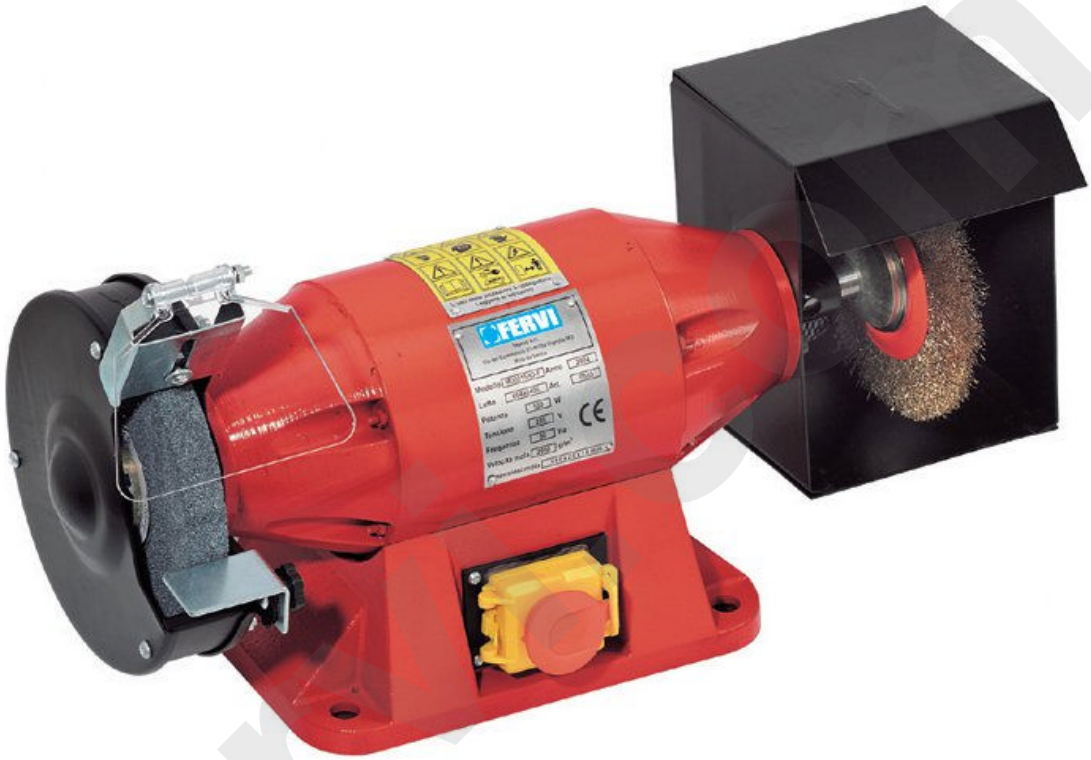
USER AND MAINTENANCE MANUAL



Professional combined grinding machine
Art. 0553

FERVI
PRO SMART EQUIPMENT

ORIGINAL INSTRUCTIONS

PREFACE

Read this manual before operating any machinery

ORIGINAL INSTRUCTIONS

Reading this instruction manual is required before operating any of the machinery. The guarantee that the machine will function and perform properly is strictly dependent upon the application of all the instructions contained in this manual.

Operator Qualifications

The workers responsible for using this machine must have all necessary information, education and receive adequate training regarding safety, including:

a) Conditions of use for the equipment;

b) Foreseeable, abnormal situations;

pursuant to art. 73 of Legislative Decree no. 81/08.

We guarantee the Machine's conformity to specifications and technical instructions described in the Manual on the date of issuance and listed herein; On the other hand, the machine may also be subject to important technical changes in the future, without the manual being updated.

Therefore, contact FERVI for information about modifications that could be implemented.

REV. 1 **March 2013**

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1 INTRODUCTION

The purpose of this manual is to provide the knowledge necessary for the use and maintenance of the bench grinding machine in question, and create a sense of responsibility and an understanding of the capabilities and limitations of the means entrusted to the operator.

As a machine is entrusted to experienced and skilled operators, so operators must have perfect knowledge of the following machines for effective and safe operation.

Selecting personnel is an important factor for efficiency and safety in the workplace, and the people considered suitable to perform a specific job must have the sufficient physical and mental capacity to allow them to understand the instructions that they are given.

GRAPHIC FORM OF THE ALERTS RELATED TO SAFETY, OPERATION AND RISK WARNINGS

The following boxes are designed to attract the attention of the reader / user for the proper and safe use of the machine:

Pay Attention

This emphasizes behavioral rules to avoid damaging the machine and/or the occurrence of hazardous situations.

Residual Risks

This highlights the presence of dangers that cause residual risks to which the operator must pay attention in order to avoid injury or damage to property.

1.1 Preface

For safe and easy operation of the grinder, this manual must be read carefully in order to acquire the necessary knowledge. In other words, durability and performance are strictly dependent on how it is used.

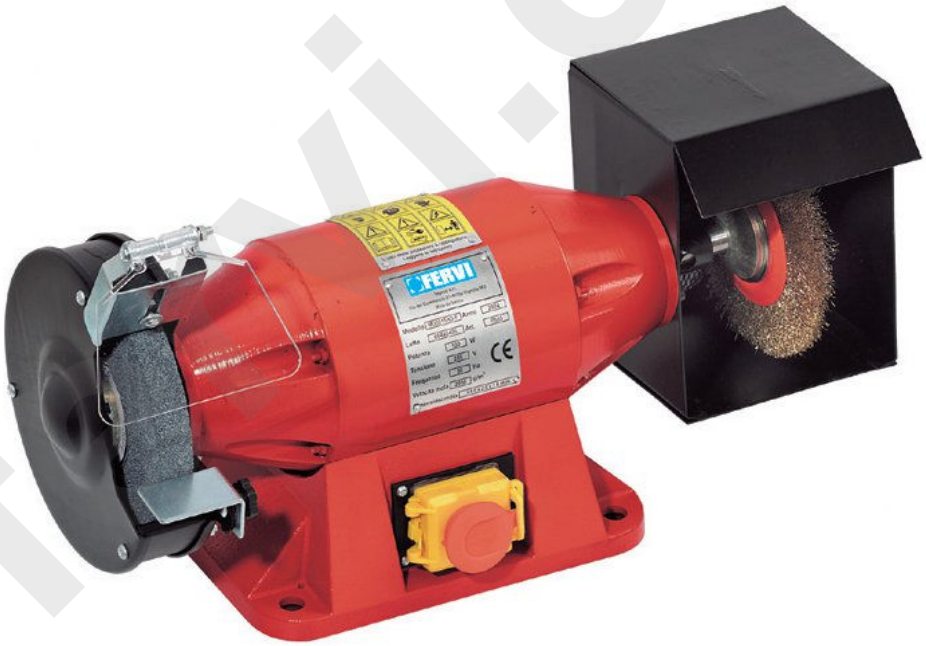
Even experienced bench grinding machine operators are required to follow the instructions below as well as the general precautions to be observed during operation.

