Nencki Rail Brush

NRB

Technical Description

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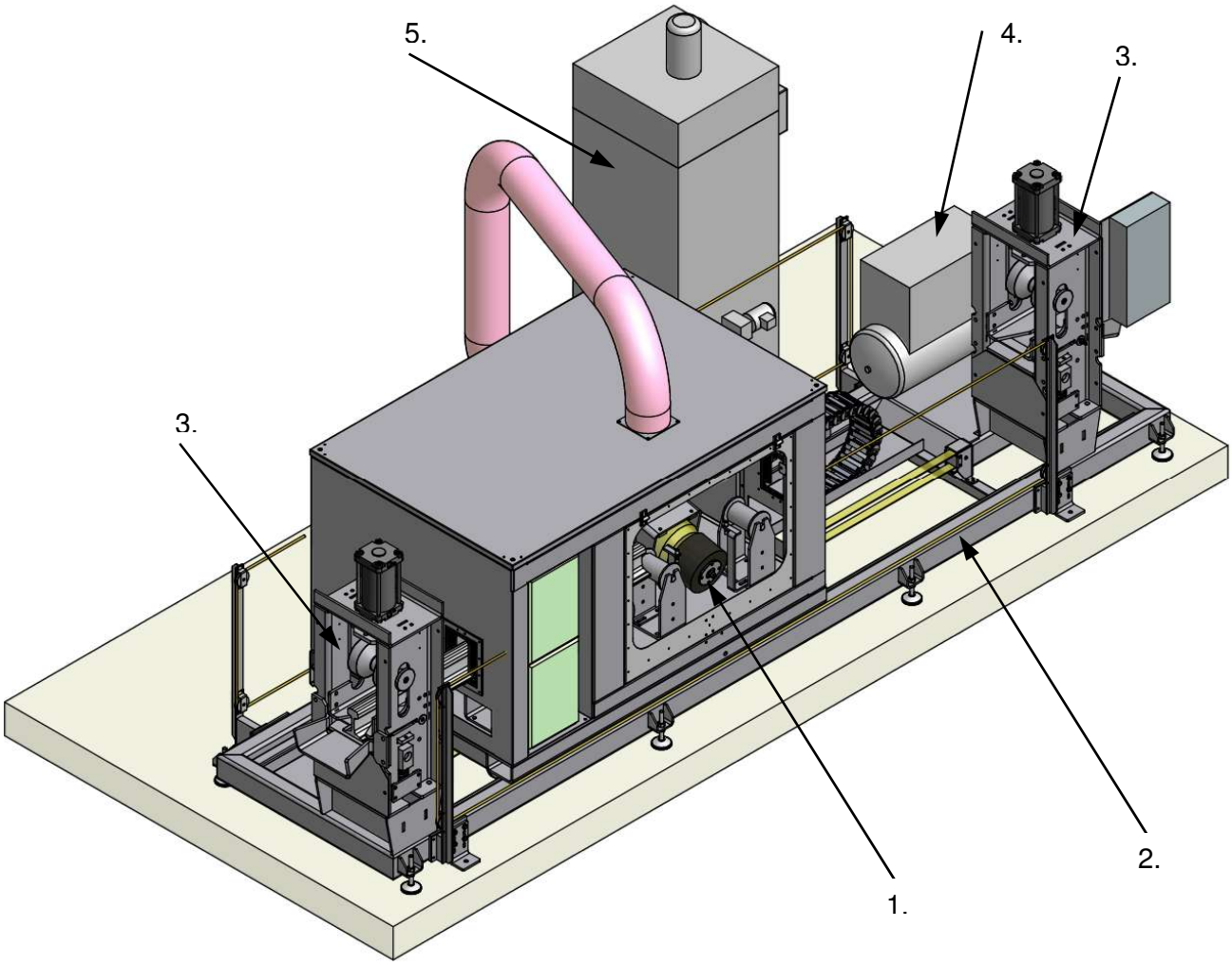
1. General

Rail brushing machine for rail ends according to layout.



1. Brushing unit
2. Guiding frame
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2. Field of application

The Nencki Rail Brush is used to prepare the rail for the flash butt welding process. Rust and other impurities are removed at the end of two rail sections in one process. The rails are cleaned on top and bottom in order to achieve a proper electrical contact for the welding electrodes. The brushing distance is adjustable depending on the customer's requirements. The front section is cleaned also on its entire face by a separate brushing unit. The entire process meets the requirements as demanded by the latest standards.

