

Rail profile grinding machine

NRG



Technical description



Nencki Ltd
Railway Technology
Gaswerkstrasse 27
4901 Langenthal | Switzerland

Tel. +41 62 919 93 93
Fax +41 62 919 93 90

railway@nencki.ch | www.nencki.ch

1. Purpose of the machine

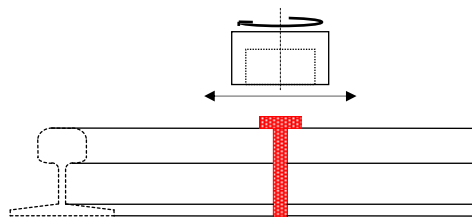


The stationary rail profile machine is used in welding or repair plants for finish grinding of welded rail joints.

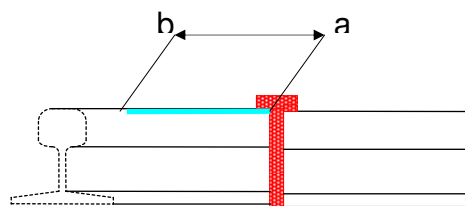
The grinding operation is carried out manually or automatically, depending on the mode and actuation of the relevant control elements on the panel at the front of the machine.

2. The grinding method

The grinding of the welded joint is easy, if the two rails have been properly aligned for welding. The grindstone needs to move back and forth only for removal of the excess burr, which remains after trimming.

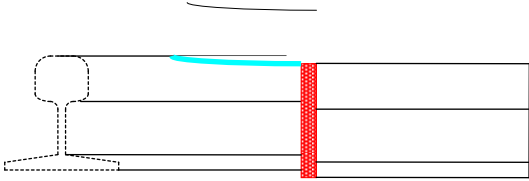


It is seldom for the ideal situation and the rails are often offset in vertical and horizontal direction.



Horizontal grinding is ineffective as the original step will still be present at the end of the grindstone travel (b) or at the joint (a)

The grindstone moves in a curved path and leaves a stepless finish on the rail head surface.

