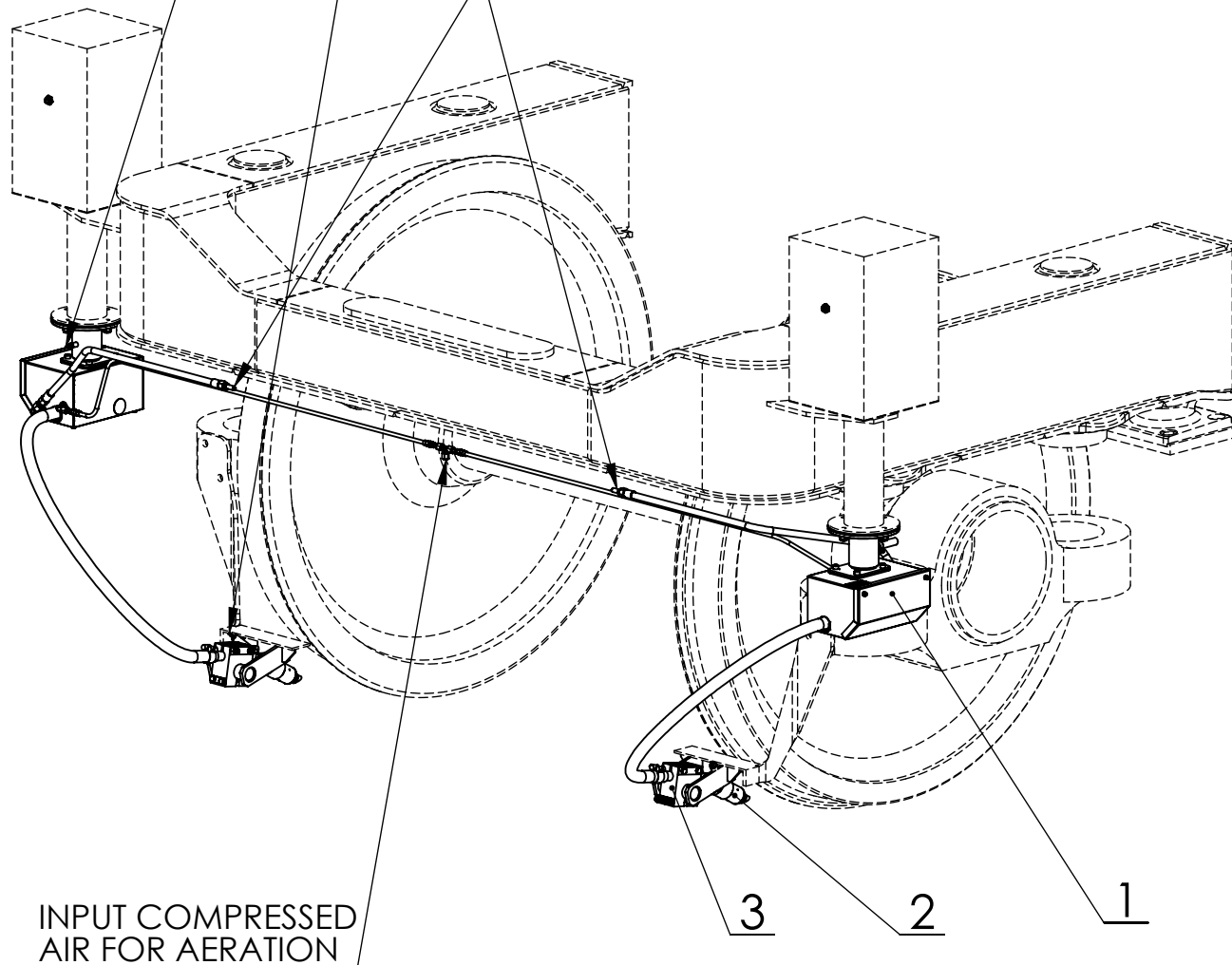
|                           |   |
|---------------------------|---|
| ČSN EN 50125-1            | Railway applications. Environmental conditions for equipment – Part 1: Equipment on board rolling stock                                   |
| ČSN EN 61373              | Railway applications – Rolling stock equipment – Shock and vibration tests.   |
| ČSN 64 0090               | Plastics. Storing of plastic products   |
| ČSN 72 1200               | Quartz sands. Basic technical requirements  |
| ČSN EN 15085-1            | Railway Applications – Welding of Railway Vehicles and Components – Part 1: General   |
| ČSN EN 15085-2            | Railway applications. Welding of railway vehicles and components – Part 2: Quality requirements and certification of welding manufacturer |
| ČSN EN 15085-3            | Railway applications. Welding of railway vehicles and components – Part 3. Design requirements.   |
| ČSN EN 15085-4            | Railway applications. Welding of railway vehicles and components – Part 4: Production requirements.                                       |
| ČSN EN 15085-5            | Railway applications. Welding of railway vehicles and components – Part 5: Inspection, testing and documentation.                         |
| ČSN EN 10204              | Metallic materials – Types of inspection documents  |
| ČSN EN ISO/IEC 17050-1    | Conformity assessment – Supplier's declaration of conformity – Part 1: General requirements   |
| ČSN 63 0001               | Rubber products. Storage and treatment of rubbers and products made from rubber   |
| ČSN 28 0312               | Checking of vehicle gauge and measurement of quantities decisive for vehicle gauge. Technical Specifications                              |
| ČSN EN 50343              | Railway applications. Rolling stock. Rules for installation of cabling  |
| ČSN 42 4384               | Foundry aluminium alloy 42 4384 AlSi10CuMn  |
| ČSN EN ISO 3834-2         | Quality requirements for fusion welding of metallic materials – Part 2: Comprehensive quality requirements                                |
| ČSN EN 45011              | General requirements for bodies operating product certification systems   |
| ČSN EN ISO/IEC 17021      | Conformity assessment – Requirements for bodies providing audit and certification of management systems                                   |
| ČSN EN ISO 9001           | Quality Management System – Requirements  |
| TNŽ 28 0001               | Railway vehicles. Railway vehicle terminology   |
| UIC 505-1                 | Eisenbahnfahrzeuge.Fahrzeugbegrenzungslinien, 10. Ausgabe, Mai 2006“  |
| ČD V 95/5 AMENDMENT No. 1 | Welding regulation for railway vehicles, their units and components   |
| ČD V 6/1                  | Regulation for railway vehicles. Performance of customer product audits in suppliers of railway vehicles or components                    |

|                             |  |
|-----------------------------|--|
| Ref. No. 31741/08-OŘ        | Railway operator instruction to ensure smooth and safe railway traffic no. 1/2008 – Amendment 09/2008  |
| 2006/679/EC and 2006/920/EC | Commission Decision on Technical Specification for Interoperability  |
| Act No. 301/2004 Coll.      | Full version of Act No. 266/1994 Coll. on Railways, pursuant to the amendments enforced by Act No. 189/1999 Coll., Act No. 23/2000 Coll., Act No. 71/2000 Coll., Act No. 132/2000 Coll., Act No. 77/2002 Coll., by the ruling of the Constitutional Court published under No. 144/2002 Coll., Act No. 175/2002 Coll., Act No. 320/2002 Coll., and Act No. 103/2004 Coll.   |
| Act No. 106/2005 Coll.      | Full version of Act No. 185/2001 Coll., on waste and amendment of some other acts, pursuant to the amendments enforced by the Act No. 477/2001 Coll., Act No. 76/2002 Coll., Act No. 275/2002 Coll., Act No. 320/2002 Coll., Act No. 167/2004 Coll., Act No. 188/2004 Coll., Act No. 317/2004 Coll., Act No. 7/2005 Coll., Act No. 444/2005 Coll., Act No. 222/2006 Coll., Act No. 314/2006 Coll., and Act No. 186/2006 Coll., as amended by later regulations |

VOLTAGE SUPPLY HEATING DISPENSING UNIT:  
24 VDC, 48 VDC, 110 VDC

SUPPLY OF HEATING NOZZLES:  
24 VDC, 48 VDC, 110 VDC

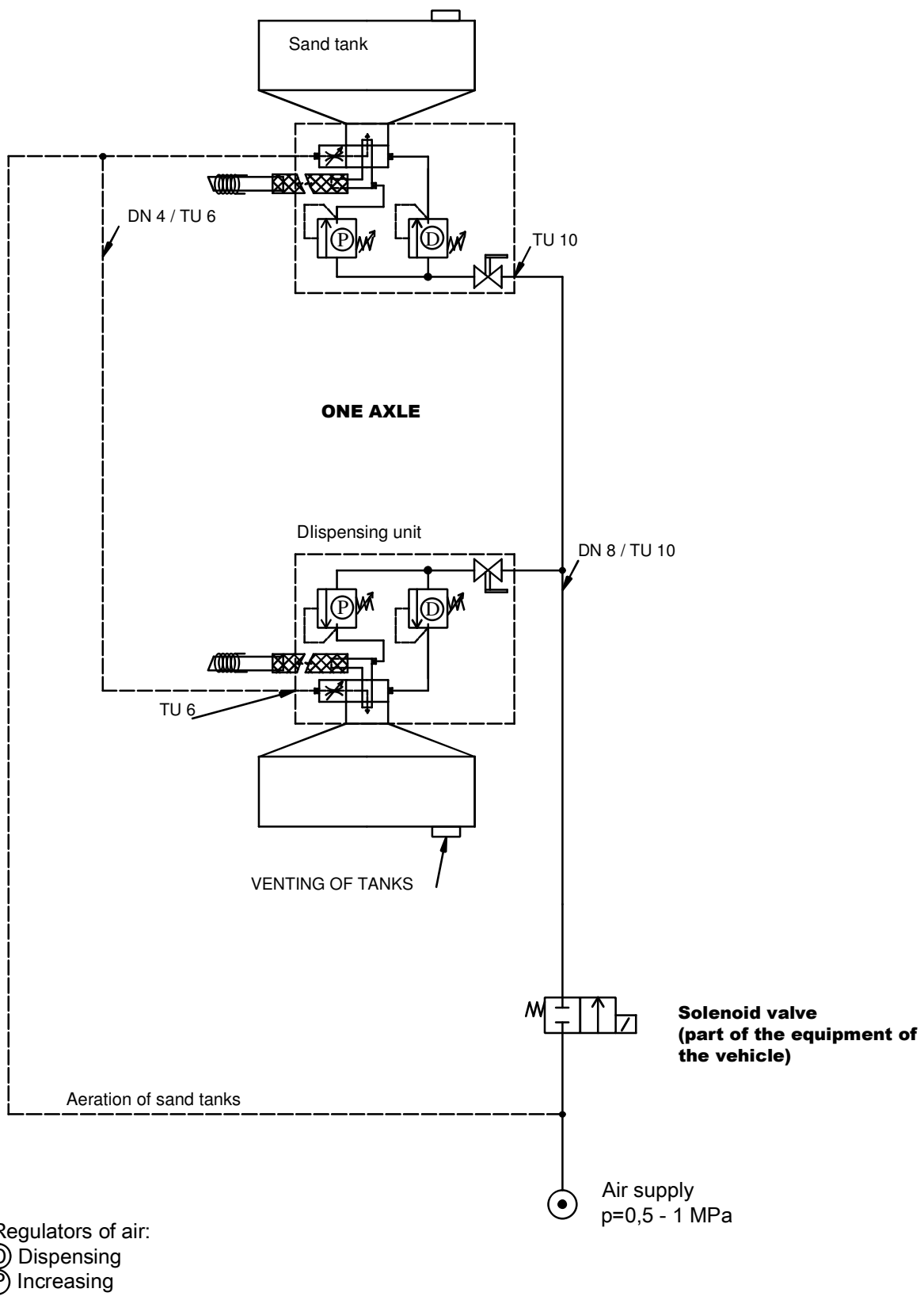
INPUT OF COMPRESSED AIR FOR SANDING



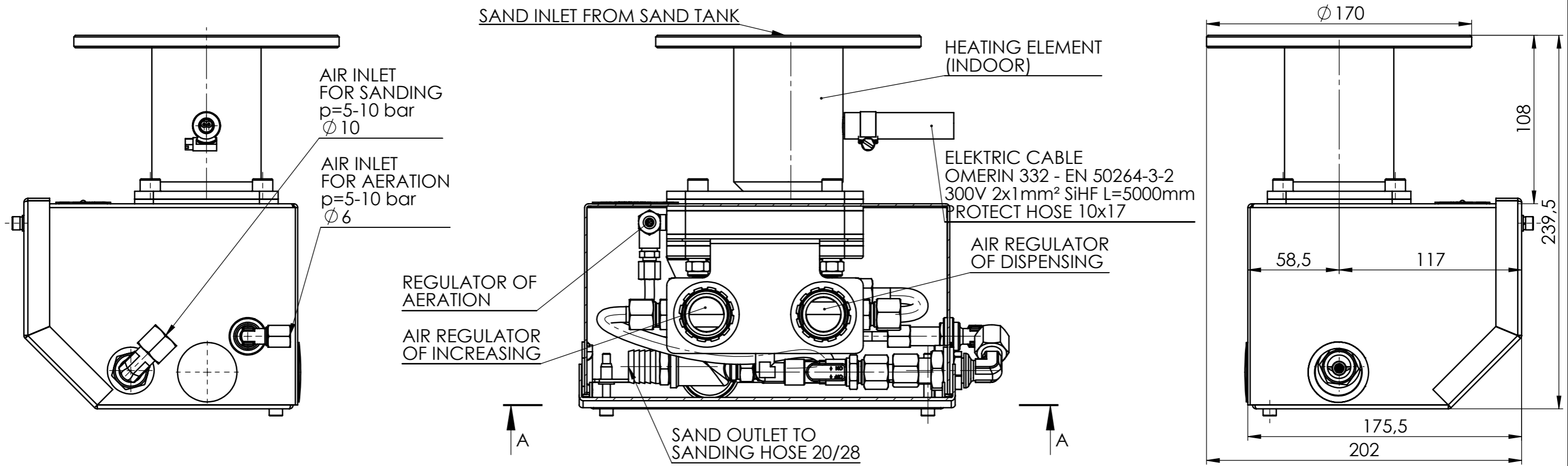
LEGEND:

- 1. DISPENSING UNIT
- 2. NOZZLE
- 3. HOLDER OF NOZZLE

|      |                           |  |
|------|---------------------------|--|
| Name | SANDING SYSTEM - ONE AXLE | ©Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA-03D-I                |  |
| Code |                           |  |

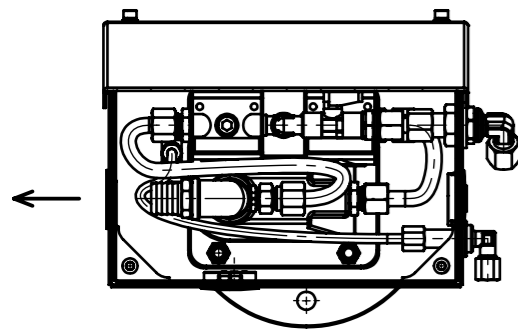


|      |                             |  |
|------|-----------------------------|--|
| Name | PNEUMATIC SCHEME - ONE AXLE | s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA - 03D - I              |  |
| Code |                             |  |