- Acquire full knowledge of the machine.

  Read this manual carefully to understand: operation, safety devices and all necessary precautions. All this is to allow safe use of the machine.
- Wear appropriate clothing for the job.

  The operator must wear appropriate clothing to prevent the occurrence of accidents.
- Maintain the machine with care.

Using the Machine
The machine must only be used by qualified personnel trained to use the machine by authorized personnel.



2 SAFETY WARNINGS

2.1 General safety rules for machine equipment

Risks associated with using the machine

DO NOT underestimate the risks associated with using the machine and concentrate on the work in progress.

Risks associated with using the machine

Despite the implementation of all safety devices for safe use of the machine, it is necessary take note of all the requirements for the prevention of the accidents reported in various parts of this manual.

Risks associated with using the machine

Every person who is responsible for the use and maintenance of the machine should have first read the instruction manual, particularly the chapter on safety information.

It is recommended that the plant safety manager get written confirmation of the above.

Operator Protection

Before starting any type of work on the machine, the operator must wear appropriate personal protective equipment (PPE) such as goggles and gloves.

1. Read this manual carefully, in order to work safely.
2. Always check the efficiency and integrity of the machine.
3. Before connecting the machine to the mains, make sure that the rotating parts are not damaged or badly worn. Make sure that the switch is in the neutral position.
4. Do not start the machine in an enclosed or poorly ventilated area, or in the presence of a flammable and/or explosive atmosphere. Do not use the machine in damp and/or wet locations, or those exposed to rain.
5. Avoid starting accidentally.
6. Before starting the machine, get used to ensuring that no remaining maintenance and service keys are inserted.
7. Keep the workplace tidy and free from obstruction; disorder causes accidents.
8. Make sure that the work environment is forbidden to children, non-employees and animals.
9. Do not perform tasks on the machine other than those for which it was designed. Only use the machine in the manner in which it was intended, as described in this instruction manual.
10. Work without disturbances.
11. Work areas must be well lit.
12. Always wear eye protection and protective gloves while working. If dust is produced, use the appropriate masks.

13. Wear appropriate clothing. Loose clothing, dangling jewellery, long hair, etc.., can get caught in the moving parts, causing irreparable injury.
14. Do not pick up moving equipment (wheels, brushes, etc.) Do not lift the machine by the equipment parts.
15. To stop the equipment on the machine, always only use the stop command device (red button).
16. Do not leave the machine until the equipment and other moveable parts are completely stopped.
17. Replace worn and/or damaged parts, check that the repairs and protections work properly before operating. If necessary, have the machine checked by the service support personnel. Use only original spare parts.
18. **Unplug the power cord of the machine from the power outlet when:**
    1. not using the machine;
    2. the machine is left unattended;
    3. performed maintenance or registration does not work properly;
    4. the power cable is damaged;
    5. the equipment is replaced (wheel, brushes, etc.);
    6. moving or transporting;
    7. cleaning.
19. It is recommended that users of this publication, for maintenance and repair, have a basic knowledge of mechanical principles and procedures inherent in repair technique.
20. **Management responsible for safety is to make sure that the staff responsible for using the machine has read and understood this manual in its entirety.**
21. **The company safety manager is responsible for monitoring the company's risk status according to Legislative Decree no. 81/08 and subsequent modifications and amendments.**

2.2 Safety Regulations for Electrical Machine Equipment

Changes in the Electrical System

- Do not modify the electrical system in any way. Any attempt in this regard may jeopardize the operation of electrical devices, thus causing malfunction or accident.
- Work carried out in the electrical system of the machine must, therefore, be carried out only by qualified and authorized personnel.
- If one hears unusual noises, or feels something strange, immediately stop the machine. Then carry out an inspection and, if necessary, perform any repairs as required.

1. The supply voltage must correspond to that stated on the label and in the technical specifications. Never use any other type of power supply.
2. The use of a life-saving device on the electric power supply for a nominal trip range of 10 to 30 mA is recommended. For more detailed information, contact a trusted electrician.
3. The mains socket type is required to be tripolar grounded 10/16 A, 230 V), extension cables must have sections that are the same or greater than the sections of the power cable of the machine.
4. Make sure that the power cord does not come into contact with hot objects, wet or oiled surfaces, and/or sharp edges.
5. The power cord should be checked regularly and before each use to check for signs of damage or wear. If these are not in good condition, do not use the machine and replace the cable.
6. Do not use the power cord to lift the machine or to remove the plug from the socket.

2.3 Technical Support

For any problems or concerns, please contact, without hesitation, the Customer Service Department of the dealer from whom you purchased the product, who has competent and specialised staff, specific equipment and spare parts.

2.4 Other Provisions

IT IS FORBIDDEN TO TAMPER WITH SAFETY DEVICES

Check the presence and integrity of protections and the proper functioning of safety devices before starting operation.

If any defect is encountered, do not use the Bench grinding machine !!

It is strictly forbidden to modify or remove guards, safety devices, labels and caution signs.

3 TECHNICAL SPECIFICATIONS

	Model	Art. 0553
Plate data	Weight (kg)	16/18.
	Voltage (V)	230
	Power (W)	520
	Frequency (80 - 16000 Hz)	50
	Size (mm)	510 x 165 x 235
1st Tool	Type of tool	Dry grinding wheel
	Size (mm)	150 x 20 x 16
	Speed (r/min)	2950
2nd Tool	Type of tool	Brush
	Size (mm)	150 x 20 x 16
	Speed (r/min)	2950
No-load sound pressure level (dB (A))		< 70
Vibration level measured through the hand-arm system (m/s2)		12.3 under load

4 INSTALLING THE MACHINE

To install the Bench grinding machine, proceed as follows:

	Clean the Machine
Before starting assembly, clean the protective product from the machine's components.	

