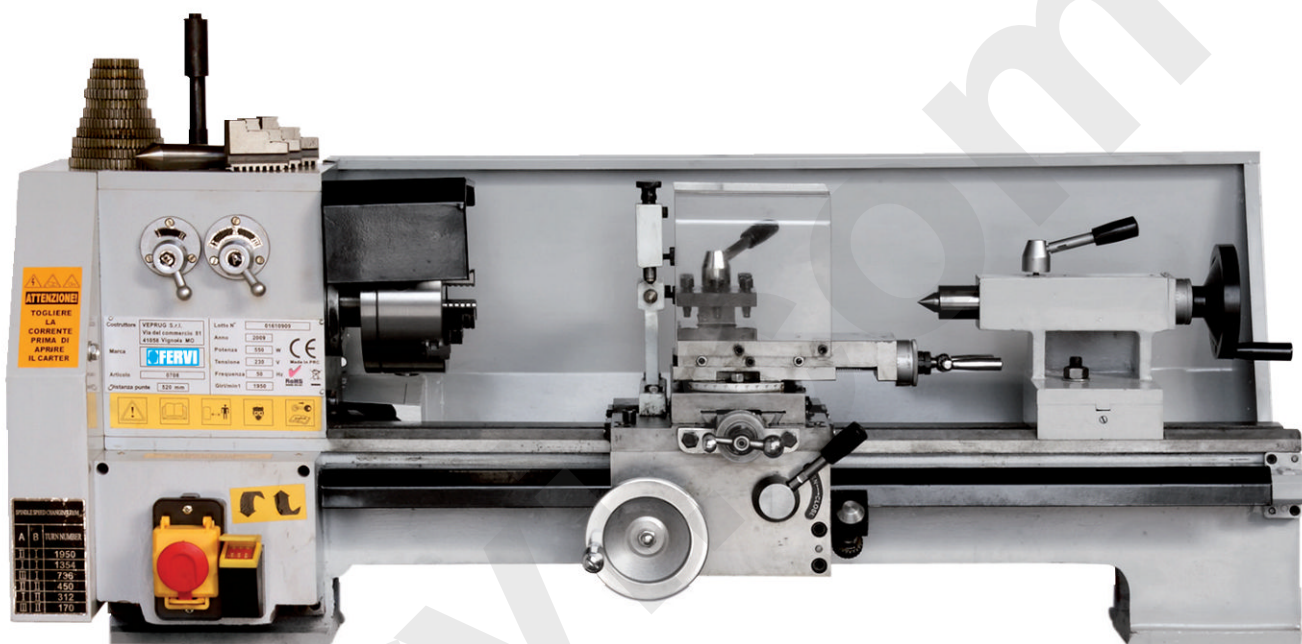


OPERATION AND MAINTENANCE MANUAL



Bench Lathe Art. 0708



ORIGINAL INSTRUCTIONS

PREFACE



Please ensure you have read this manual before operation

TRANSLATION OF THE ORIGINAL INSTRUCTIONS

It is compulsory to read this instruction manual before starting operation. The guarantee of smooth operation and full performance of the machine is highly dependent on the application of all the instructions contained in this manual.



Operator qualifications

The workers responsible for the use of this machine must have all the necessary information and instruction and should be given adequate training in relation to safety regarding:

- a) Conditions of use for the equipment;
- b) Foreseeable, abnormal situations;
- c) pursuant to art. 73 of Legislative Decree no. 81/08.

We guarantee the Machine complies with the 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 may have been implemented.