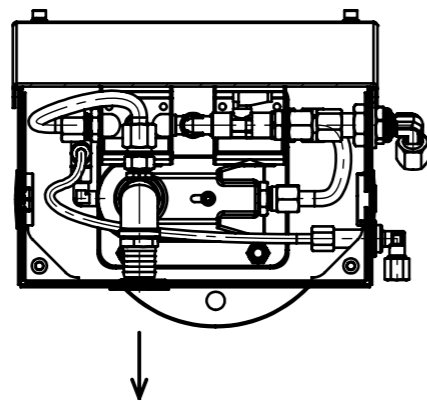


A-A (SCALE 1:5) VARIANTS OF OUTLET SANDING HOSE:

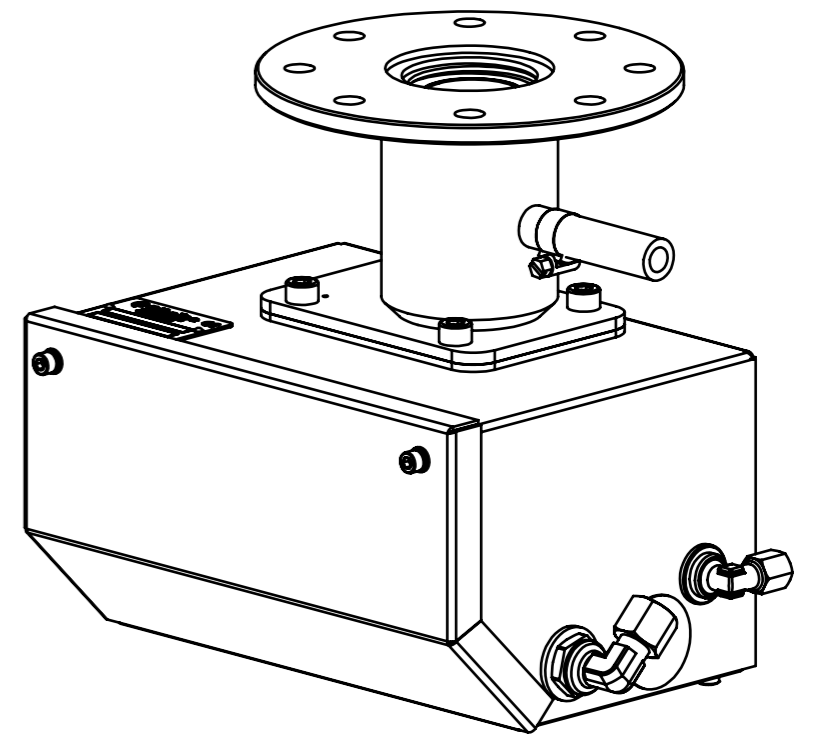
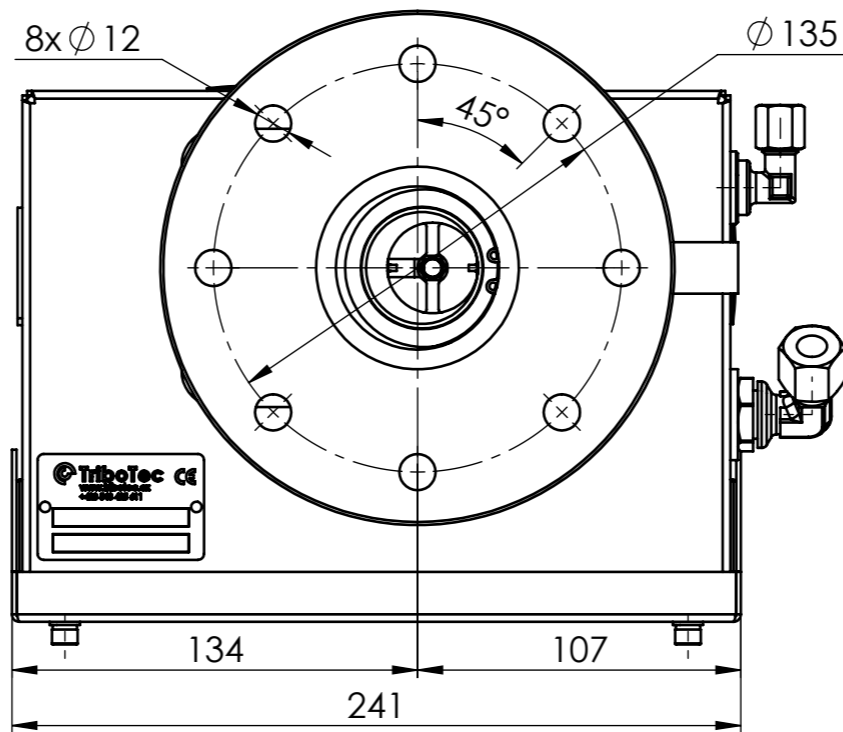
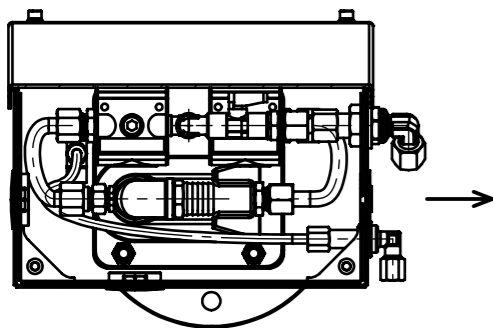
ON THE LEFT



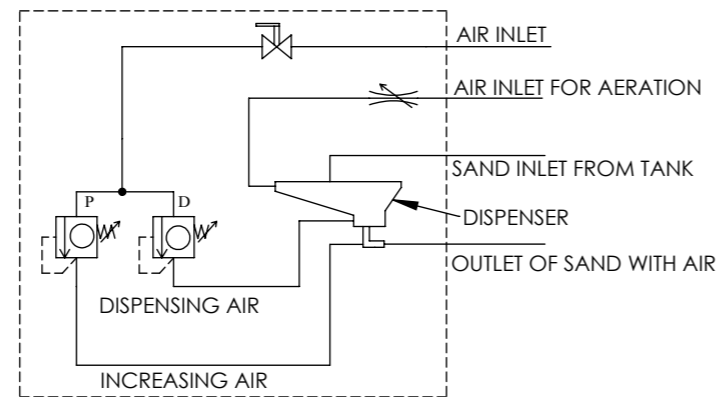
ON THE BACK



ON THE RIGHT



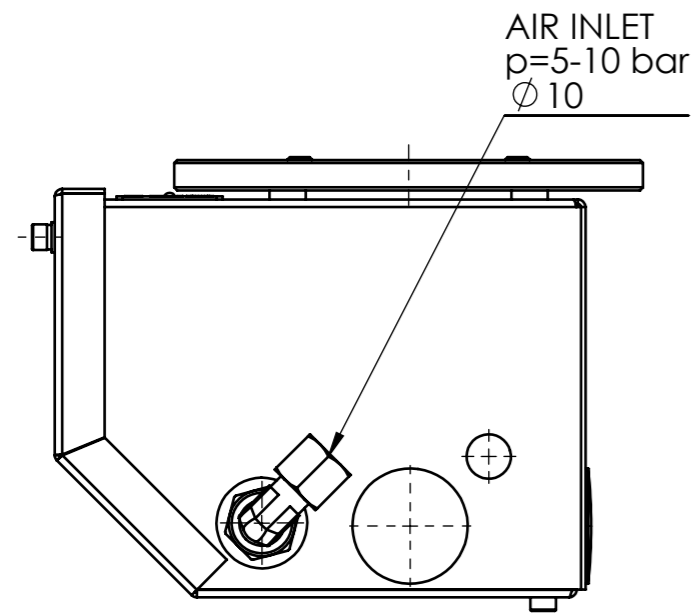
PNEUMATIC SCHEME :



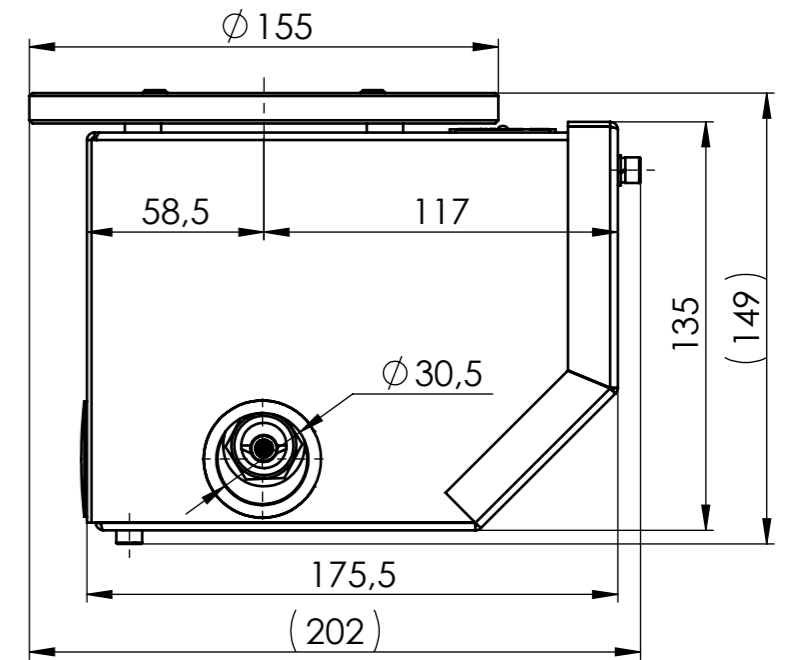
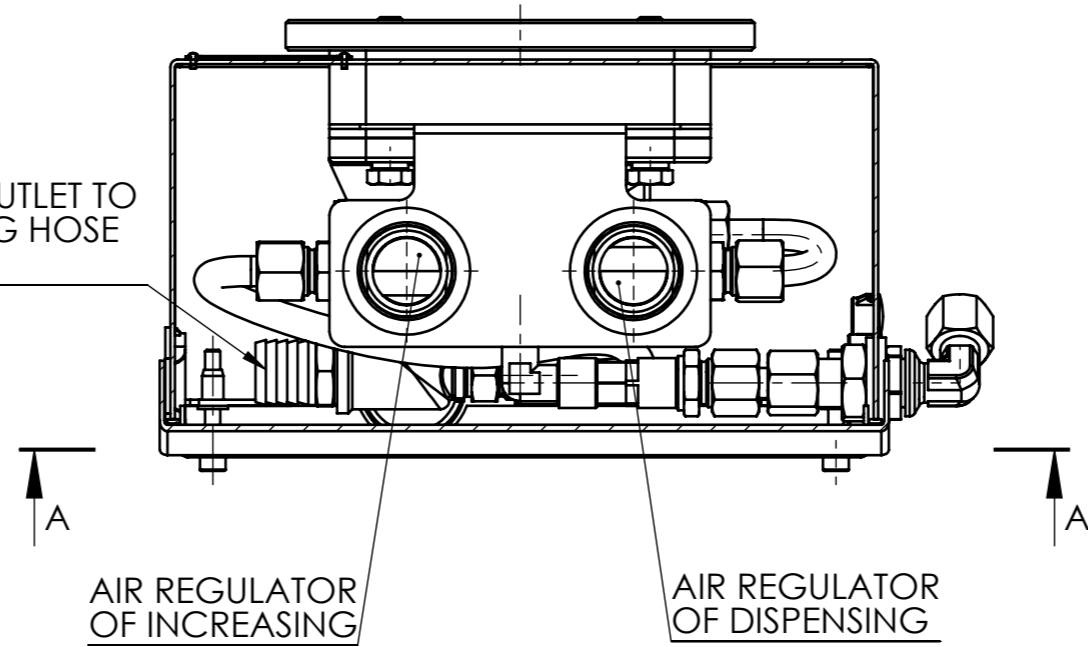
VOLTAGE SUPPLY FOR HEATERS (V DC): 24, 48, 110  
 POWER OF HEATERS (W): 30, 50

|      |  |
|------|--|
| Name | DISPENSING UNIT FOR SINGLE SPEED VEHICLE WITH HEATING AND AERATION |
| Type | KOVA - 03D - I   |
| Code | 8 53 5648  |