4.1 Positioning and fixing on the bench

	Loss of Stability
Mount the Bench grinding machine on a surface that is solid and strong to avoid it falling over and so it does not cause vibrations;	

	Clean the Workbench
Before fixing the machine in place, clean the workbench of any materials and dirt that may be present.	

Place the machine on a workbench (or other supporting surface) that is level, stable and sturdy and secure it with four bolts in the appropriate fastening holes in the base of the machine body (see Figure 1).

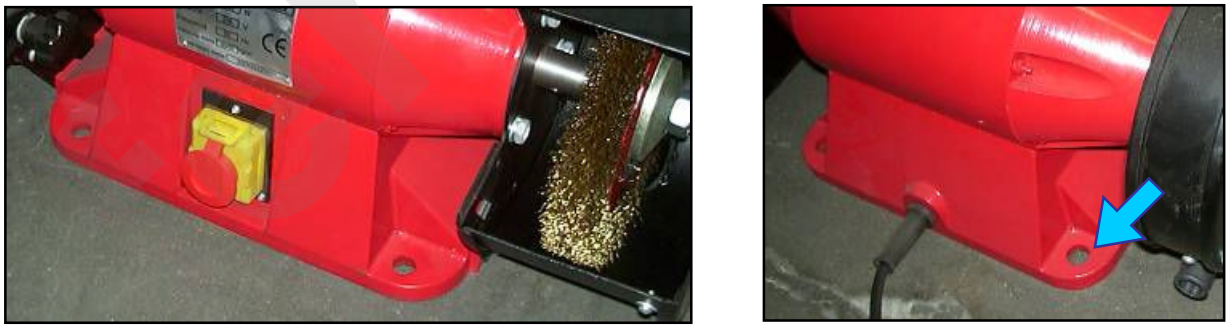


Figure 1 – Close-up of fastening holes.

In the case of using a steel bench, it is advisable to place between the grinder and the supporting surface a layer of material which is suitable to reduce the vibrations.

	Installing the Machine
Do not install the machine outdoors to avoid deformation, loss of function and damage to the electrical control circuit.	

4.2 Installation of screens and clamping brackets

1. Mount the transparent protective screen of the dry grinding wheel using the fixing screws provided (see Figure 2).

   Place the protective screen so that it does not touch the wheel and there is a maximum gap (light) of 5 mm between the metal support of the screen itself and the wheel (see the screen in Figure 2).

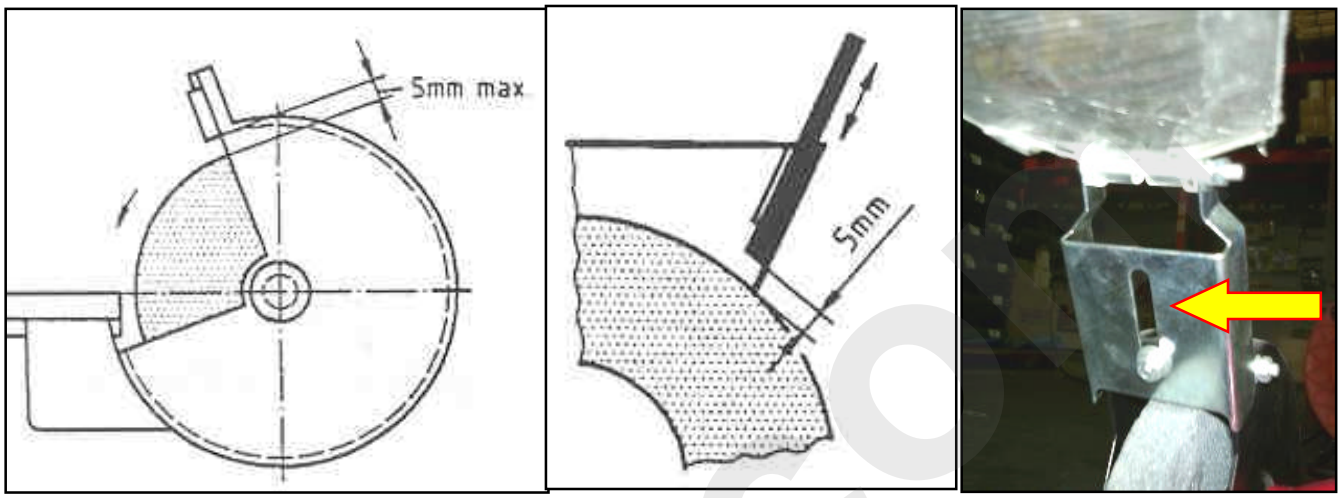


Figure 2 – Mounting and adjustment of the protective screen.

2. Fit the clamping brackets to the lower end of the protective dry grinding wheel casing, using the special screws with knob (see Figure 3). Place the clamping bracket so that it does not touch the wheel and there is a maximum gap (light) of 2 mm between the bracket itself and the wheel.

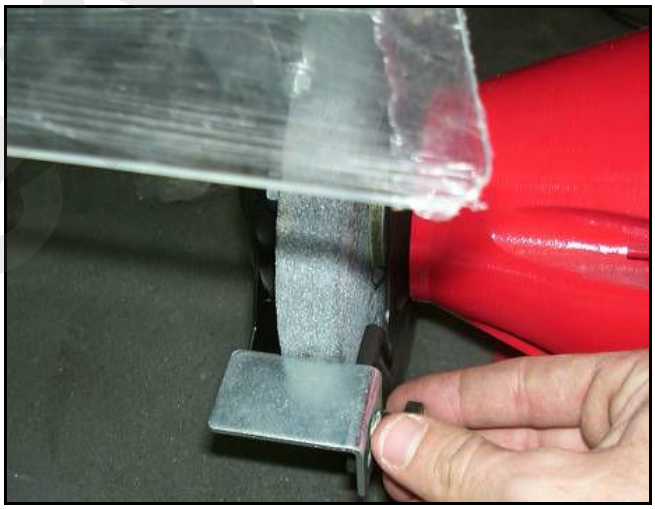


Figure 3 – Bracket adjustment.

4.3 Connecting the Power Plug and Start-Up Test

1. Insert the power plug into a power outlet with a grounding wire.
2. Start the machine by pressing the green switch I (see Figure 7) and make sure that the rotating direction of the equipment is consistent with that indicated by the arrows marked on the protective casing (caps).
3. Before starting the grinding, check the mounted wheels as follows:
   - making them rotate freely for at least 5 minutes at a peripheral operating speed;
   - with the guards closed and without the presence of personnel.