2.1. Work standards

- DIN EN 14587-1:2007

3. Comfort

The rails to be cleaned are moved into the brushing machine by the conveyors of the welding line. The operator is starting the fully automatic brushing process by the central control unit.

The control is from a central location. All necessary steps are released and controlled by the PLC. The operator can concentrate on one control panel.

4. Mechanical part

The rigid welded steel guiding frame is positioned at the beginning of the welding line on the workshop floor. For a correct positioning the frame is equipped with eight anti vibration levelling feet. The propelled brushing cabin is moving back and forth on the base frame during the cleaning process.

The surface is sandblasted, prime coated and finished.

5. Control

The entire process is controlled by a PLC; the control panel is installed at the front of the machine. The screen displays the status of the machine, error messages and diagnosis. Various settings for the operation of the machine can be changed in order to optimize the brushing process according to the customer's request.

The joystick is used to control the welding plants conveyor in order to feed the machine and to move the rails forward to the welding machine. The machine can be fully integrated into the welding line, in this case the operator only has to confirm the position of the rail and to push the start button for the brushing process.

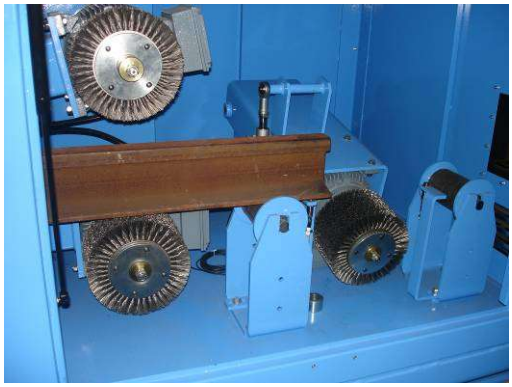
For tele-maintenance and diagnosis an interface for communication via internet is provided.

As an option the control can be equipped with an air condition for countries with high temperatures and humidity.

6. Brushing units

The machine is equipped with three brushing units which include the following functions:

- Top to brush the top of the rail head
- Bottom to brush the bottom of the rail foot
- End to brush the front section of the rail



The force of the top and bottom brushes onto the rail is controlled by pneumatic cylinders. For brushing the front section, the end unit is also lifted and lowered by a pneumatic cylinder.

Each brush is equipped with its own motor, the brush is installed directly onto the motor shaft. Because of the different dimensions of the brushes, two types of motors are used. Both of them are equipped with reinforced dustproof bearings and the cast iron housing protects the motors against impacts.

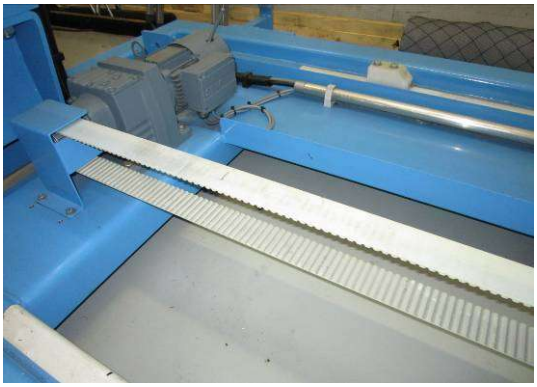
The NRB is equipped with three brushes. This feature has the advantages of shorter cycle times for brushing and long lifetimes of the brushes.

The brushes are wearing parts. They have to be exchanged depending on the wearing which is influenced by the grade of impurity and the pressure onto the rail.

7. Shifting mechanism

The rails are fed into / out of the machine by the customer's rail conveyors. The position of the rails is controlled by two sensors, the conveyors are stopped after reaching the brushing position.

During the brushing process the cabin is shifted along the rail in order to brush the top and bottom part. The shifting is carried out by an electric motor with a gear belt. The stroke of the cabin can be adjusted depending on the customer's request.



8. Clamping devices

8.1. Clamping device MIR

On both ends of the base frame a clamping device is installed. After the rail is positioned in the machine, the clamps are lowered by pneumatic cylinders. The rails are centred laterally and fixed in horizontal direction during the brushing process.

Various rail profiles can be handled without changing any thrust parts because of the prismatic shape of the rollers

8.2. Clamping device RPE

As an option, the clamping devices can be equipped with an electric drive in order to assure a reliable feeding process and an accurate control of the rail speed.

This feature is specially important, if the feeding conveyors in the welding factory are not equipped with sufficient power for rail transport.