**Tribotec** spol. s r.o.  
 Košuličova 4, 619 00 Brno  
 www.tribotec.cz  
 +420 543 212 328

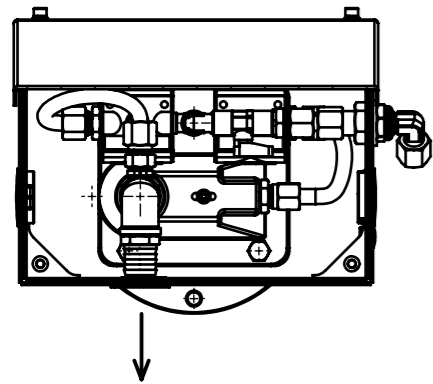


SAND OUTLET TO SANDING HOSE 20/28

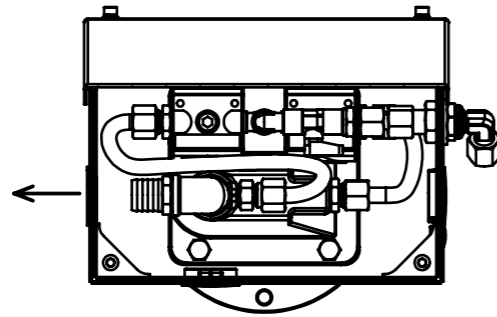


A-A (SCALE 1:5) VARIANTS OF OUTLET SANDING HOSE

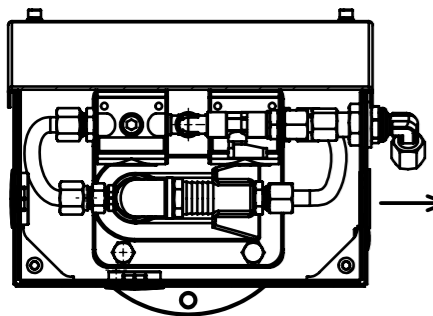
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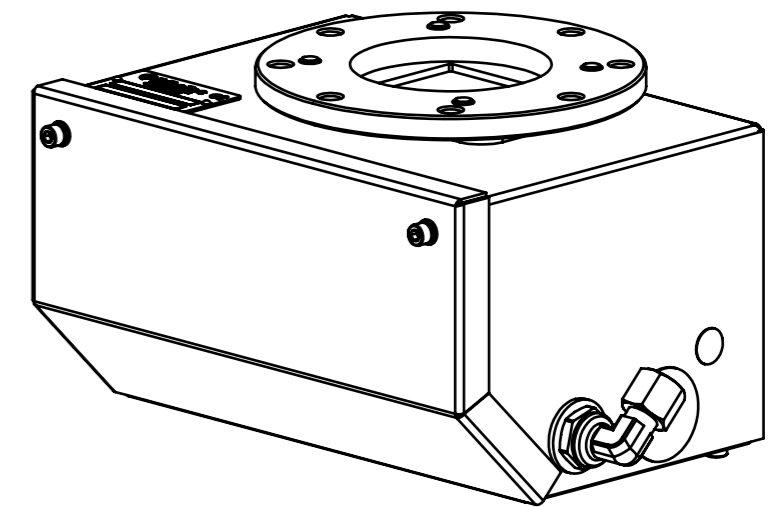
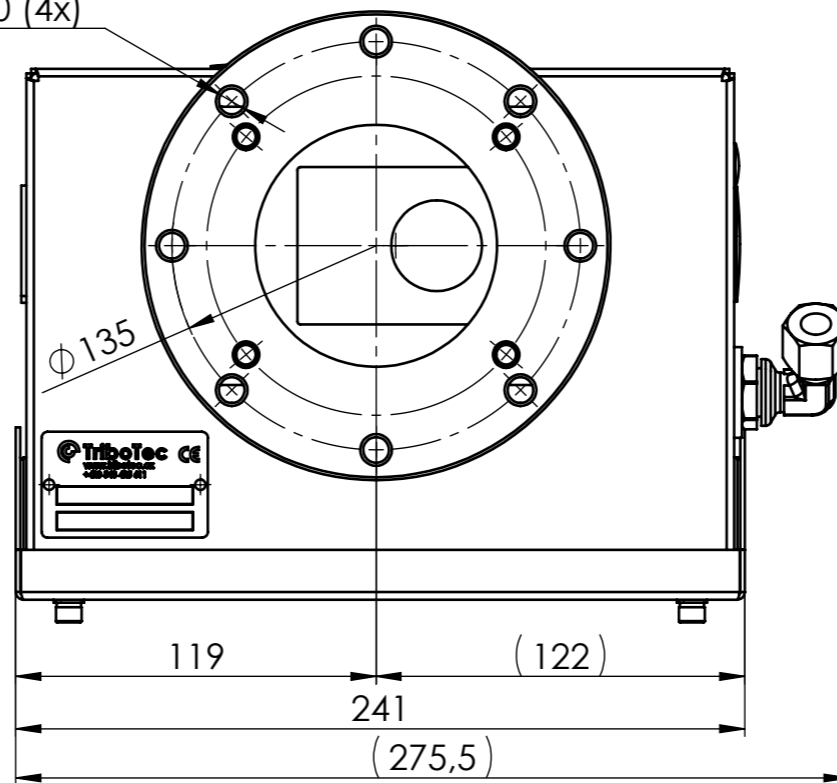
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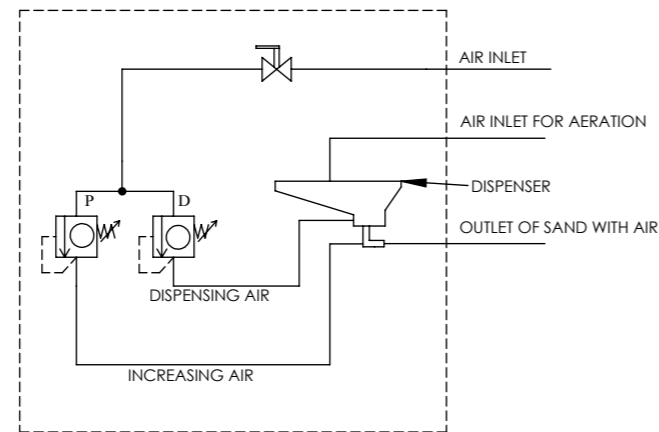
ON THE RIGHT



M10 (4x)



PNEUMATIC SCHEME:

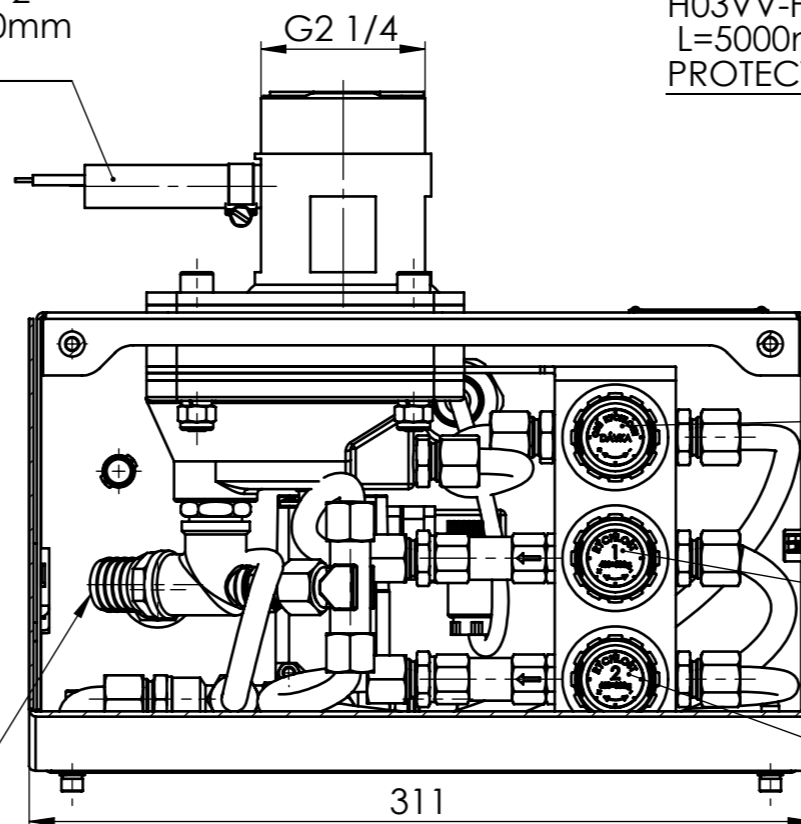
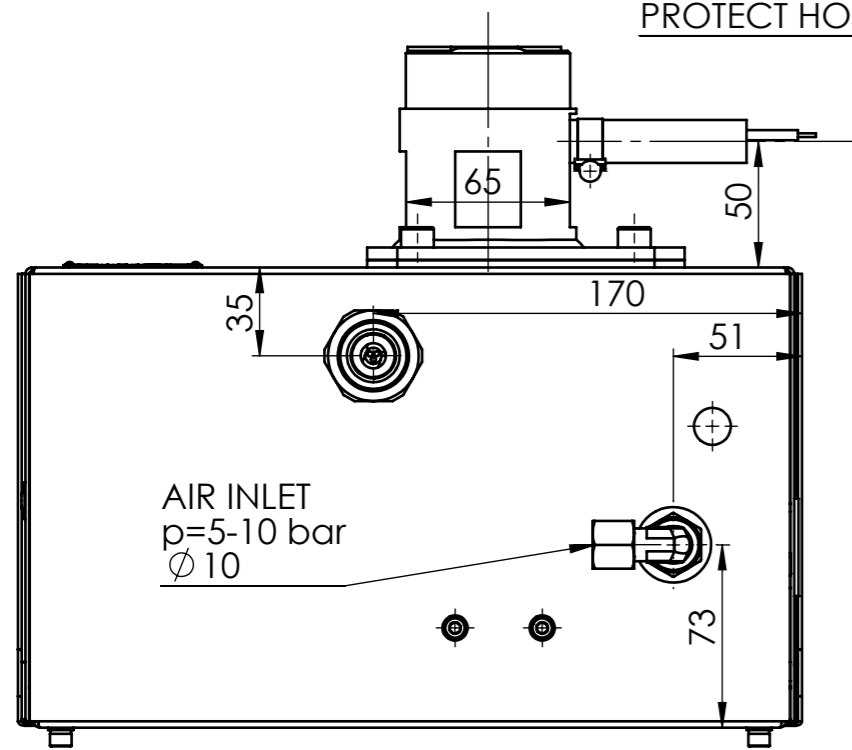


|      |   |
|------|---|
| Name | DISPENSING UNIT FOR SINGLE SPEED VEHICLE WITHOUT HEATING AND AERATION |
| Type | KOVA - 03D - I  |
| Code | 8 53 5265   |

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 Košuličova 4, 619 00 Brno  
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 +420 543 212 328

ELETRIC CABLE  
 OMERIN 332 - EN 50264-3-2  
 300V 2x1mm<sup>2</sup> SiHF L=5000mm  
 PROTECT HOSE 10x17

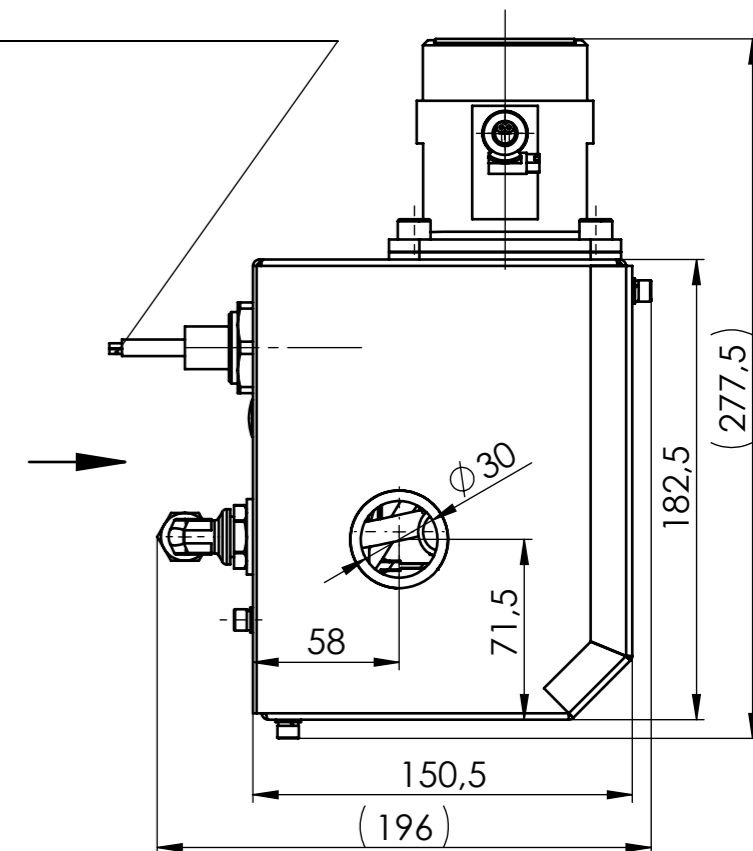
ELECTRIC CABLE FOR SOLENOID VALVE  
 H03VV-F 3G0,75 - HD308 S2 ČSN EN 50 525-2-11  
 L=5000mm  
 PROTECT HOSE 10x17



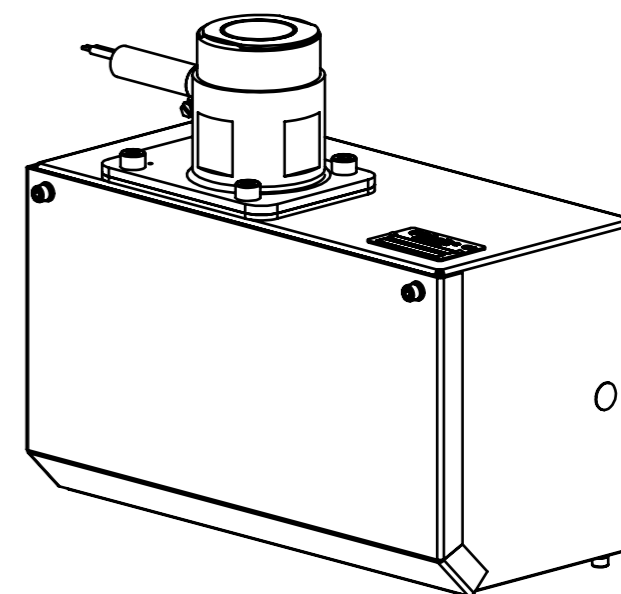
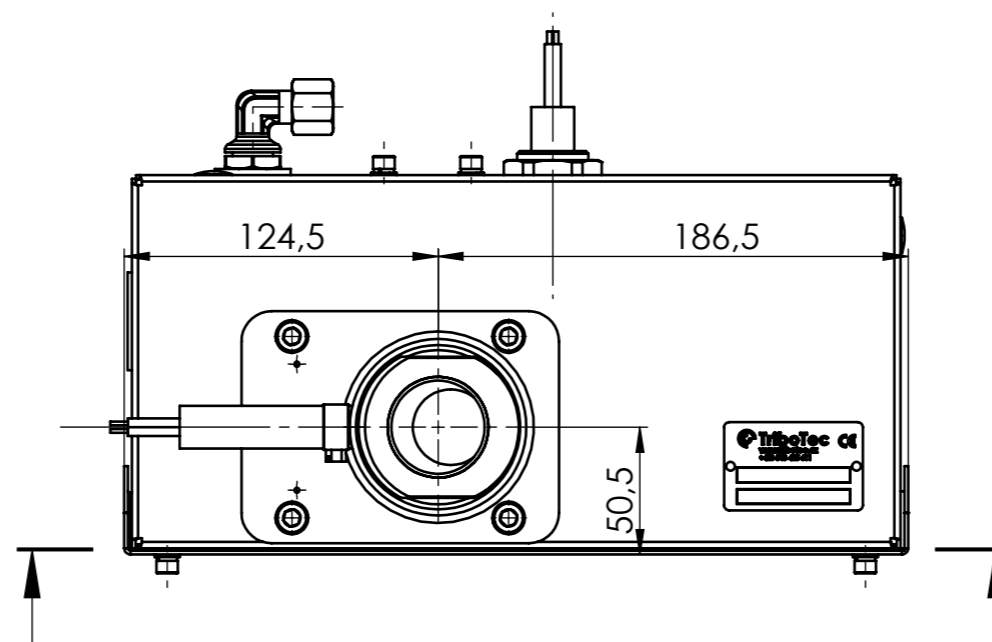
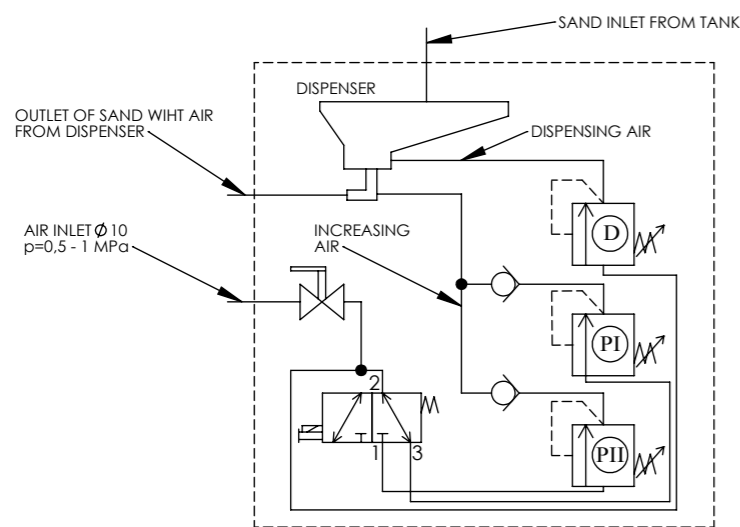
AIR REGULATOR  
 OF DISPENSING