Impact of Thrown Parts
During the test run, no operator and no other person should be within range of the machine.

5 DESCRIPTION OF THE MACHINE

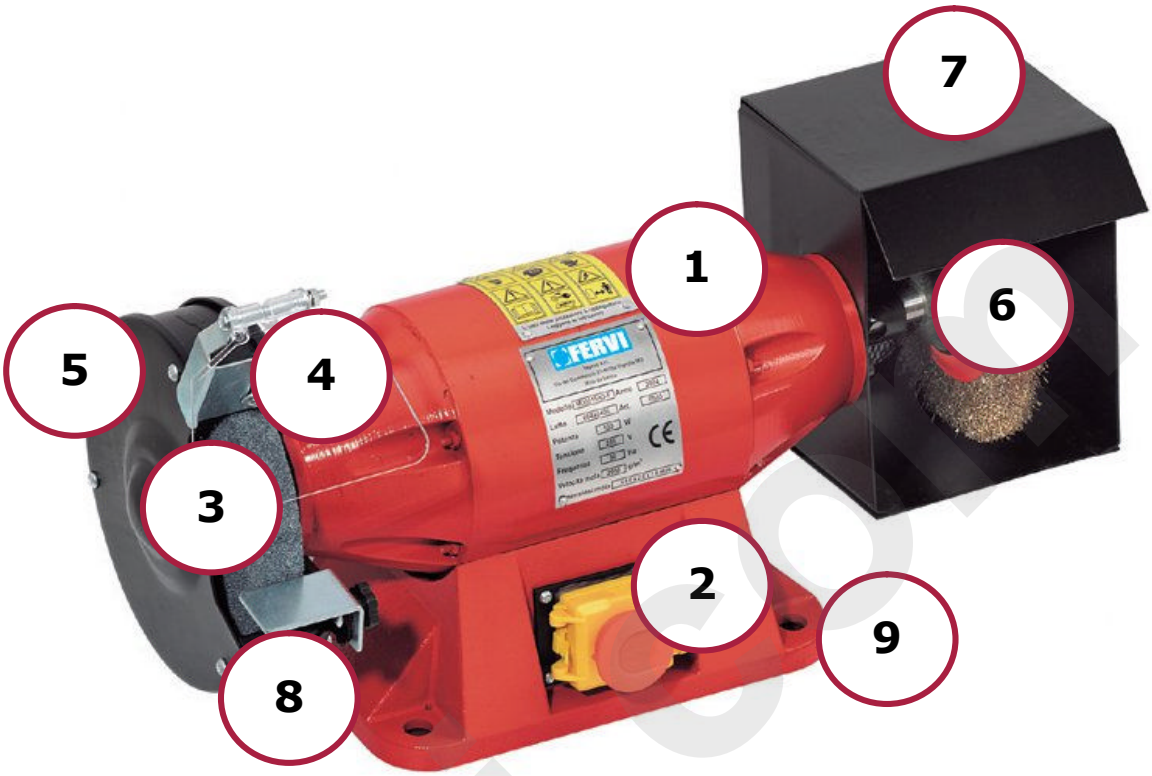


Figure 4 - Main Parts

1	Machine body / motor;
2	Start and stop buttons;
3	Dry grinding wheel;
4	Dry grinding wheel protective screen;
5	Protective wheel casing;
6	Brush
7	Protective brush casing;
8	Piece support bracket with adjustment knob
9	Fastening holes on the bench.

5.1 Plate

The following nameplate is attached to the machine:

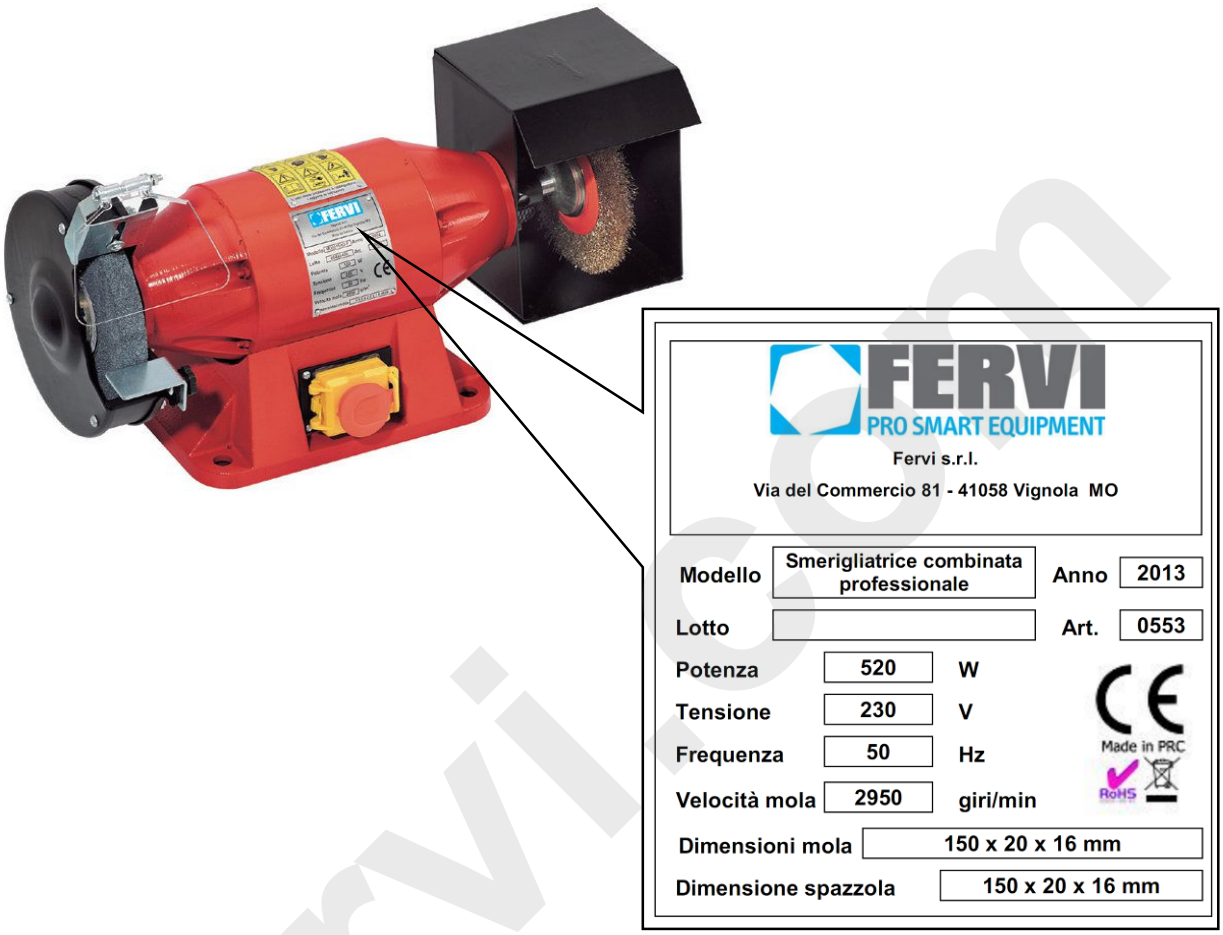


Figure 5 – Nameplate

5.2 Pictograms

The machine has the following warning and attention pictograms (Figure 6):

Figure 6 – Caution and warning pictograms.

Legend:

PLATE IN ITALIAN	PLATE IN ENGLISH

ATTENZIONE!!

- LEGGERE LE ISTRUZIONI PRIMA DI UTILIZZARE LA MACCHINA
- NON AVVICINARE LE MANI ALL'UTENSILE IN MOVIMENTO
- NON AFFERRARE IL PEZZO CON LE MANI PER ARRESTARLO
- NON REGOLARE LA MACCHINA MENTRE È IN FUNZIONE
- INDOSSARE SEMPRE IDONEE PROTEZIONI QUALI OCCHIALI E MASCHERINE QUALORA VENFA PRODOTTA POLVERE
- SCOLLEGARE LA MACCHINA DALL'ALIMENTAZIONE ELETTRICA IN CASO DI RIPARAZIONI O REGOLAZIONI
- NON INDOSSARE INDUMENTI SVOLAZZANTI, GIOIELLI,
- CATENINE E BRACCIALI CHE POSSONO AGGANCIARSI ALLA MACCHINA E CAUSARE DANNI IRREPARABILI
- SCOLLEGARE LA MACCHINA DALL'ALIMENTAZIONE ELETTRICA PRIMA DI ESEGUIRE MANUTENZIONE, REGOLAZIONI E RIPARAZIONI

CAUTION!!

- READ THE INSTRUCTIONS BEFORE USING THE MACHINE.
- KEEP HANDS AWAY FROM THE MOVING TOOL.
- DON'T GRAB THE PIECE WITH YOUR HANDS TO STOP IT.
- DON'T ADJUST THE MACHINE WHILE IT IS IN OPERATION.
- ALWAYS WEAR PERSONAL PROTECTION EQUIPMENT SUCH AS GOGGLES AND MASK IF POWDER IS PRODUCED.
- DISCONNECT THE MACHINE FROM THE POWER SUPPLY IF REPAIRS OR ADJUSTMENTS ARE BEING MADE ON IT.
- DON'T WEAR LOOSE CLOTHING, JEWELLERY,
- CHAINS AND BRACELETS MAY CATCH IN THE MOVING PARTS AND CAUSE IRREPARABLE INJURY.
- BEFORE PERFORMING MAINTENANCE, REPAIRS AND ADJUSTMENTS ON THE MACHINE, DISCONNECT IT FROM POWER SUPPLY.

6 CONTROL SWITCHES

They are located on the base of the machine body. They are used to turn the bench grinding machine on and off.

6.1 On switch (start)

The green button (I), is used for starting (turning on) the bench grinding machine (Figure 7). With this button, the electric motor is powered and the equipment is set in rotation (grinding wheel, brush, etc.).

Figure 7 – Start button.

6.2 Off switch (stop)

The red button (0), is used for switching off (stop) the bench grinding machine (Figure 8). With this button, the power to the electric motor is turned off and the rotation of the equipment is stopped (grinding wheel, brush, etc.).

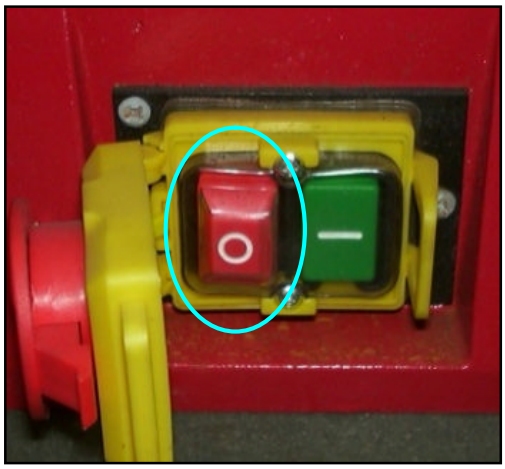


Figure 8 – Stop button.

Risk of Abrasion

- After pressing the off switch (0), the equipment will continue to rotate by inertia.
- Do not allow body parts near the wheel or the brush while in motion!

6.3 Emergency Button

On the control buttons panel there is an emergency stop button. To stop the machine in case of emergency, press the red button. When it is pushed, the motion of the electric motor and the grinding wheels is interrupted.

To restore power to the machine again after an emergency stop, open the red button and press the green start button.

Checking the Emergency Button
Before starting any work on the machine, ensure that the emergency stop button functions.

Risk of Abrasion and Accident
• After pressing the emergency switch, the equipment will continue to rotate by inertia. • Do not allow body parts near the wheel or the brush while in motion!

7 OPERATION

7.1 Instructions for Use

Bench grinding machines are very easy to use.

The **dry grinding** wheel is used for grinding, sanding and/or smoothing solid and massive material (especially metal and metal alloys) by abrasion.

The **metallic brush** is used to clean away impurities and polish the outer surfaces of solid and resistant items.

Using the Machine
The Bench grinding machine must be used only with sharpening wheels and brushes that are suitable for the type of machine and the type of material to be processed.

Risk of Abrasion and Accident
• Before using the machine, make sure that it is rigidly fixed to the workbench to prevent movement or loss of stability. • Wear appropriate personal protective equipment (PPE) such as gloves, goggles, overalls or apron and safety shoes.