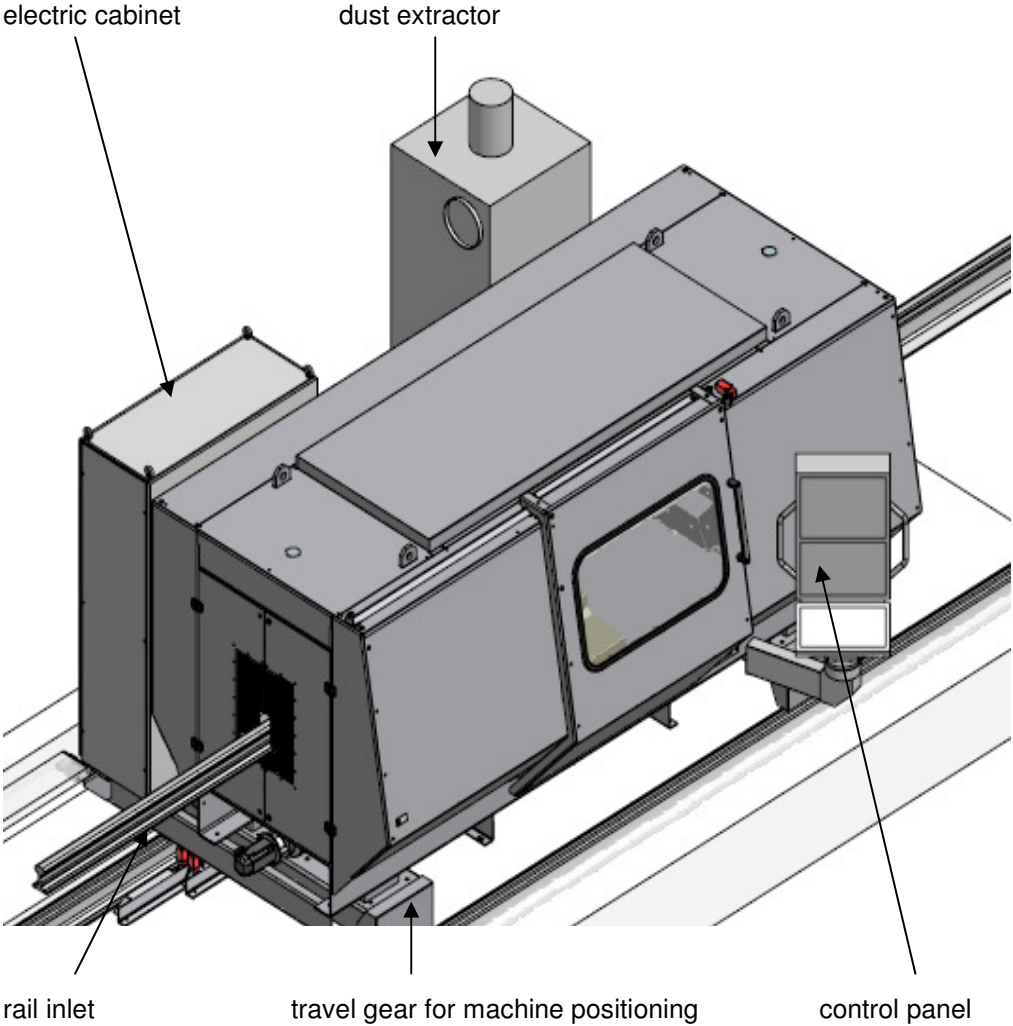


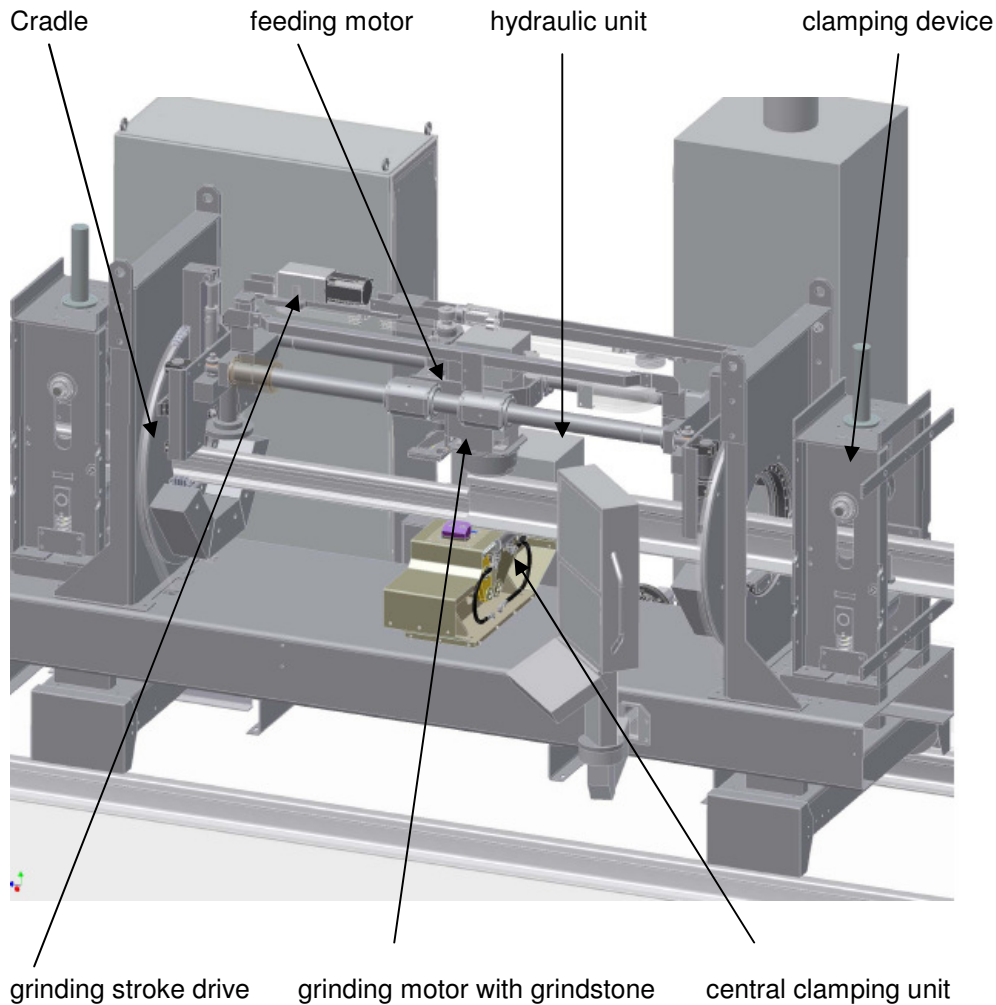
This curved grinding path is applied to the top and the lateral surface of the rail profile.