9. Air supply

An air compressor is providing the necessary compressed air for the lifting cylinders of the brushing units and the filter cleaning device.

The operating pressure is maintained automatically and the system is equppied with all necessary protection devices.

Due to the integrated compressor the customer does not have to provide an external air supply.

10. Dust collector

The entire machine is housed in order to protect the environment from dust. The dust inside the machine is drawn off by a powerfull dust collector which has a built-in filter cartridge. This filter is equipped with a pneumatic self cleaning device to depurate the filter depending on its condition. A display indicates the condition of the filter.

If the vacuum decreases to an adjustable value, the self cleaning mechanism will start automatically. The dust is collected in a drawer which can be easily removed and emptied.

The filtered exhaust air can be expelled from the building through a hose which is not in our scope of supply.

Because of the cleaning device the filter is not a wearing part. The filter can also be washed with water.

11. Safety

The following standards and regulations were considered during development and manufacture of the machine:

- CE-conformity regulations 2006/42/EG
- Electric material 2006/95/EG
- Electro magnetic resistance 2004/108/EG
- Basics, general design principles EN ISO 12100
- Pneumatic fluid power - General rules and safety requirements for systems and their components SN EN ISO 4414:2010
- Electrical equipment for machines EN 60204-1
- Emergency stop system EN 13850
- Avoiding of unexpected start EN 1037
- Risk classification EN 14121-1
- CE certificate

12. Operation

12.1. Brushing process

- Start of the control
- Fully automatic positioning of the rail
- Start of the brushing process
- Forwarding of the rail to the welding machine

12.2. Display

All relevant data are shown on the display.

- Stroke of the brushing cabin
- Stroke of the vertical brush
- Pressure of the brushes onto the rail
- Process time

13. Requirements on site

No extra requests on site are necessary. The location must be protected against weather influences. Conveyors are necessary to feed the rails into the brushing machine, the machine usually is integrated in a welding line. The details of the interfaces will be provided together with the foundation plan.

14. Maintenance

The Nencki Rail Brush is very maintenance-friendly and one annual service is sufficient. The brushes have to be exchanged depending on the wear.

15. Technical data

Rail profiles	
Rail profile	35 kg/m to 86.8 kg / m (175 lb/yd)
Rail profile height	125 mm to 203 mm
Brushing process	
Cleaning of two rail ends (one weld)	2 – 3 minutes
Length of cleaned section	500 mm
Distance of cleaning start from rail end	100 mm
Brushing cabin stroke max.	1200 mm
Dimensions	
Brushing cabin	L x W x H; 2200 x 1450 x 1450 mm
Brushing machine complete	L x W x H; 5700 x 1550 x 1850 mm
Dust collector	L x W x H; 750 x 700 x 2250 mm
Required space for entire system	L x W x H; 5700 x 2700 x 2700 mm
Weight of the entire system	3900 kg
Top brushing unit	
Brush dimension	⌀ 250 mm, width 75 mm
Motor power	7.5 kW
Motor and brush speed	3000 rpm

Bottom brushing unit	
Brush dimension	⌀ 250 mm, width 150 mm
Motor power	11 kW
Motor and brush speed	3000 rpm
End brushing unit	
Brush dimension	⌀ 250 mm, width 150 mm
Motor power	11 kW
Motor and brush speed	3000 rpm
Lifetime of brushes	
Lifetime depending on condition	Average 60 – 120 welds
Clamping device MIT	
Clamping force	6850 N
Clamping device RPE with electric drive	
Clamping force	6850 N
Feeding speed slow and start	14 m/min
Feeding speed rapid	56 m/min
Motor power	1.8 kW
Air compressor	
Pressure	8 bar
Air reservoir	100 litre
Motor power	1.5 kW
Dust collector	
Air flow	3000 m^3/h at 1200 Pa pressure difference
Air filter	15 m^2, BIA classification M (C)
Motor power	2.2 kW

Electrics	
Voltage	3 x 400 V AC, others on request
Frequency	50 Hz
Fuse	63 A
Power	30 kW
Protection class	IP 55
Ambient temperature	5 – 40°C
Control voltage	24 V DC
Emissions	
Noise level	75 dB(A) under full load, distance 1 m

Nencki reserves the right to make changes without prior notice

16. Imprint

Railway technology Plant technology Vehicle technology Manufacturing Service

Nencki Ltd. offers a comprehensive customer and spare parts service in Switzerland but also through international representatives.

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