AIR REGULATOR  
 OF INCREASING  
 FOR SPEED 1

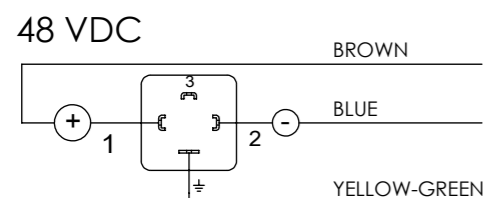
AIR REGULATOR  
 OF INCREASING  
 FOR SPEED 2



PNEUMATIC SCHEME:



WIRE DIAGRAM



|         |               |
|---------|---------------|
| SPEED 1 | to 140 km/h   |
| SPEED 2 | over 140 km/h |

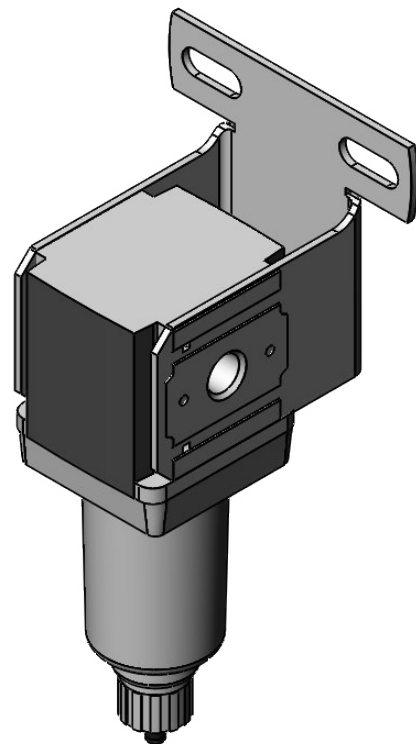
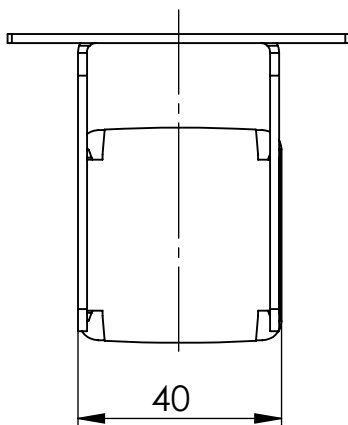
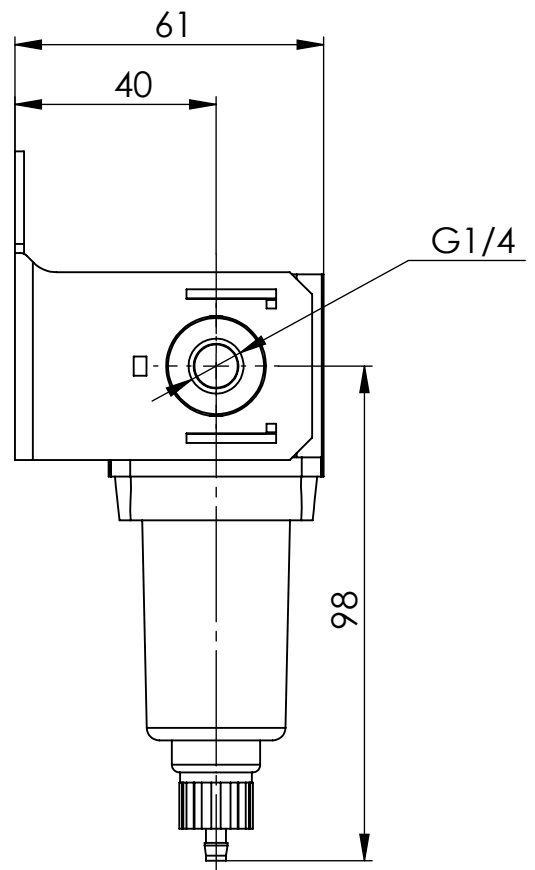
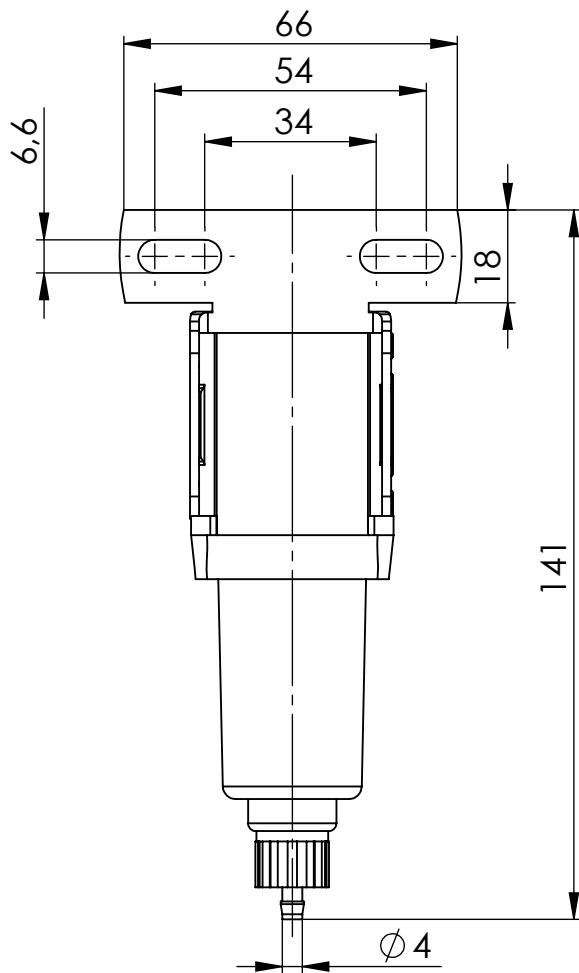
| STANDARDS FOR SANDING |                |
|-----------------------|----------------|
| to 140 kph            | over 140 kph   |
| 400+100g/30sec        | 650+150g/30sec |

VOLTAGE SUPPLY FOR HEATERS AND CONTROL OF SOLENOID VALVE (V DC): 24, 48, 110  
 POWER OF HEATERS (W): 30, 50

|      |  |
|------|--|
| Name | DISPENSING UNIT FOR DOUBLE SPEED VEHICLE |
| Type | KOVA - 03D - I                           |
| Code | 8 53 5648                                |


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 www.tribotec.cz  
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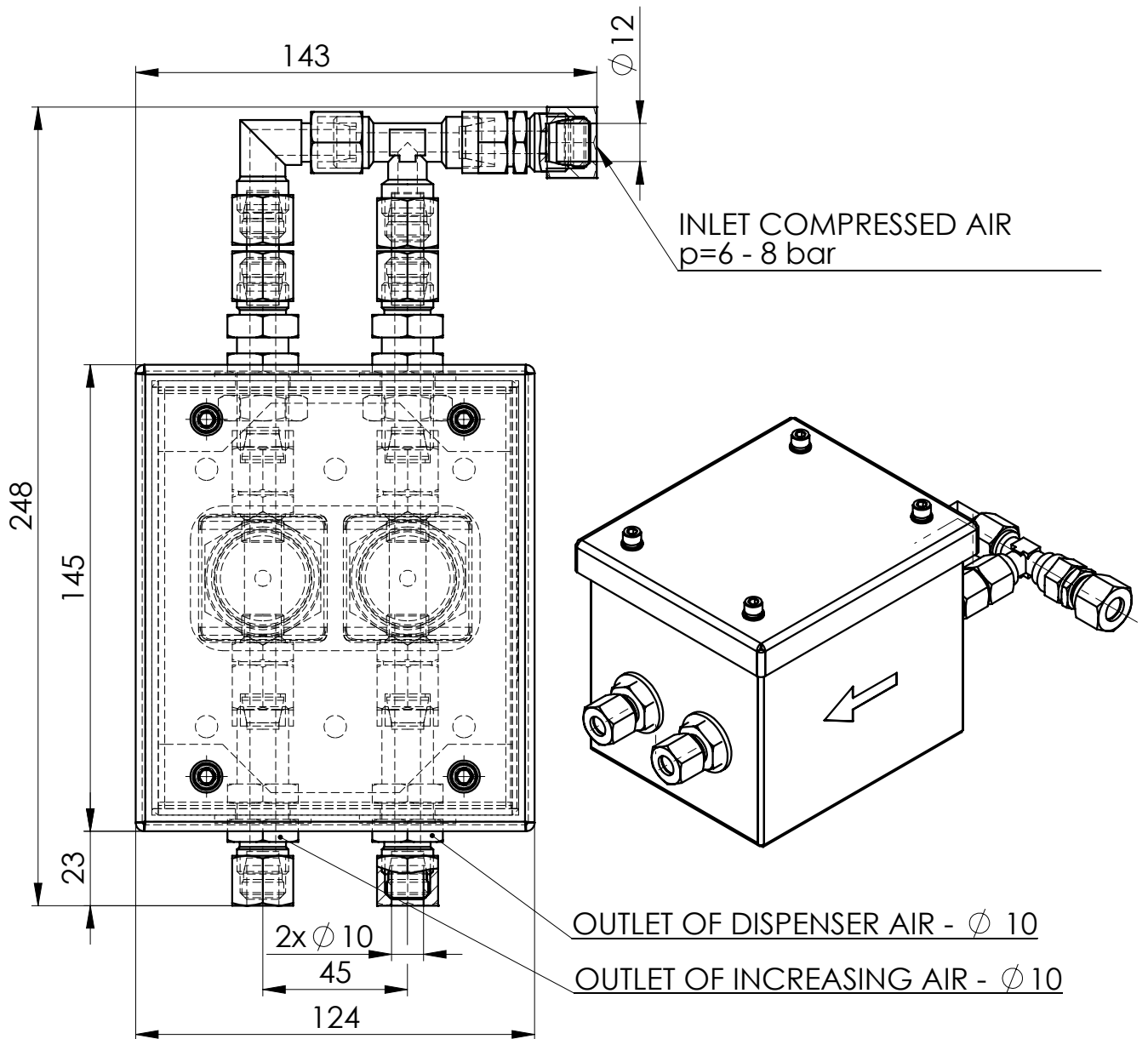
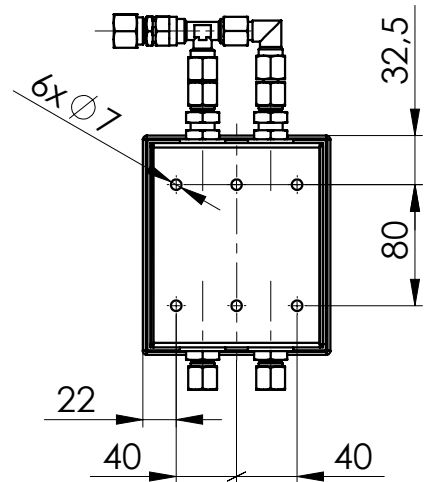
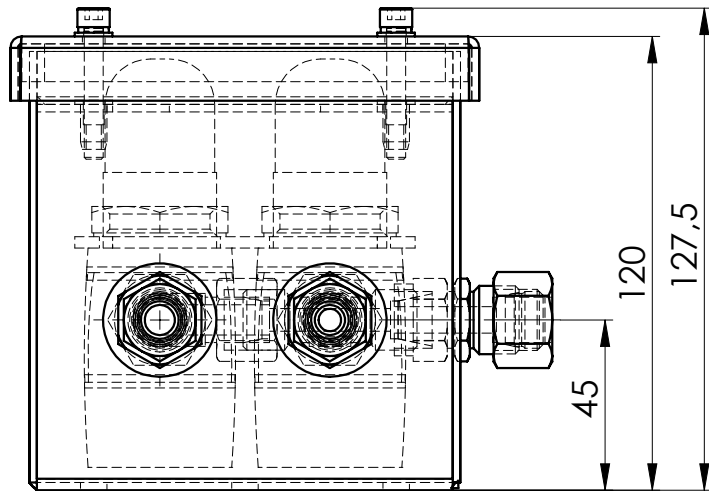