It is recommended to not extend the continued use of the machine for more than 10 minutes to avoid overheating of the machine (which could damage the engine) and the equipment.

7.2 Using the dry grinding wheel

1. Press the green start button (start, see Figure 9)
2. Place the piece to be ground on the support bracket and push it towards the grinding wheel without pressing excessively;
3. To avoid overheating, place the piece in water and cool it;
4. If necessary, to revive the working surface of the grinding wheel and to obtain a perfectly flat surface, using a hardened steel bar. Gradually bringing it closer to the grinding wheel as in normal sanding;

Figure 9 – Starting the grinding wheel.

5. After processing, turn off the machine by pressing the red stop button (see Figure 10).

Figure 10 – Turning off the grinding wheel.

7.3 Metal brush operation

When using the brush, take the same precautions and follow the procedure given in section 7.2 of this manual, regarding the use of the dry grinding wheel; **except for the fact that there is no support for the piece**.

1. Press the green button to start;
2. Move the piece to be treated towards the brush and push it against the brush without doing so excessively;
3. After processing, turn off the machine by pressing the red stop button.

8 MACHINE SAFETY

8.1 Electrical Safety

The control device inserted in the electrical circuit of the Bench grinding machine is a **magnetic switch** with two buttons (see Section 6 of this manual). This prevents the danger of unwanted and/or accidental starts of the machine, since the switch can only be activated through a voluntary action suitable for the given purpose and when the machine is powered.

The start button is, moreover, equipped with a protective ring.

The machine is also equipped with an **emergency stop button**, formed by a plastic cap placed over the on and off switches, when pressure is applied it acts only on the stop button. When, in an emergency, pressure is applied to the cap, the dangerous functions stop.

In the event of malfunction or breakdown, the Bench grinding machine is equipped with a power cable and plug with **grounding conductor**, which provides a path of least resistance for electric current and reduces the risk of electric shock.

The plug must be plugged into an appropriate outlet, grounded in accordance with current regulation. Extension cables must be of a section equal to or greater than the power cable of the machine.

	Electric Shock
Improper connection of the machine's grounding conductor can result in the risk of electric shock.	

It is necessary to connect the machine to a system equipped with a device for the automatic disconnection of power in the event of a ground fault.

Check with a qualified electrician if you don't understand the instructions for grounding or if you have any doubts about the grounding of the machine.

8.2 Mechanical Safety Devices

PROTECTIVE CASING AND TRANSPARENT SCREENS

This prevents the hot splinters, dust or wheel fragments that eventually get separated from being thrown into the operator's face.

Checking the Safety devices

- Each time the grinding wheel is used, check that the safety devices function and are positioned properly.
- In case of damage and/or breakage, do not use the machine.

Use of PPE

In any case, ALWAYS use appropriate personal protective equipment such as:

- Gloves,
- Goggles or face shields;
- Overalls or aprons;
- Safety shoes.

Figure 11 - Personal Protective Equipment.

9 MAINTENANCE

9.1 Routine maintenance

	**Electric Shock**
Before maintenance or checks, turn off the machine and ALWAYS unplug the plug from the power outlet. This is so that there is no risk of electric shock.	

Regularly clean and take care of the machine to guarantee proper efficiency and a long working life.

With a compressor, routinely blow away the dust and residue that accumulate on the machine and on the protective screens from the operations of sanding, grinding, polishing etc.

	**Working with the Air Compressor**
ALWAYS wear protective goggles when using the air compressor.	

Only use a warm, damp cloth to clean the body of the machine and other external parts.

	**Cleaning the Machine**
DO NOT use detergents or any solvents; the plastic parts are easily damaged by chemical agents.	

Periodically check for wear on the grinding wheel and the brushes, taking care to replace them if there are cracks, defects and/or detached materials or irregular wear. (in this regard, see section 9.2 of this manual).

As the dry grinding wheels wear, record the position of the supports of the transparent screens so that the distance (light) between the supports themselves and the grinding wheels is no more than **5 mm** (see section 4.2 of this manual).

Similarly, record the support brackets of the pieces so that the distance (light) between the brackets themselves and the grinding wheels is no more than **2 mm** (see section 4.2 of this manual).

In addition, run a thorough check of operation and wear every 6 months of the life of the machine; lubricate the tool holder rotating shaft with oil.

9.2 Replacing tools

	Electric Shock
Before replacing tools, turn off the machine and ALWAYS unplug the plug from the power outlet. This is so that there is no risk of electric shock.	

	Characteristics of the Wheels
• Do not use grinding wheels with a cavity. • Only use wheels with the size and characteristics indicated in the table of technical specifications (see Section 3 of this manual) • The speed marked on the wheel must be equal to or greater than that specified in the specifications table.	

	Characteristics of the Wheels
• For the clamping of the grinding wheels only use flanges with identical size and shape as the supporting surface. • The shims between the flanges and the grinding wheels must be made of elastic materials such as rubber, soft cardboard etc.	

If a caution label does not indicate the maximum permissible peripheral velocity or is unreadable, calculate it using the following formula:

$$v = (n \cdot D \cdot \pi) / 60000;$$

v: peripheral velocity (in m/s);
n: rotational speed (in revs/min);
D: external diameter of the wheel (in mm).
π: 3.14.

	Characteristics of the Wheels
DO NOT use grinding wheels with peripheral velocity lower than 30 m/s.	

	Characteristics of the Wheels
• The hole of the sharpening wheel should not be enlarged due to the possible danger of breaking the sharpening wheel. • Before fitting the wheel, check that there are no cracks and that it has not been damaged during transport. We recommend that you tap it, a light sound confirms its integrity.	

9.2.1 Dry grinding wheel

1. Unscrew the three fastening screws and remove the protective casing.
2. For this purpose use a screwdriver.

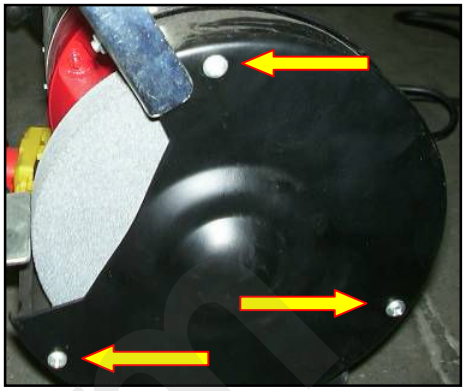


Figure 12 – Protective casing.

