# MACHINE FOR MAGNETIC SEPARATION

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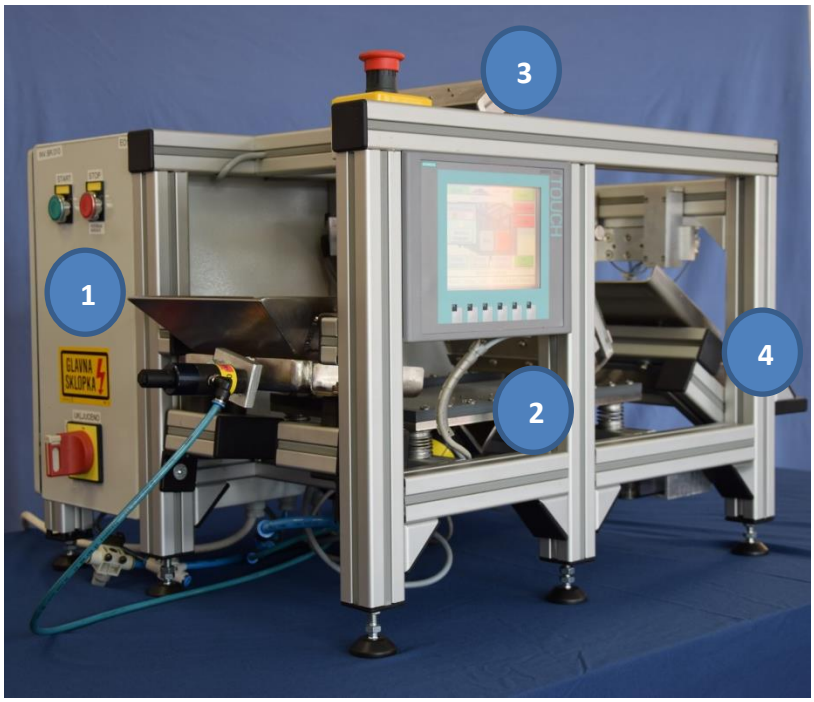
# "MARA"


Picture 1: Machine for magnetic separation

## ***Main device characteristics:***

- ***Material separation with magnets (magnets placed in rotor)***
- ***Transport material distribution conducted with pneumatic vibrators***
- ***Separation of magnetic material component with primary magnet***
- ***Discharge of magnetic material elements by linear movement of primary magnet under influence of secondary magnet***
- ***Rotor speed (stepper motor) is changeable***
- ***Material transport speed (pneumatic vibrator) is changeable***

## Machine components and their usage:




Picture 2: Machine components

### 1) Control part

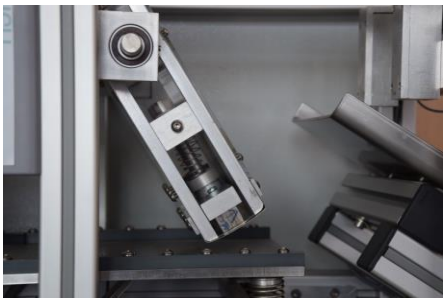
***Components:***

- HMI Siemens KTP 600
- Siemens S7-1200 PLC
- Stepper motor driver
- Stepper motor
- Proportional valve for vibrational plate
- Power supplies
- Safety elements
- Communication devices

***Description:***

- Operator defines process parameters over HMI
- PLC controls process with its I/O ports

## 2) Transport parts



Picture 3: Transport table

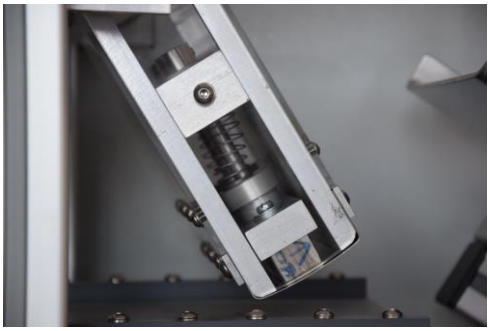
***Components:***

- Vibrational funnel with plate
- Vibrational transport table
- Damping springs

***Description:***

- Operator puts material in vibrational funnel
- By machine start vibrating funnel, PLC controlled, distributes material evenly on vibrational transport table
- Vibrational transport table is controlled trough vibrator connected to proportional regulation valve

## 3) Material separation system



Picture 4: Material separation system

***Components:***

- Rotor with primary magnet and protection sheet metal
- Secondary magnet for primary magnet shift

***Description:***

- Vibrations move material on transport plate thus passing under primary magnet on rotor. Valid (magnetic) material catches itself on rotor and comes to exiting part where primary magnet is being moved linearly backward freeing valid material to fall into discharge system, without ever touching it.
- Backward linear movement of primary magnet is accomplished by bringing it in proximity of secondary magnet with same polarity

## 4) Material discharge system

Picture 5: Output plate and container

***Components:***

- Plate for magnetic material discharge
- Container for magnetic material
- Container for non-magnetic material

***Description:***

- Separated magnetic material falls on discharge plate and through it in container for magnetic material
- Non-magnetic material moves on transport table and fall down in for it provided container