The radius of the curved path is automatically calculated by the control system according to the result of the laser measuring.

3. Main Components

complete view:





3.1. Base

The machine is made in a robust steel construction. The complete grinding area is protected, the dust is extracted. The design and size of the machine is made for fast moving to other welding facilities. The machine is very compact. With the integrated laser measuring system it is very easy to control the surface quality after grinding.

3.2. Positioning of the machine

The complete machine is positioned with 4 wheels on two guide rails on the floor. It can be moved in the rail direction by a hydraulic travel gear. The direction and the position is controlled by a joystick.

3.3. Grinding stroke drive

The complete grinding unit is moved in the rail direction by a servomotor. The stroke and the speed can be programmed.

3.4. Cradle drive

The cradle drive is controlled by a servo amplifier and positioned with a positioning control system.

The cradle end position can be adjusted between 87° and 90° depending on the requirements.



3.5. Feeding motor

The feeding motor is controlled by a servo-module, with revolution counter.

Feeding of the grindstone follows either continuously (fast approach approx. 2 mm/s) or step by step (1 step approx. 0,08mm).

3.6. Grinding motor

The grinding motor drives the grind stone. The speed of the motor is controlled with a frequency converter. The grinding stone can be changed without removing the rail from the machine, by moving the motor upwards.

3.7. Central clamping device

During the grinding process, the rails are fixed and centred horizontally and vertically by the central clamp operated by two hydraulic cylinders.

3.8. Clamping devices at the in- and outlet side of the machine



On the in- and outlet side of the machine a clamping device is installed. It has the function to centre the rail lateral and to fix the rail during the grinding process. The prismatic shape of the centring roller allows to clamp different rail profiles without exchange of format parts.

The roll is controlled by a hydraulic cylinder with a force of 6850 N.

3.9. Hydraulic unit power pack

Integrated hydraulic power pack within the frame of the machine. Easy accesible for maintenance work. With low noise gear pump, overload, pressure relief and flow control valves from first quality suppliers.

3.10. Electric control

With the PLC control supported by an industrial computer running under Windows XP all functions of the grinding and measuring process are controlled. Thanks to the touch screen it is very user-friendly to operate the machine. The PLC also includes an error diagnosis system. The customer's conveyor can be activated by joystick, in order to feed the grinding machine or in order to forward the rails to the next process.



For countries with high temperature or high humidity an optional air condition is recommended.

3.11. The laser measuring system

The measuring system is installed in the center of the machine.

A measure head, consisting of 3 laser sensors, moves 1 m. One laser sensor is located over the running surface, the other two are installed under 93° for the gauge-side measure. The arrangement of the 3 sensors ensures the application on rail heads with a width from 65 mm up to 75 mm without any adjustments. The measure is triggered by single pushbutton control and is graphically displayed on a 15" screen, which permits instant evaluation of conformity. The computer writes a protocol and actuates an alarm

when the permitted tolerance is exceeded. The recording of the measurements may be stored on the hard disc (capacity 60 000 welds). The straightness before and after grinding is displayed.