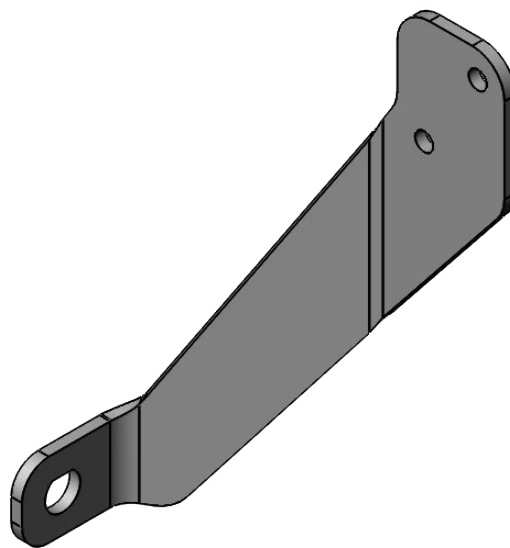
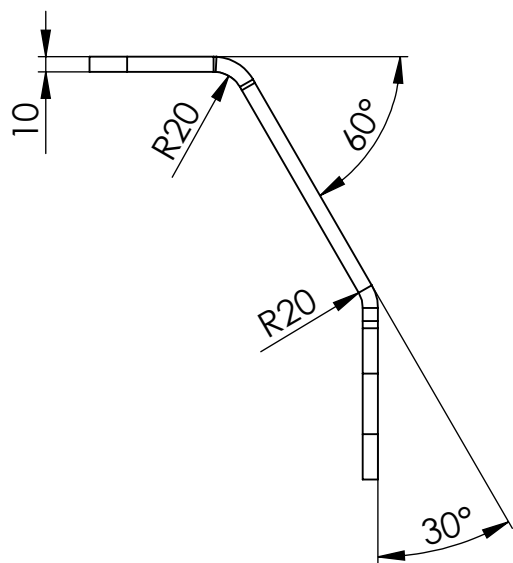
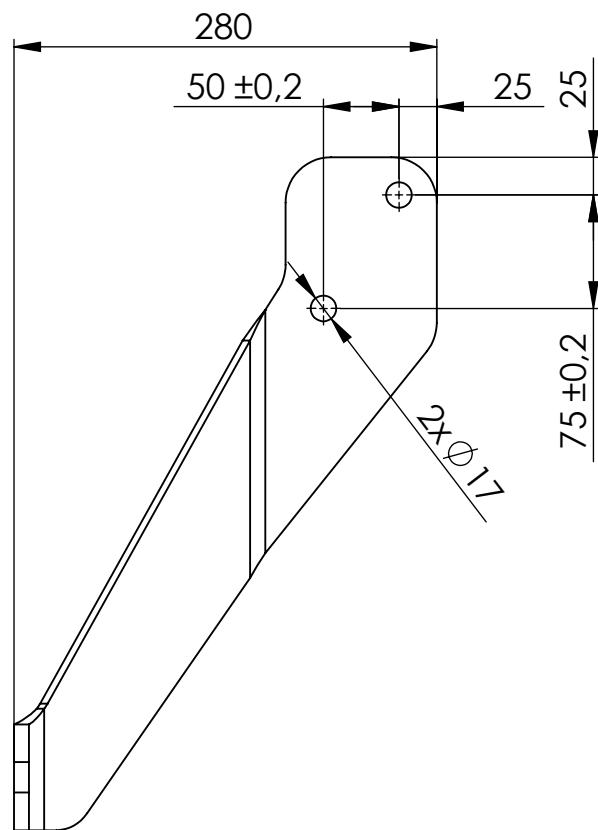
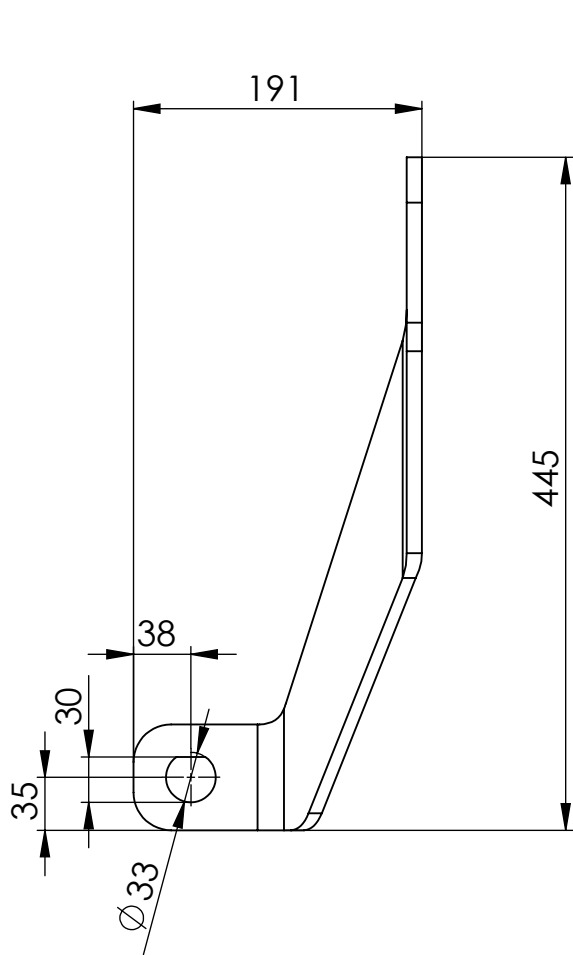
FILTRATION ELEMENT: 5  $\mu\text{m}$   
 MAX PRESSURE:  $p=1,7 \text{ MPa}$   
 MAX FLOW:  $Q=12 \text{ dm}^3/\text{sec}$

IT IS ONLY USED IN LOCOMOTIVES NOT EQUIPPED WITH AIR DRYERS.

|             |                 |   |
|-------------|-----------------|---|
| <b>Name</b> | FILTRATION UNIT |  <b>Tribotec</b> s.r.o.<br>Košuličova 4 Brno<br><a href="http://www.tribotec.cz">www.tribotec.cz</a><br>+420 543 425 611 |
| <b>Type</b> | KOVA - 03D      |   |
| <b>Code</b> | 8 53 2980       |   |



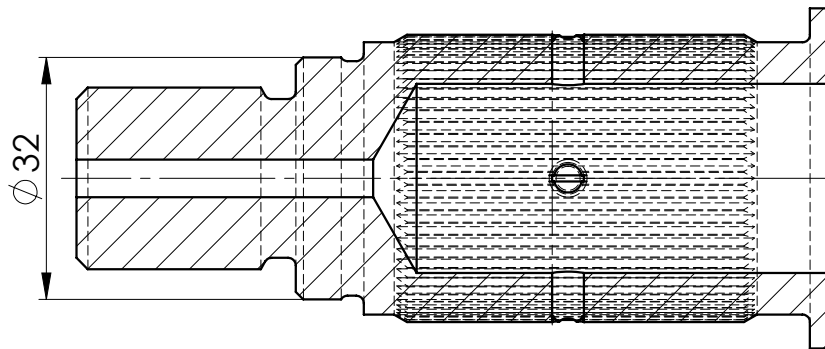
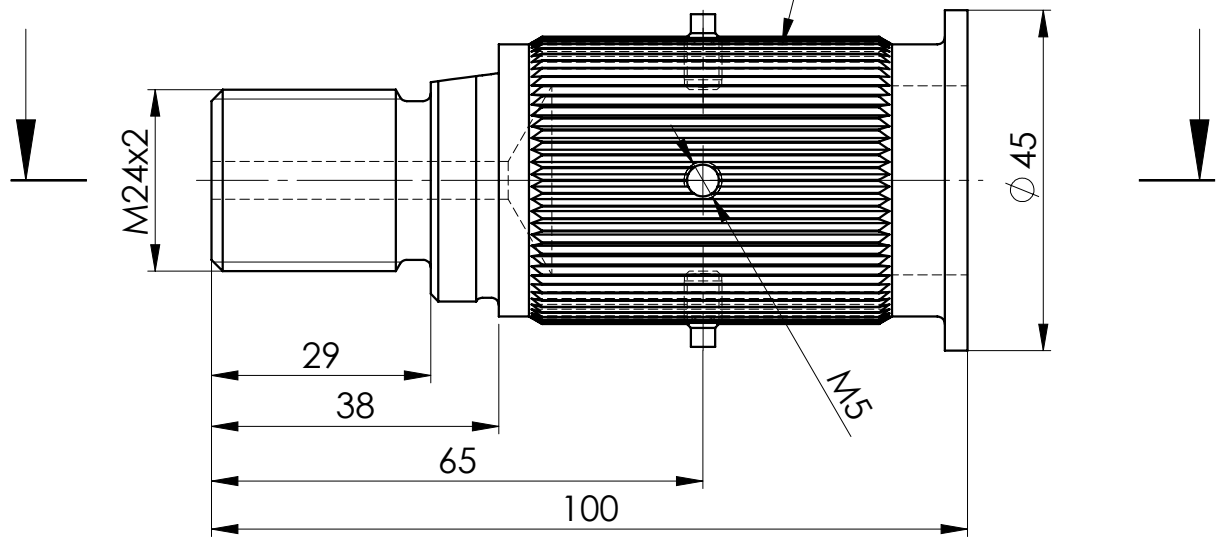
|      |                         |   |
|------|-------------------------|---|
| Name | BOX WITH AIR REGULATORS | Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA - 03D              |   |
| Code | 8 53 3567               |   |



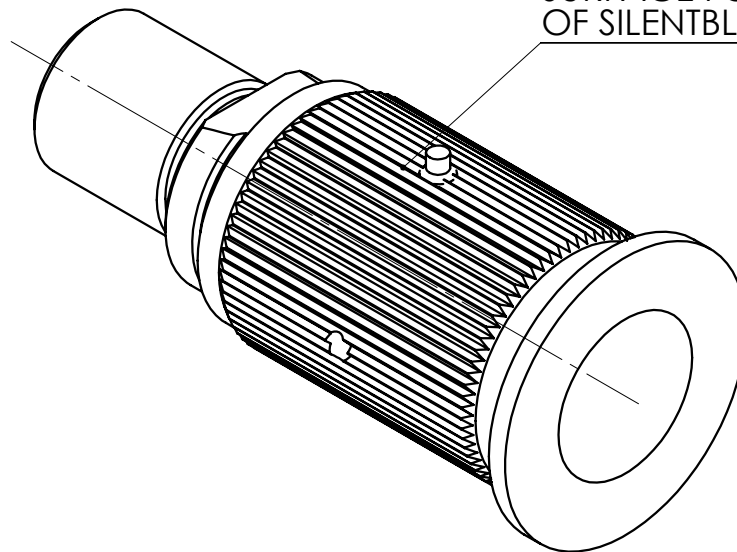
Note: Left and right version of holder

|             |                      |   |
|-------------|----------------------|---|
| <b>Name</b> | <b>NOZZLE HOLDER</b> | <b>©Tribotec s.r.o.</b><br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| <b>Type</b> | <b>KOVA - 03D</b>    |   |
| <b>Code</b> | <b>53 2612</b>       |   |

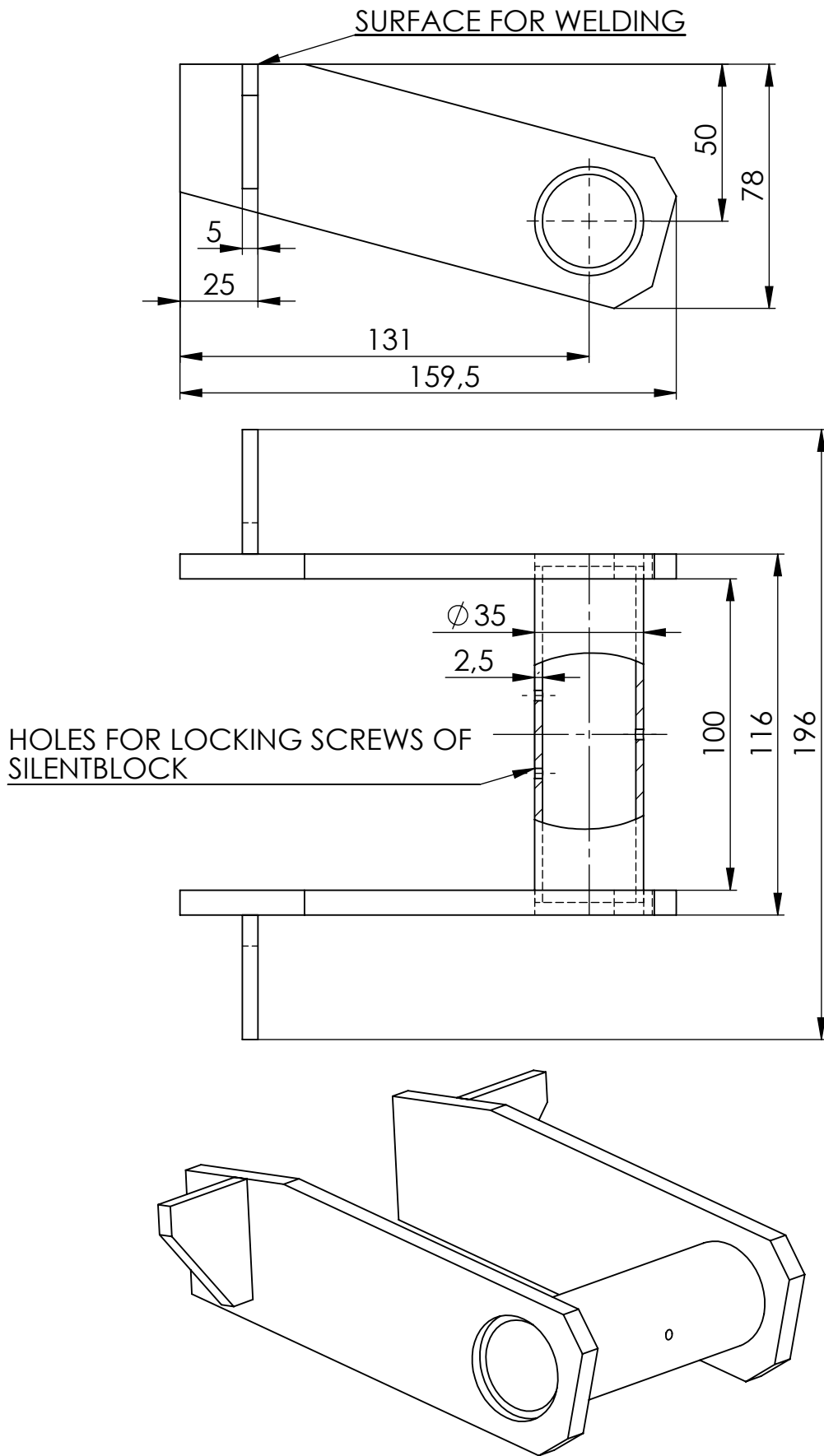
REEDED - 1,0 ČSN 01 4930



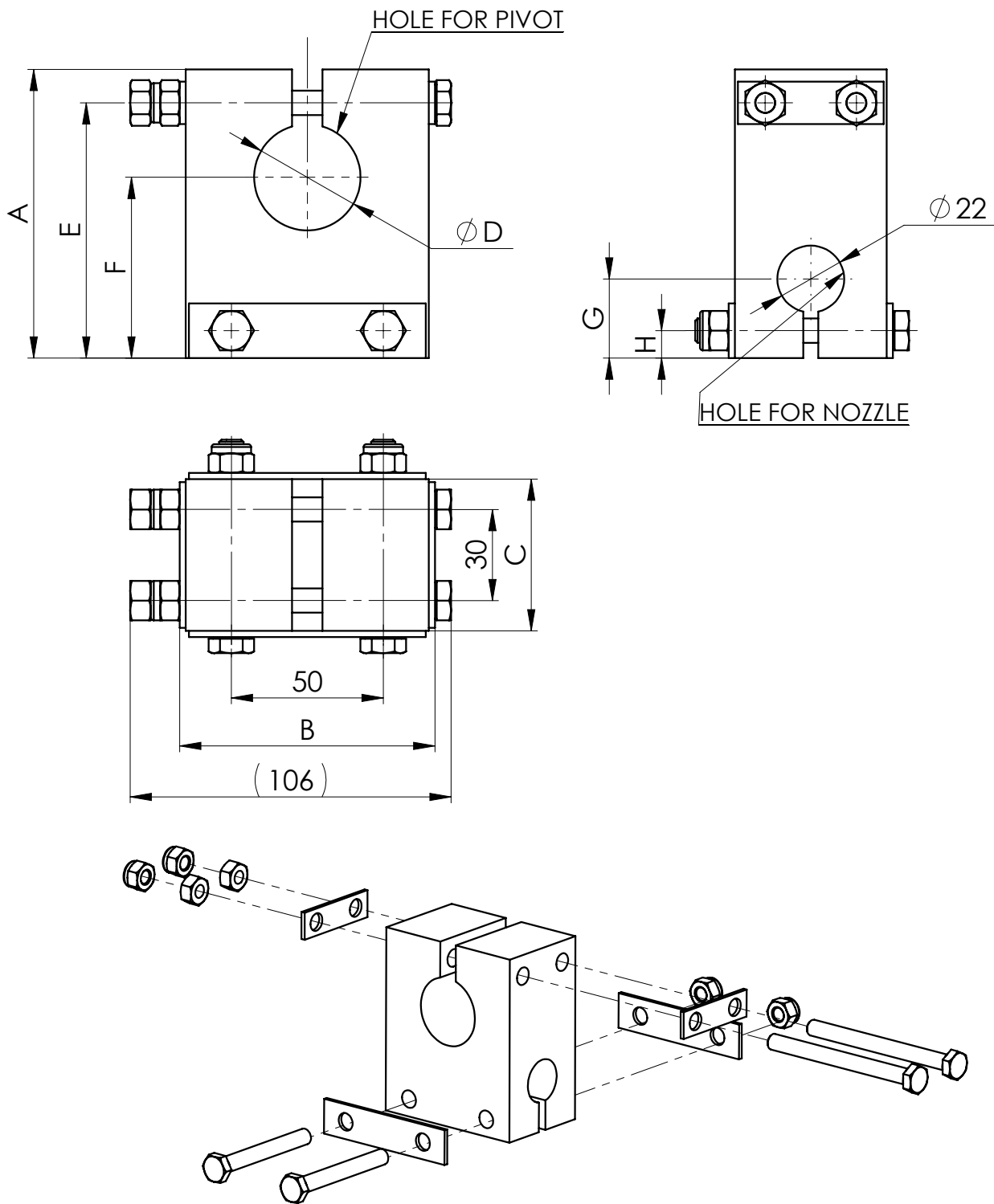
SURFACE FOR MOUNTING  
OF SILENTBLOCK



|      |                   |  |
|------|-------------------|--|
| Name | SILENTBLOCK PIVOT | ©Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA - 03D        |  |
| Code | 8 53 3581         |  |



|             |               |  |
|-------------|---------------|--|
| <b>Name</b> | NOZZLE HOLDER | <b>Tribotec</b> s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| <b>Type</b> | KOVA - 03D    |  |
| <b>Code</b> | 8 53 3118     |  |