3. Unscrew the fastening nut (ref. 17 in Figure 13) using a spanner for hexagonal nuts, turning anti-clockwise.
4. Remove the fastening flange (ref. 18 in Figure 13) of the grinding wheel.
5. Remove the plastic reduction ring which is inserted into the hole of the grinding wheel and insert it into the new one (which must be mounted on the machine).
6. Insert the new wheel onto the wheel shaft and secure it using the steps described in points 3 and 2 (in reverse order).
7. Replace the protective casing and secure it with the three fastening screws.

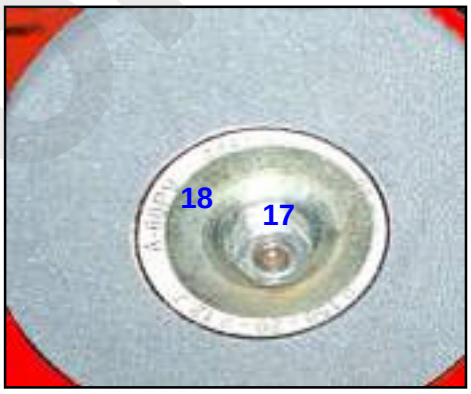


Figure 13 – Fastening nut and flange.

9.2.2 Metal brush

1. Insert the steel pin in the hole which is located on the brush shaft, between the brush itself and the protective casing.

Figure 14 – Hole on the shaft.

Figure 15 – Fastening nut and flange.

Unscrew the fastening nut (ref. 19 in Figure 15) using a spanner for hexagonal nuts, turning anti-clockwise.

2. Remove the fastening flange of the brush.
3. Remove the brush, insert the new wheel on the shaft and secure it following the steps described in points 2 and 1 (in reverse order).
4. After removing the steel pin, rotate the brush freely without any load for a few minutes to see if it is secure and balanced, if is it not repeat the operation.

10 FAULT FINDING

PROBLEM	PROBABLE CAUSE	SOLUTION
Noisy operation.	A) Damaged bearings. B) Bearings not lubricated. C) Rubbing of a tool. D) Loose tool.	A) Contact the service department. B) Lubricate. C) Remove / replace the tools and check they are balanced. D) Tighten the fastening nut.
The motor will not start.	A) Electrical power supply. B) Wiring connections C) Burnt motor windings. D) Broken switch.	A) Check the mains power supply. B) Check the wiring connections. C) Contact the service department. D) Contact the service department.

11 DISPOSAL OF PARTS AND MATERIALS

If the machine is to be scrapped, its parts must be disposed of separately.

	Respect the Environment!
Contact a specialist centre for the collection of metallic materials.	

The structure of the grinding wheels is made of steel, the grinding wheels are made of sintered abrasive material while the transparent protective screens and some seals are made of polymeric material. In this regard, divide the materials according to their nature, employing specialist companies which are authorised for their disposal, in accordance with the requirements of law.

12 ELECTRICAL CIRCUIT

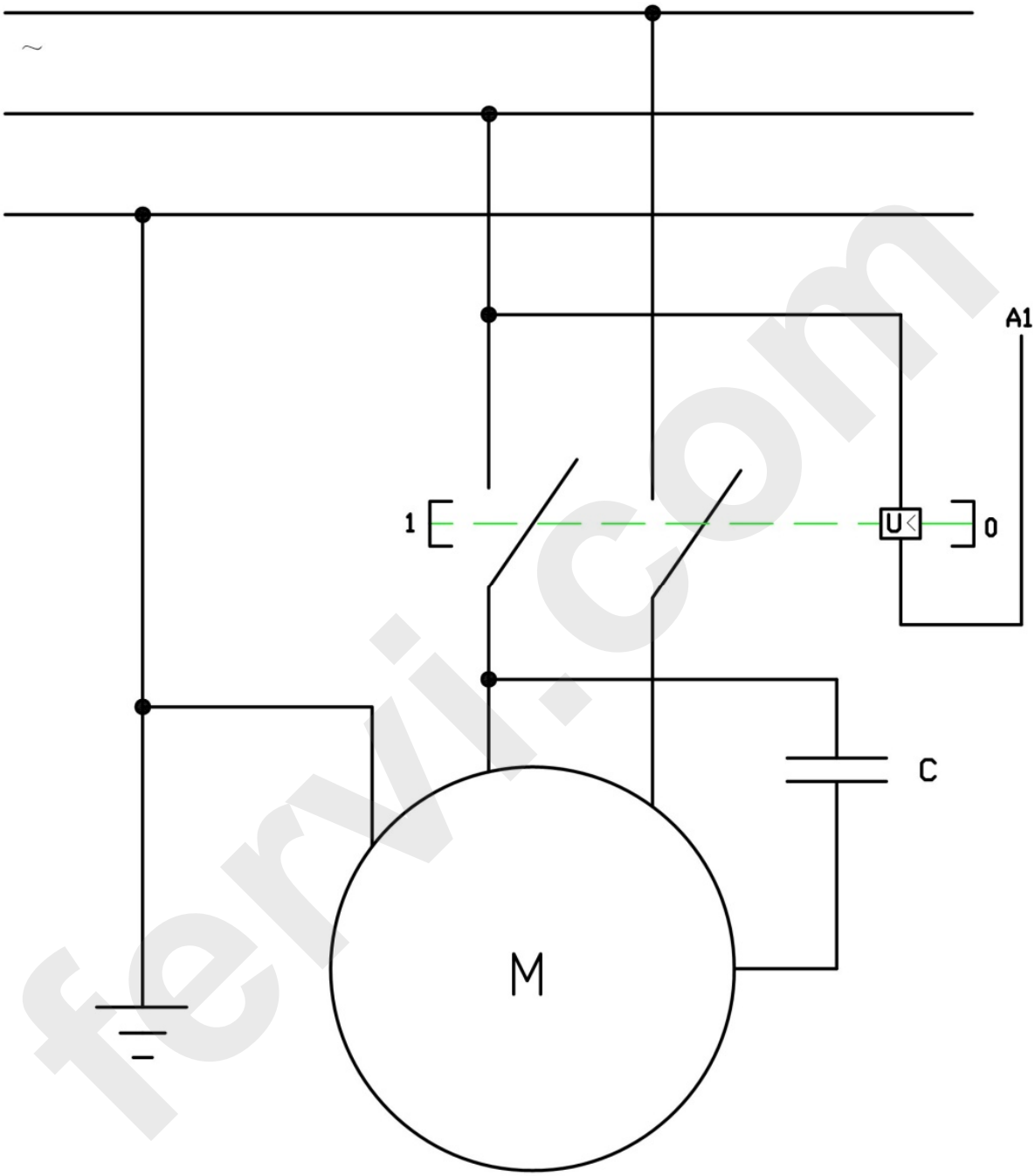


Figure 16 – Wiring diagram.