3.12. Dust extraction

The entire machine is protected by a housing in order to avoid development of dust in the vicinity. The dust is removed by a powerful extractor. The built-in filter cartridges have a self-cleaning device with compressed air and are controlled by the machine. A display indicates the condition of the filter. The dust is collected in a drawer which can be easily removed and emptied.

The clean exhaust air can be expelled out of the room through a hose (not in our scope of supply) or it can be used to heat the room. In such case we recommend an optional absorber.

3.13. Interface to the line control of the other machine in the welding process

The machine is normally integrated in the line control of the complete welding plant. Together with the foundation plan NENCKI provides a description of the necessary electrical interfaces.

3.14. Safety precautions

- The machine is designed according to the international EN 89/392 and CE standards.
- The machine is equipped with an emergency stop.
- The cabin door is equipped with a security switch, which stops all motions as soon as the door opens.

3.15. Necessary infrastructure

- The grinding machine needs a special foundation with two guide rails. In the event of contract, a foundation plan will be provided by Nencki
- Electric power supply 3 x 400 Volts, 50 Hz , 1 x 230 Volt
- Compressed air for filter cleaning, 6-8 bar, dry air
- Roller conveyor on the in- and outlet side of the machine
- Internet connection via LAN, broadband or ADSL modem to allow remote control from manufacturer's premises in case of maintenance.

3.16. Semi automatic operation of the machine

After positioning of the machine the operator programs the depth of grinding and starts the process. The machine moves now automatically in horizontal and rotating direction. Then the operator programs the next deeper grinding cycle. The operator defines when the rail surface has to be measured again. If it is necessary to grind more he starts the grinding process again.

3.17. Fully automatic operation of the machine (Option)

NENCKI provides also a fully automatic version. After positioning the machine, the laser system measures the profile of the weld. Based on those data an automatic grinding program is created, after which the fully automatic grinding process starts

3.18. Operator

One operator is necessary, with experience in operating a tool machine and operating a PC.

4. Technical data Rail Grinding Machine NRG

Possible rail profiles	
All standard rails between 35kg / m with h = 125 mm and 80 kg / m (corresponding to the USA standard 155 lbs / yd) with h = 203 mm	Up to UIC 68

Processing time	
If the height distance between male and female part of the rail is less than 0.5 mm, according to EN 14587-1	5 - 6 minutes

Grinding motor and grinding stone	
Motor power	5,0 kW
Motor volt and frequency	3 x 400 Volt, 50 Hz, 9,7 Amp. or others
Motor rpm	2870 rpm
Grinding stone diameter	200 mm

Grinding stroke drive	
Motor power	1,5 kW
Motor voltage and frequency	3 x 400 V, 50 Hz or others

Cradle drive	
Motor power	1,5 kW
Voltage	3 x 400 V or others

Feeding motor	
Motor power	0.54 kW
Voltage	3 x 400 V or others

Dust extractor	
Nominal airflow	2500 m ³ /h at 2720 Pa
Filter cartridge	75 m ² surface
Motor power	4 kW
Noise level	<= 75 dBA (1m)
Necessary supply of compressed air (filter cleaning)	min. 6 bar

Machines dimension	
Machine L x W x H	3800 x 2400 x 2860x mm
Dust extractor L x W X H	1400 x 1400 x 3000 mm
Weight complete machine incl. extractor	7000 kg
Dimension for packing L x W x H in cm	400 x 220 x 225 cm, 6200 kg 140 x 140 x 300 cm, 800 kg

Machine and components colour	grey / yellow
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Power supply	
Voltage, Frequency	3 x 400 V AC / 50 Hz 1 x 230 V or others
Power consumption with all options	15 kW
Control voltage	24 V DC