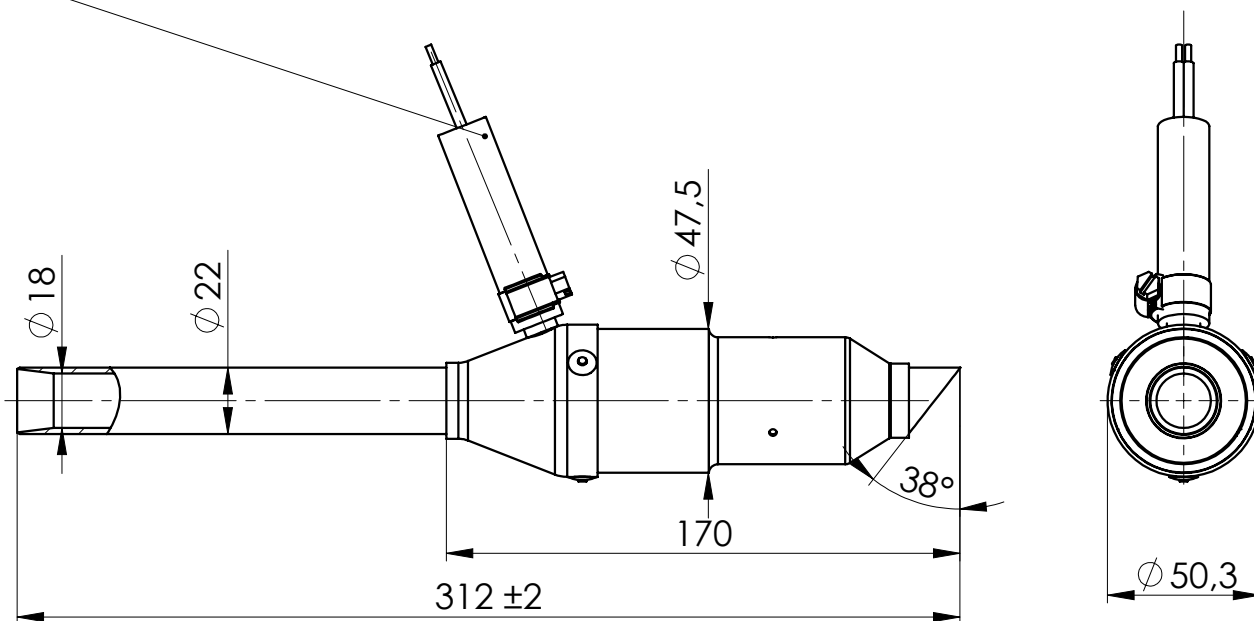


| ORDERING NUMBER | NAME          | DIMENSION [mm] |    |    |    |    |      |    |    |
|-----------------|---------------|----------------|----|----|----|----|------|----|----|
|                 |               | A              | B  | C  | D  | E  | F    | G  | H  |
| 8 53 3578       | SILENTBLOCK A | 110            | 84 | 50 | 35 | 95 | 68,5 | 30 | 11 |
| 8 53 5630       | SILENTBLOCK B | 95             | 84 | 50 | 35 | 84 | 59,5 | 26 | 9  |

OTHER ATYPICAL VERSION CAN BE MADE ACCORDING TO CUSTOMERS REQUIREMENTS

|       |            |   |
|-------|------------|---|
| Název | SILENTBLOK | Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Typ   | KOVA - 03D |   |
| Kód   |            |   |

ELECTRIC CABLE OMERIN 332 - EN 50264-3-2 300V 2x1 mm<sup>2</sup> SiHF  
 L=5000mm  
 PROTECT HOSE 10 x 17 - L=5000mm



U00XXWxxxV

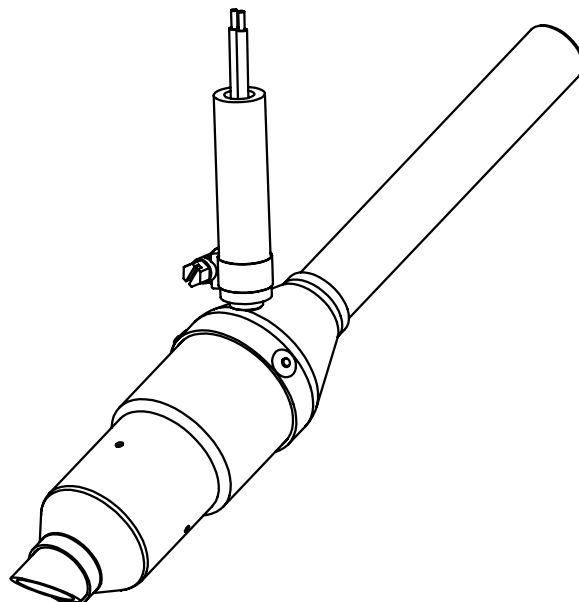
UNIVERSAL VERSION      BEND OF TUBE      HEATING POWER      VOLTAGE SUPPLY OF HEATING

Example:

U0030W024V

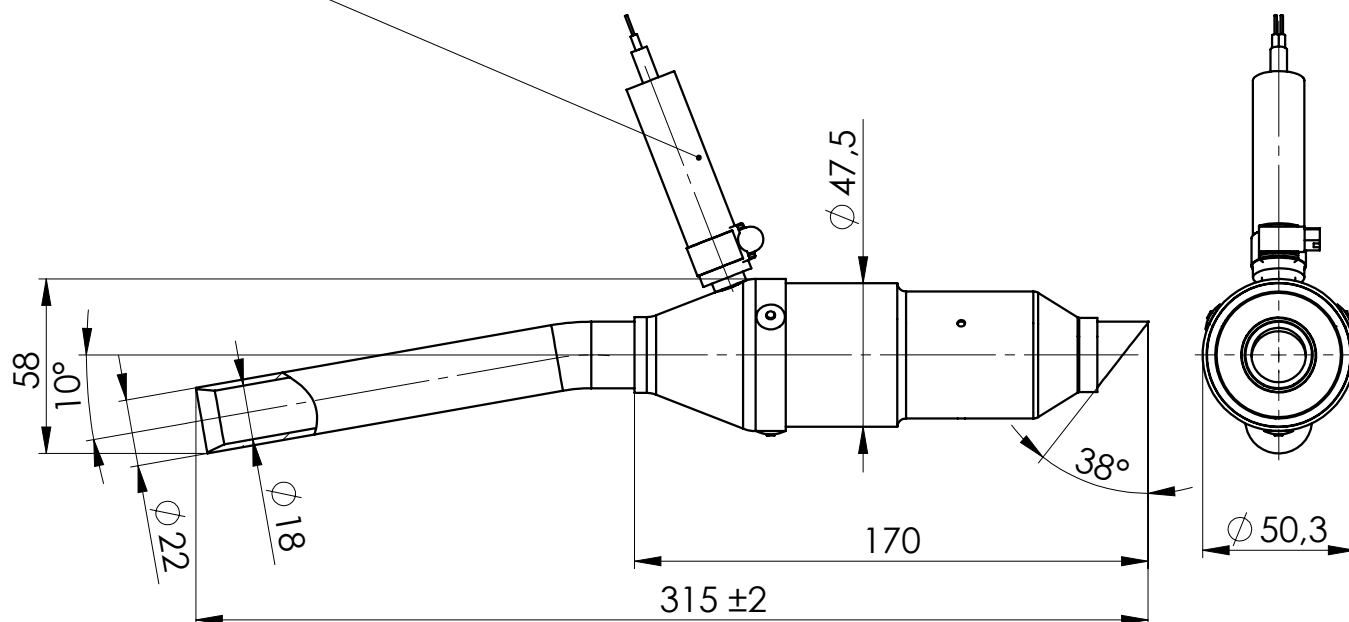
0° (STRAIGHT)      30W      24V

| ORDERING NUMBER | NAME       | VOLTAGE SUPPLY [V] | HEATING POWER [W] |
|-----------------|------------|--------------------|-------------------|
| 8 53 5332       | U0030W024V | 24                 | 30                |
| 8 53 5874       | U0050W024V | 24                 | 50                |
| 8 53 5301       | U0030W048V | 48                 | 30                |
| 8 53 5875       | U0050W048V | 48                 | 50                |
| 8 53 5876       | U0030W110V | 110                | 30                |
| 8 53 5877       | U0050W110V | 110                | 50                |



|      |                           |   |
|------|---------------------------|---|
| Name | SANDING NOZZLE - STRAIGHT | Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA - 03D                |   |
| Code |                           |   |

ELECTRIC CABLE OMERIN 332 - EN 50264-3-2 300V 2x1mm<sup>2</sup> SiHF  
 L=5000mm  
 PROTECT HOSE 10 x 17 - L=5000mm



**U10XXWxxxV**

UNIVERSAL  
VERSION

BEND OF  
TUBE

HEATING  
POWER

VOLTAGE SUPPLY  
OF HEATING

Example:

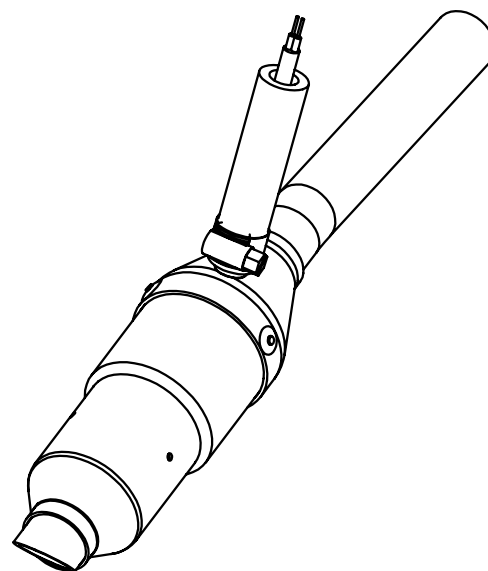
**U1030W024V**


10°

30W

24V

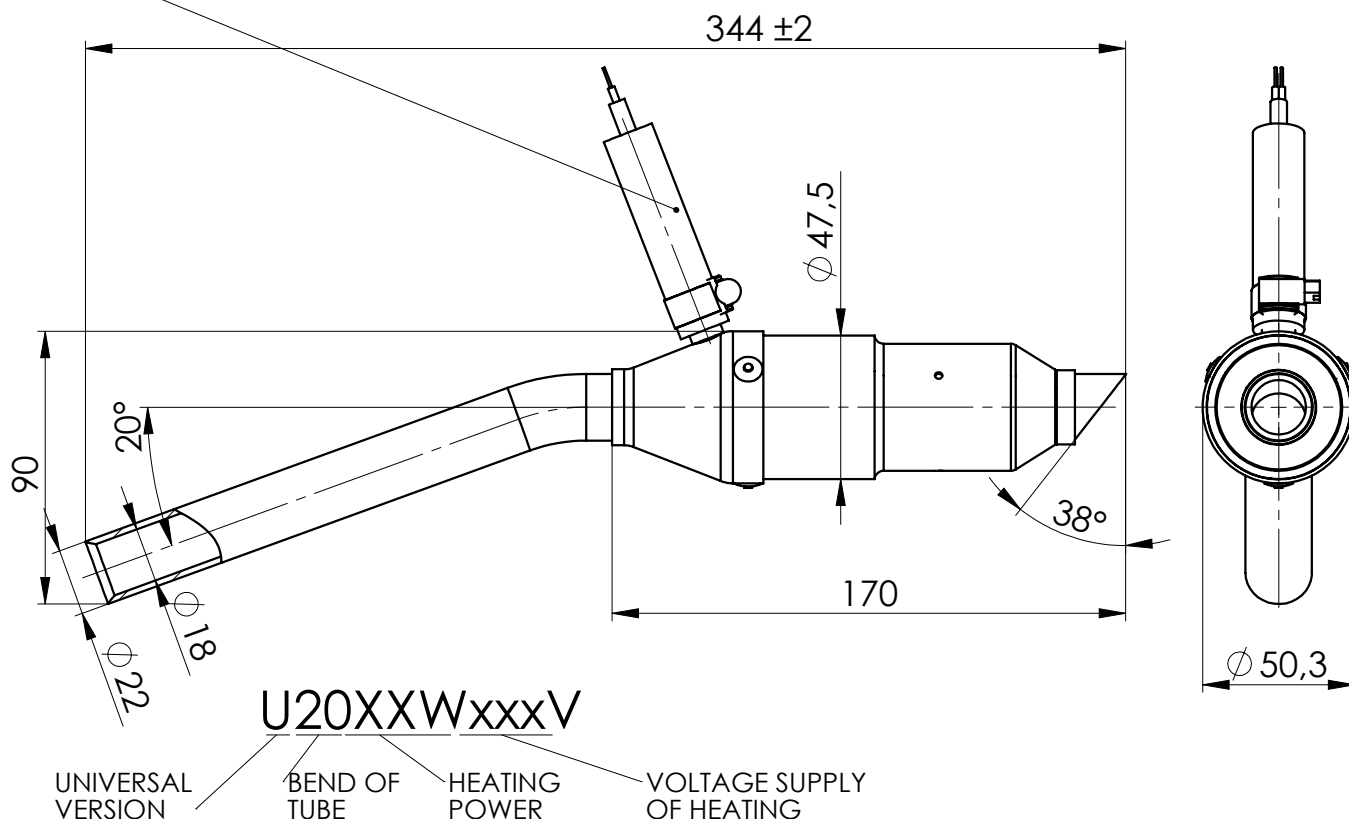
| ORDERING NUMBER | NAME       | VOLTAGE SUPPLY [V] | HEATING POWER [W] |
|-----------------|------------|--------------------|-------------------|
| 8 53 5878       | U1030W024V | 24                 | 30                |
| 8 53 5879       | U1050W024V | 24                 | 50                |
| 8 53 5880       | U1030W048V | 48                 | 30                |
| 8 53 5881       | U1050W048V | 48                 | 50                |
| 8 53 5882       | U1030W110V | 110                | 30                |
| 8 53 5883       | U1050W110V | 110                | 50                |



|      |                           |   |
|------|---------------------------|---|
| Name | SANDING NOZZLE - BEND 10° |  Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA - 03D                |   |
| Code |                           |   |



