

RAIL GRINDING MACHINE MS14S



**EQUIPPED WITH 14 TANGENTIAL
GRINDING STONES**



TECHNICAL SPECIFICATION

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1.0 About MECNO SERVICE

Mecno Service, founded in 1997, began its activities in 1986 under a different name, when it entered the field of rail grinding equipment and services.

Based in Mestre, the dryland of Venice, Mecno Service is both designer and user of rail reprofiling technology in mobile systems for service contracts.

Mecno Service disposes of a modern workshop in Salzano, on the outskirts of Mestre that occupies an area of over 10,000 sq. m. and is an important Company resource for production and refurbishment operations of one's rail grinders.

Here, there is a track for testing purposes to constantly improve its machines; thus providing the customers with proven technology and sound grinding solutions at competitive cost.

Mecno Service has always adopted an ingenuity approach in its engineering activities, which led to the development of innovative rail grinders, equipped with tangential stones instead of the traditional cup grinding wheels working according to the "multi-facets" mode.

Mecno Service is certified and complies with ISO9001/UNI EN ISO 9001:2015 requirements in the design, production and servicing of on-site rail grinding machines. Provision of on-site grinding services.

Mecno Service is certified and complies with ISO14001/UNI EN ISO 14001:2015 requirements in the provision of on-site grinding services. Design, construction (by assembly of electrical and mechanical components) and servicing of on-site rail grinding machines.

2.0 Information

Mecno Service MS14S-C is the ultimate rail grinding machine capable restoring the original circular profile of the rail. The MS14S-C is a fully automated machine and electrically operating unit; equipped with state of the art dust and noise control system, spark guards and fire prevention equipment, exhaust treatment and environmentally friendly engines.

It is ideal for the preventive, corrective or initial rail grinding of railway lines.

3.0 Description

Mecno Service MS14S-C is a self-propelled, electrically operated grinder consisting of a driving car, five grinding modules and a rear drive cabin. The driving module houses the control cabin, engine, pneumatic system and a 1000lt water tank.

Each module is made of a compact and robust metal framework supporting the grind stones, their engines, 800lt water tanks, noise, spark and dust suppression systems.

The rear driving cabin ensures controls and maximum safety during transfer in both directions.



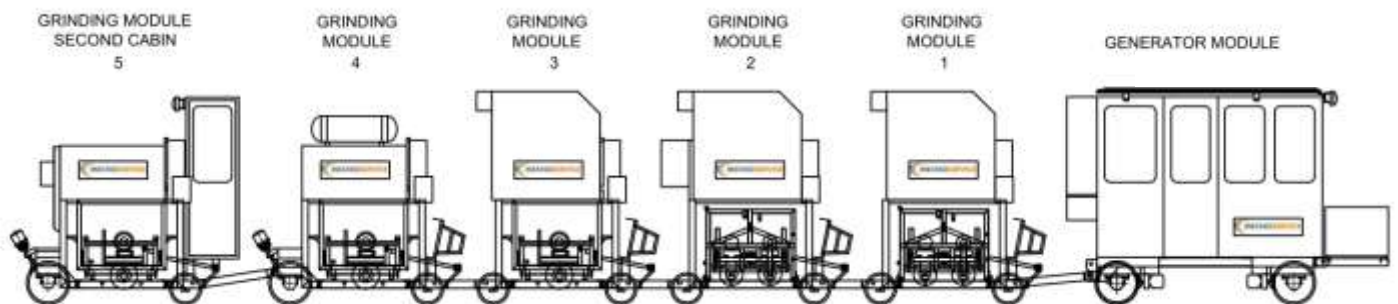
Grinding machine overview

4.0 Grinding principle




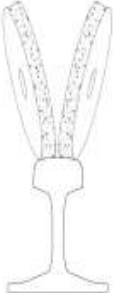
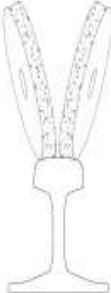
The MS14S uses tangential rotating abrasive stones powered by electric motors mounted on a self-propelled vehicle. Depending on the target profile, the grinding stones are set at different angles of inclination and kept in contact with the rail head via an automated pneumatic system which controls the grinding load.

It is a superior technology for the tangential configuration of the grinding stones restores the rail head profile to its original circular shape without leaving surface defects or facets and with minimum metal removal. Thus rail life is extended to its maximum with associated cost savings.

The following schemes provide an example of the grinder configuration and the operating mode of individual grinding module in restoring the transverse profile of the rail:



Configuration of grinding machine

Grinding module nr. 5	Grinding module nr. 4	Grinding module nr. 3	Grinding module nr. 2	Grinding module nr. 1
Operates with one tangential grinding stone per rail and restores the internal radius R=13 mm.	Operates with one tangential grinding stone per rail and restores the internal radius R=13 mm.	Operates with one tangential grinding stone per rail and restores the external radius R=13 mm.	Operates with two tangential grinding stones per rail and restores radius R=80 mm.	Operates with two tangential grinding stones per rail and restores radius R=300 mm.
				