12.1 Parts of the machine

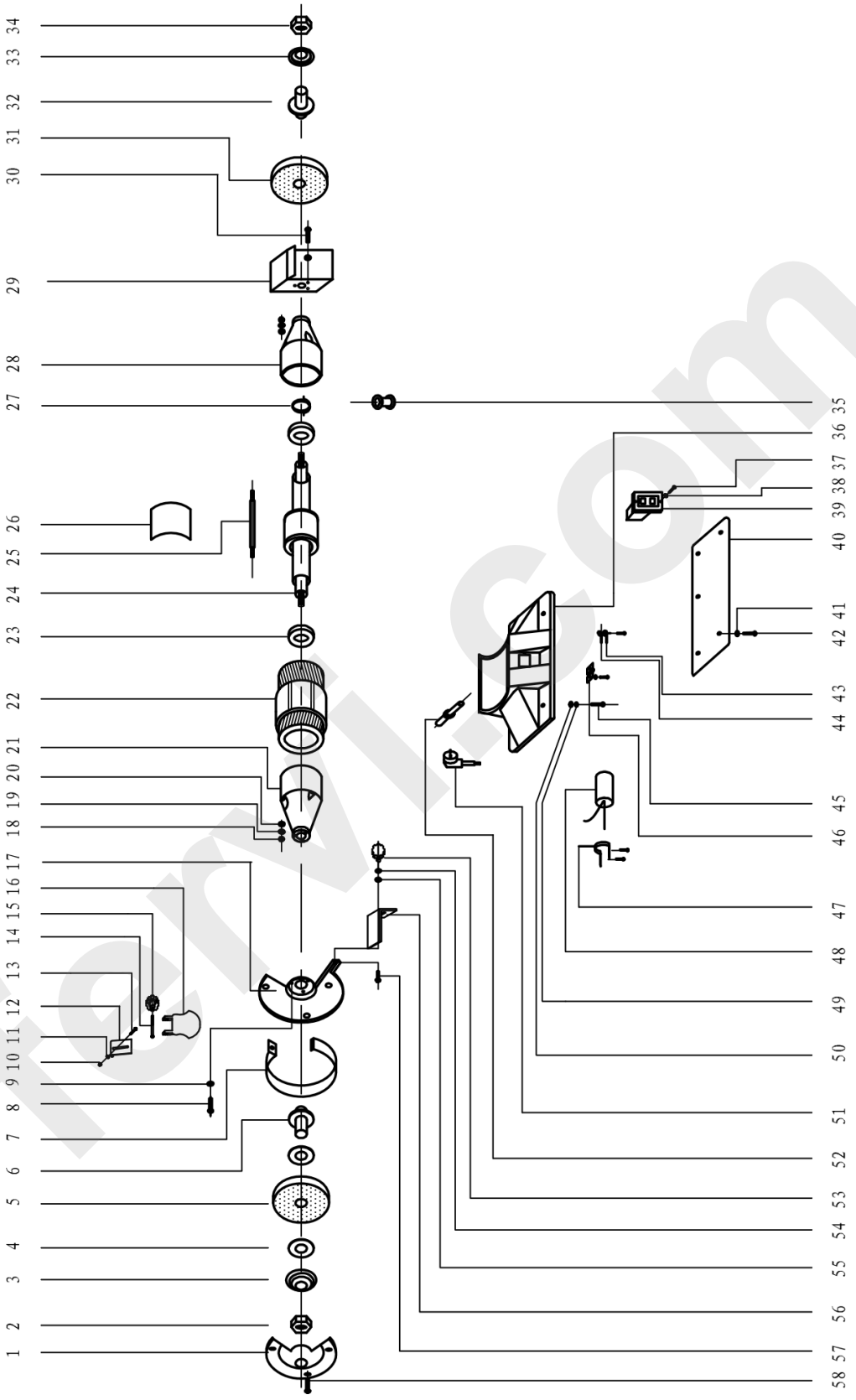


Figure 17 – Set of parts.

Code	Description	N°	Code	Description	N°
0553/01	Left external casing	1	0553/30	Bolt	4
0553/02	Disc lock nut	1	0553/31	Abrasive Disc	1
0553/03	Disc flange	2	0553/32	Short axis	1
0553/04	Disc nameplate	2	0553/33	Disc flange	1
0553/05	Abrasive disc	1	0553/34	Disc lock nut	1
0553/06	Short axis	1	0553/35	Wire guide	1
0553/07	Middle ring	1	0553/36	Base	1
0553/08	Bolt	4	0553/37	Bolt	2
0553/09	Bolt	5	0553/38	Washer	2
0553/10	Screw	2	0553/39	Switch	1
0553/11	Washer	2	0553/40	Base plate	1
0553/12	Protective casing support	1	0553/41	Washer	4
0553/13	Bolt	2	0553/42	Bolt	4
0553/14	Bolt	2	0553/43	Washer	1
0553/15	Square shank screw	1	0553/44	Ground terminal	1
0553/16	Protective device	1	0553/45	Bolt	4
0553/17	Left inner casing	1	0553/46	Cable inlet plate	1
0553/18	Washer	4	0553/47	Condenser coupling	1
0553/19	Washer	4	0553/48	Condenser	1
0553/20	Disc lock nut	4	0553/49	Washer	4
0553/21	Casing	1	0553/50	Washer	4
0553/22	Stator	1	0553/51	Left piece support	1
0553/23	Bearing	2	0553/52	Plug and cable	1
0553/24	Rotor	1	0553/53	Knob nut	1
0553/25	Bolt	4	0553/54	Washer	1
0553/26	Nameplate	1	0553/55	Washer	1
0553/27	Spring	1	0553/56	Piece support	1
0553/28	Casing	1	0553/57	Bolt	1
0553/29	Protective casing	1	0553/58	Bolt	1