ELECTRIC CABLE OMERIN 332 - EN 50264-3-2 300V 2x1mm<sup>2</sup> SiHF  
 L=5000mm  
 PROTECT HOSE 10 x 17 - L=5000mm

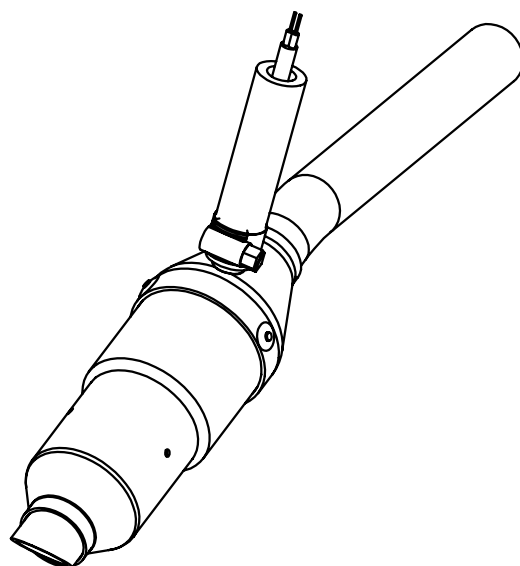


Example:

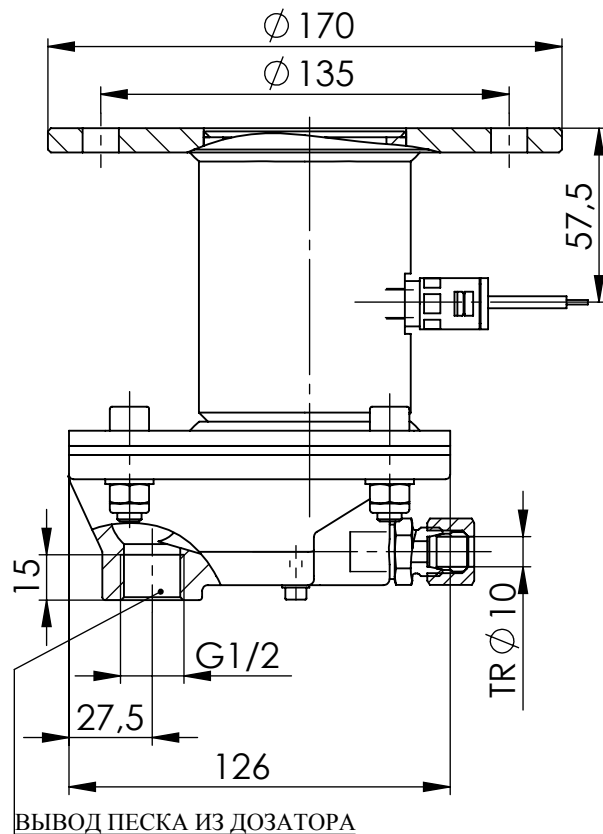
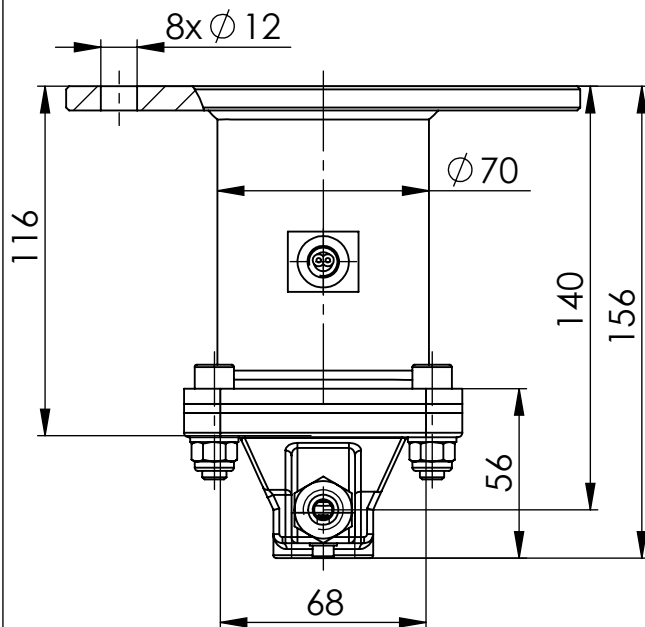
**U2030W024V**

20°      30W      24V

| ORDERING NUMBER | NAME       | VOLTAGE SUPPLY [V] | HEATING POWER [W] |
|-----------------|------------|--------------------|-------------------|
| 8 53 5340       | U2030W024V | 24                 | 30                |
| 8 53 5884       | U2050W024V | 24                 | 50                |
| 8 53 5885       | U2030W048V | 48                 | 30                |
| 8 53 5886       | U2050W048V | 48                 | 50                |
| 8 53 5887       | U2030W110V | 110                | 30                |
| 8 53 5888       | U2050W110V | 110                | 50                |



|             |                           |  |
|-------------|---------------------------|--|
| <b>Name</b> | SANDING NOZZLE - BEND 20° | <b>Tribotec</b> s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| <b>Type</b> | KOVA - 03D                |  |
| <b>Code</b> |                           |  |



**PxxXXXTxPR**

МОЩНОСТЬ  
ОТОПЛЕНИЯ

ПИТАНИЕ  
ОТОПЛЕНИЯ

АЭРАЦИЯ

Пример:

**P30024TNPR**

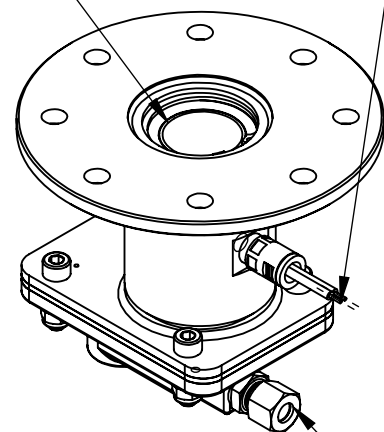
30Вт

24В

БЕЗ АЭРАЦИИ

**ПОДАЧА ПЕСКА ИЗ БАКА**

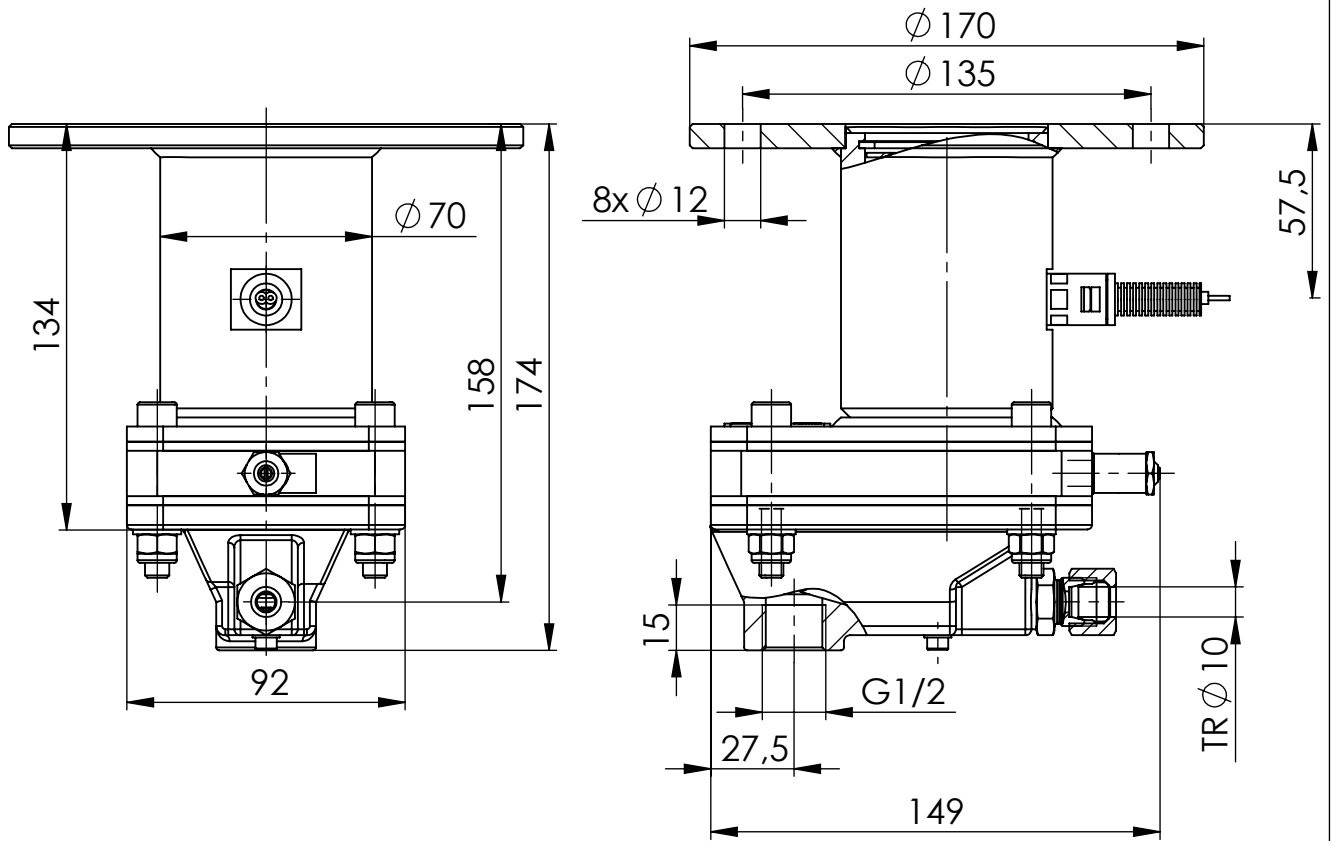
ПИТАНИЕ ОТОПЛЕНИЯ  
КАБЕЛЬ 2x1 мм<sup>2</sup> SiHF  
L=5000 мм



**ПОДАЧА ДОЗИРУЕМОГО  
ВОЗДУХА TR 10**

| ЗАКАЗНОЙ<br>НОМЕР | МАРКИРОВКА | ПИТАНИЕ (В) | МОЩНОСТЬ<br>ОТОПЛЕНИЯ<br>(Вт) | АЭРАЦИЯ<br>(л/мин) |
|-------------------|------------|-------------|-------------------------------|--------------------|
| 8 53 3514         | PNTNPR     | 0           | 0                             | 0                  |
| 8 53 3516         | P30024TNPR | 24          | 30                            | 0                  |
| 8 53 3517         | P50024TNPR | 24          | 50                            | 0                  |
| 8 53 3518         | P30048TNPR | 48          | 30                            | 0                  |
| 8 53 3519         | P50048TNPR | 48          | 50                            | 0                  |
| 8 53 3520         | P30110TNPR | 110         | 30                            | 0                  |
| 8 53 3521         | P50110TNPR | 110         | 50                            | 0                  |

|                     |                                      |  |
|---------------------|--------------------------------------|--|
| <b>Наименование</b> | <b>ДОЗАТОР С ФЛАНЦЕМ БЕЗ АЭРАЦИИ</b> | <b>Tribotec</b> s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| <b>Тип</b>          | <b>KOVA - 03D</b>                    |  |
| <b>Код</b>          |                                      |  |



PxxXXXTxPR

FLANGE    HEATING POWER    VOLTAGE SUPPLY    AERATION

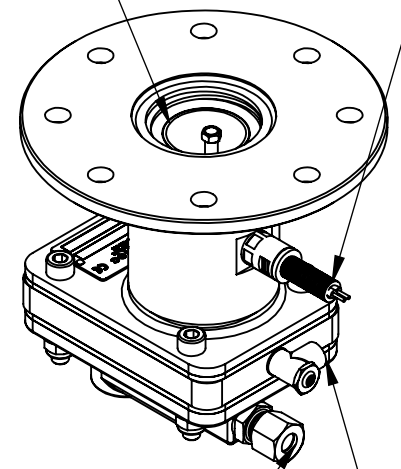
Example:

P30024T2PR

30W    24V    2l/min

SAND INLET FROM TANK

HEATING SUPPLY CABLE 2x1mm<sup>2</sup> SiHF L=5000mm

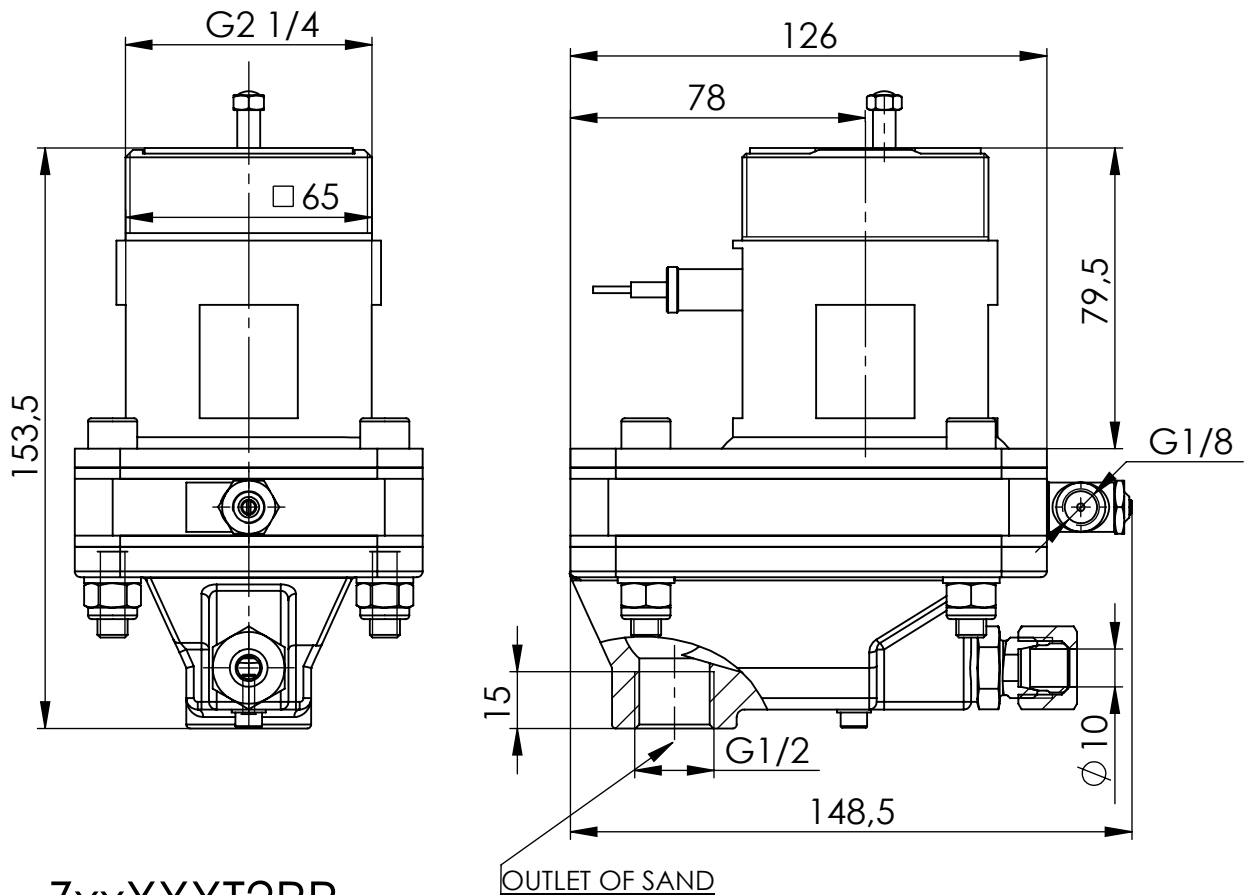


AIR INLET FOR SANDING Ø 10

AIR INLET FOR AERATION  
p=5-10bar  
Q=2l/min

| ORDERING NUMBER | NAME       | VOLTAGE SUPPLY [V] | HEATING POWER [W] | AERATION [l/min] |
|-----------------|------------|--------------------|-------------------|------------------|
| 8 53 3515       | PNT2PR     | 0                  | 0                 | 2                |
| 8 53 3522       | P30024T2PR | 24                 | 30                | 2                |
| 8 53 3523       | P50024T2PR | 24                 | 50                | 2                |
| 8 53 3524       | P30048T2PR | 48                 | 30                | 2                |
| 8 53 3525       | P50048T2PR | 48                 | 50                | 2                |
| 8 53 3526       | P30110T2PR | 110                | 30                | 2                |
| 8 53 3527       | P50110T2PR | 110                | 50                | 2                |

|      |                                     |   |
|------|-------------------------------------|---|
| Name | DISPENSER WITH FLANGE WITH AERATION | Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA - 03D                          |   |
| Code |                                     |   |



ZxxXXXT2PR

HEATING POWER / VOLTAGE SUPPLY / AERATION

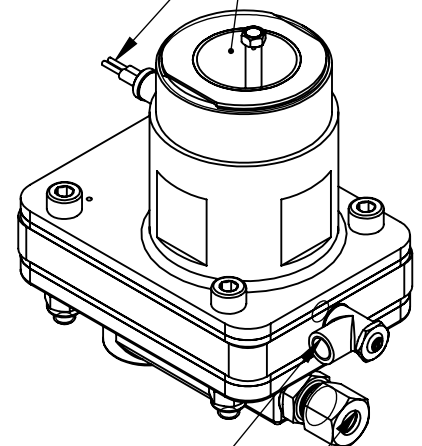
Example:

Z30024T2PR

30W / 24V / 2 l/min

SAND INLET FROM TANK

HEATING SUPPLY  
CABLE 2x1mm<sup>2</sup> SiHF  
L=5000mm

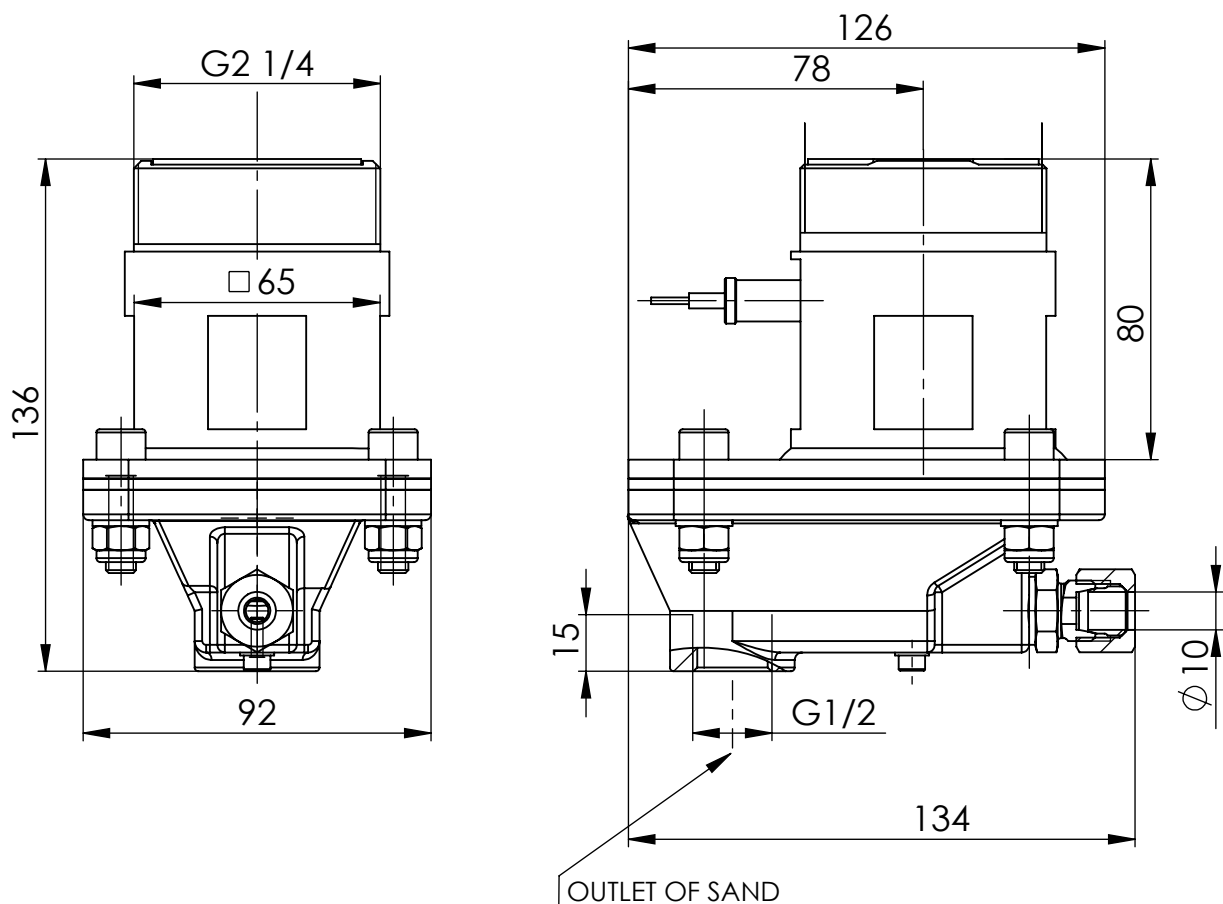


AIR INLET FOR AERATION  
p=5-10bar  
Q=2l/min

AIR INLET FOR SANDING Ø10

| ORDERING NUMBER | NAME       | VOLTAGE SUPPLY [V] | HEATING POWER [W] | AERATION [l/min] |
|-----------------|------------|--------------------|-------------------|------------------|
| 8 53 3501       | ZNT2PR     | 0                  | 0                 | 2                |
| 8 53 3508       | Z30024T2PR | 24                 | 30                | 2                |
| 8 53 3509       | Z50024T2PR | 24                 | 50                | 2                |
| 8 53 3510       | Z30048T2PR | 48                 | 30                | 2                |
| 8 53 3511       | Z50048T2PR | 48                 | 50                | 2                |
| 8 53 3512       | Z30110T2PR | 110                | 30                | 2                |
| 8 53 3513       | Z50110T2PR | 110                | 50                | 2                |

|             |   |  |
|-------------|---|--|
| <b>Name</b> | <b>DISPENSER WITH THREAD AND AERATION</b> | <b>TriboTec</b> s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| <b>Type</b> | <b>KOVA - 03D</b>                         |  |
| <b>Code</b> |   |  |



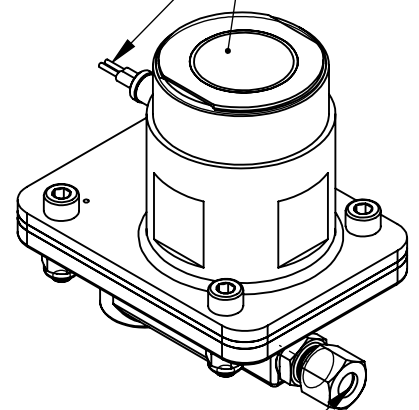
OUTLET OF SAND

ZxxXXXTNPR  
 HEATING POWER      VOLTAGE SUPPLY      AERATION

SAND INLET FROM TANK  
 HEATING SUPPLY  
 CABLE 2x1mm<sup>2</sup> SiHF  
 L=5000mm

Example:

Z30024TNPR  
 30W      24V      WITHOUT AERATION

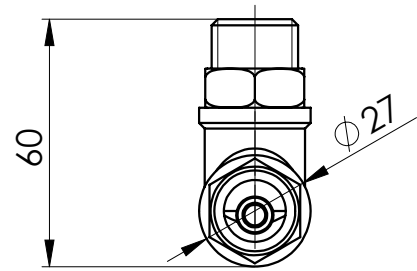
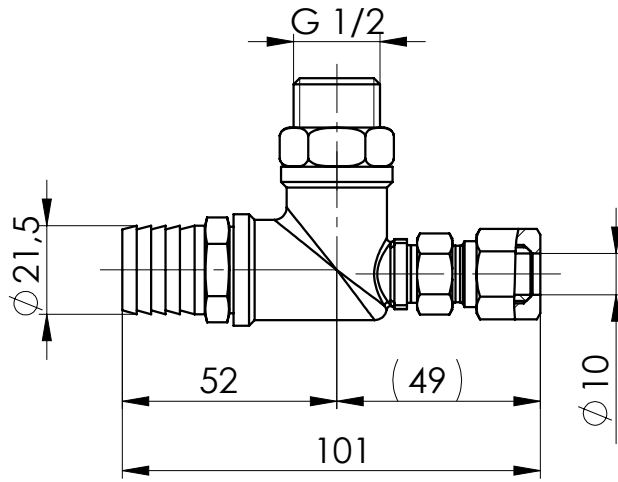


AIR INLET FOR  
 SANDING Ø10

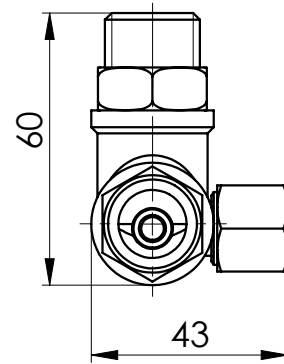
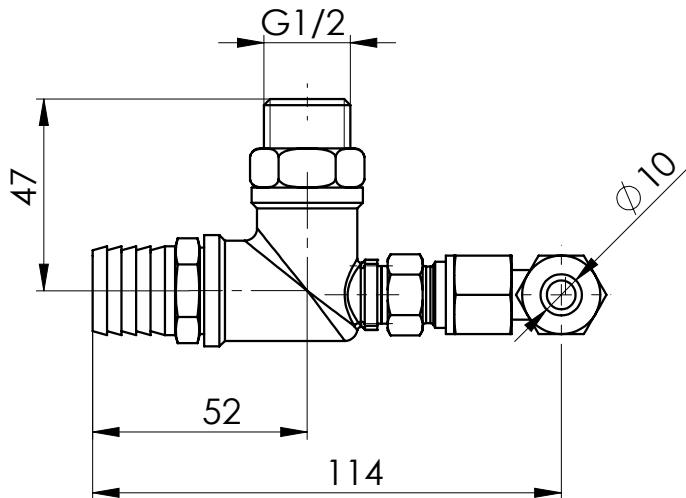
| ORDERING NUMBER | NAME       | VOLTAGE SUPPLY [V] | HEATING POWER [W] | AERATION [l/min] |
|-----------------|------------|--------------------|-------------------|------------------|
| 8 53 3500       | ZNTNPR     | 0                  | 0                 | 0                |
| 8 53 3502       | Z30024TNPR | 24                 | 30                | 0                |
| 8 53 3503       | Z50024TNPR | 24                 | 50                | 0                |
| 8 53 3504       | Z30048TNPR | 48                 | 30                | 0                |
| 8 53 3505       | Z50048TNPR | 48                 | 50                | 0                |
| 8 53 3506       | Z30110TNPR | 110                | 30                | 0                |
| 8 53 3507       | Z50110TNPR | 110                | 50                | 0                |

|             |  |  |
|-------------|--|--|
| <b>Name</b> | DISPENSER WITH THREAD WITHOUT AERATION | <b>TriboTec</b> s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| <b>Type</b> | KOVA - 03D                             |  |
| <b>Code</b> |  |  |

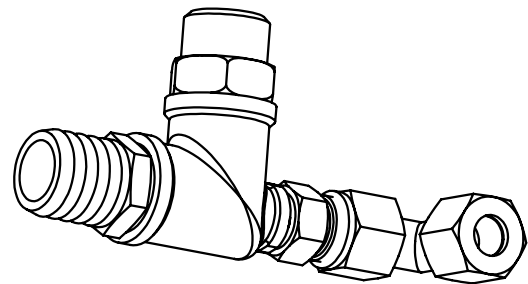
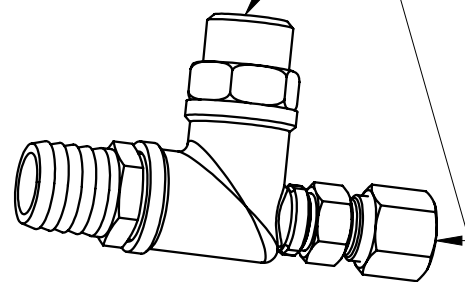
VERSION WITH STRAIGHT AIR INLET - SG12TR10P




VERSION WITH ELBOW AIR INLET - SG12TR10K



INLET OF INCREASING AIR  
SAND INLET  
FROM DISPENSER



| ORDERING NUMBER | NAME      |
|-----------------|-----------|
| 8 53 3565       | SG12TR10P |
| 8 53 3566       | SG12TR10K |

|      |                      |   |
|------|----------------------|---|
| Name | FITTING OF DISPENSER |  Tribotec s.r.o.<br>Košuličova 4 Brno<br>www.tribotec.cz<br>+420 543 425 611 |
| Type | KOVA - 03D           |   |
| Code |                      |   |