5.0 Dimensions and weight

The MS14S-C is 18.0 long, 2.50m wide, 2.70m high and weighs approximately 20 tonnes.

Its size is suitable for operating in any rail environment from tunnels, to railways, restrictions and curves down to a minimum of 20m radius. Please refer to Appendix B for a dimension drawing of the machine.

6.0 Engine

The MS14S is propelled by an IVECO engine which is at the forefront in achieving fuel efficiency and low emissions.

7.0 Transfer speed and Traction

To ensure constant transfer and grinding speeds in both directions, the MS14S-C is equipped with Siemens Sinamics traction devices.

The grinding machine MS10S - C is equipped with two cabins (one in the rear and one the front) and the maximum transfer speed is 30 km/h in both directions.



Second cabin

The two driving seats are equipped with seat for the driver.

8.0 Grinding speed and Productivity

The objective of rail grinding is to restore the rail original circular shape with minimum metal removal in order to extend rail life. The MS14S achieves this objective at grinding speeds between 1-2 km/h. All grinding operations are in accordance with all the requirements of the European Standard EN-13231/3.

9.0 Grinding stones and power

The grinding machine MS14S-C is equipped with 8 x 10HP and 6 x 20 HP grinding stones engines (14 in total). The latter are spares to be used when severe edge deformation of the rail has occurred and higher metal removal rates are required on the beveling module.

Grinding Stones are of metal resin-bonded type with a diameter of 350mm and different thicknesses in relation to the radiuses to be profiled. The duration of the grinding stones guarantees not needing to change it during the work shift.

For optimal performance and output Mecno Service recommends using their specially manufactured stones which can be offered upon request.

10.0 Dust suppression system

The MS14S-C dust aspiration system features a fan capable of extracting 2.500 m³/h and 16 filter bags.

11.0 Water spraying system

Also the MS14S-C features a water spraying system with nozzles at the front and rear of the machine. By spraying water on the track, the nozzles reduce dust particles present on the track to become airborne.

12.0 Noise suppression system

The MS14S noise suppression system consists of noise suppression panels installed on the modules metal structural frames and capable of reducing the noise level.

13.0 Operation

For the operation of the grinding procedure, two people are required. For safety reason Mecno Service recommend a crew of three people (a supervisor, a driver and a surveyor).

The supervisor is in charge of studying the track and the rail profiles before, during and after grinding.

The surveyor is in charge of producing the data used by the supervisor by measuring the defects in the rail with instruments.

The grinding machine will be equipped with a control panel to manage the grinding works.

It is possible to raise/lower the grinding module as a complete unit from either side of the vehicle using the control panels on the side.

The operators can adjust the pressure on the grindstones using the control panels located at the front of the vehicle.

It will also be possible for any operator to stop the vehicle by using any of the emergency stop button fitted around the vehicle.



Dust Aspiration system



PLC main control panel

14.0 Safety features

The MS14S features several safety systems to ensure safe working conditions of personnel during operation.

- Emergency Stop Buttons are located on each side of a module and the vehicle can be stopped immediately by any operator.
- CCTV Cameras are positioned at the front, rear and sides of the machine in order to give the cabin operator a full screen view of the environment and persons present around the machine.
- Dead Man's Pedals are present in the cabin.

15.0 Applications

The MS14S is used for the preventive, corrective or initial rail grinding of Subway and tramway lines. The machine can be used on rail tracks with gradients up to 7% and on curves with a minimum radius of 20m.

Appendix A – Specification sheet

Application:	Grinding of rails for Preventive, Corrective or Initial Rail Grinding maintenance programmes.
Grinding Capabilities:	Restoration of the longitudinal profile within: little waves (10-30mm), short waves (30-100mm), medium waves (100-300mm) and long waves (300-1000mm). Restoration of the transversal profile to its original shape Restoration of the rail surface material homogeneity by eliminating surface defects and any martensite layer.
Overall length:	18.00 m
Overall width :	2.50 m
Overall height:	2.70 m
Overall weight:	20.00 tonnes
Max transfer speed:	30 km/h
Max grind speed:	2 km/h
Min. curve radius:	20 m
Track gauge:	1 435 mm
Max. track gradient:	6 %
Noise level at 7.5 m:	74 dB (A)
Number of stones:	14 grinding stones
Electric motors power:	8 grinding motors at 10 hp 6 bevelling motors at 20 hp
Grinding angle range:	Field side +5° Gauge side -70°
Power supply:	200 kVA
Water tank capacity:	2 000 lt
Environmental:	Dust control system Noise suppression system Low Emission Engine

Appendix B – Drawing