INDEX

1	INTRODUCTION	5
2	SAFETY WARNINGS	7
2.1	General safety rules for machine equipment.....	7
2.2	Safety Regulations for Electrical Machine Equipment.....	9
2.3	Technical Assistance	9
2.4	Other provisions	9
3	TECHNICAL SPECIFICATIONS	10
4	DESCRIPTION OF THE MACHINE	11
4.1	Intended use and field of application.....	11
4.2	Description of the Main Parts	13
4.2.1	Supporting table	13
4.2.2	Head and spindle	14
4.2.3	Spindle speed adjustment panel	14
4.2.4	Feeding speed change gearbox	14
4.2.5	Tool holder guide carriage.....	15
4.2.6	Tailstock	15
4.2.7	Electrical and control panel	16
4.3	Identification plate	17
4.4	Pictograms and plates.....	18
4.4.1	Control markings	19
4.4.2	Spindle rotation speed plate	19
5	MACHINE SAFETY DEVICES	20
5.1	Electrical Safety	20
5.1	Mechanical safety devices.....	21
5.2	Personal Protective Equipment (PPE)	22
6	FORBIDDEN USES AND HAZARDS	22
7	LIFTING, TRANSPORTATION AND STORAGE IN WAREHOUSE	23
7.1	Lifting	23
7.2	Transportation;	25
7.3	Warehouse storage	25
8	ASSEMBLY AND COMMISSIONING	26
8.1	Identification of the installation site.....	26
8.2	Support base.....	26
8.3	Securing the machine	26
8.4	Levelling the machine	27
8.4.1	Preliminary phase	27
8.4.2	Transverse levelling of the table	27
8.4.3	Levelling of the lathe guides.....	27

8.5	Operations before starting the machine.....	27
8.5.1	Lubrication and greasing.....	27
8.5.2	Connecting the power supply plug.....	27
8.5.3	Operating test run.....	28
9	DESCRIPTION OF CONTROLS	29
9.1	Control buttons	29
9.1.1	On switch (start).....	29
9.1.2	Off switch (stop).....	29
9.1.3	Switch for reversing the rotation direction of the electric motor.	29
9.1.4	Emergency Button	30
9.2	Levers and control wheels	30
9.2.1	Spindle speed adjustment knobs.....	30
9.2.2	Levers and handwheels of the carriage and tool holder slides	31
9.2.3	Lever and handwheel of the tailstock.....	32
10	OPERATION	33
10.1	Automatic feed of the tool holder carriage.....	35
11	MAINTENANCE	35
11.1	Lubrication.....	37
11.2	Periodic checks	39
11.3	Machine adjustment.....	39
11.3.1	Motor belt tension adjustment.....	39
11.3.2	Tailstock alignment	39
11.3.3	Spindle alignment	40
12	EXPLODED VIEW AND PARTS LIST	41
13	ACCESSORIES SUPPLIED	46
14	DISPOSAL OF PARTS AND MATERIALS	46
15	TROUBLESHOOTING	47
16	WIRING PLAN	48



1 INTRODUCTION

This manual is considered an integral part of the machine it was attached to at the time of purchase.

The manufacturer holds all ownership to material and intellectual property of this manual; any disclosure or copying, even partial, of this publication without prior written consent is forbidden.

This manual is designed to provide the knowledge required for the use and maintenance of the **Gear bench lathe Art. 0708** and to provide the operator assigned to the device with a sense of responsibility and knowledge of its possibilities and limitations.

Operators must be properly trained and prepared, so make sure that this manual is read and consulted by the staff responsible for commissioning, operation and maintenance of the machine. This is to make all operations as safe and effective as possible for those who carry out these tasks. Therefore, it is imperative to strictly comply with the requirements in this manual, a necessary condition for safe and satisfactory operation of the Lathe.

Before starting operation, installation and use of the machine, authorized staff must therefore:

- read this technical document carefully;
- know which protections and safety devices are available on the Lathe, their location and how they work.

The buyer is responsible for ensuring that users are properly trained, that they are aware of all the information and instructions in this document and that they are aware of the potential risks of operating the Lathe.

The manufacturer will not be held responsible for any damage to people and/or property caused by non-compliance with any instructions in this manual.

Operators will be held fully responsible for any changes they have made to the machine; the manufacturer will not be held responsible for any damage to persons and/or property resulting from maintenance performed by unqualified personnel and in a manner that differs from the operating procedures shown below.

The **Gear bench lathe** has been designed and built with mechanical guards and safety devices designed to protect the operator/user from possible injury.

It is strictly forbidden to modify or remove guards, safety devices and caution labels. If this must be done (for example, for cleaning or repair), make sure that no one can use the machine.

GRAPHIC REPRESENTATION OF SAFETY, OPERATIONAL 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 highlights behavioural rules to prevent damage to the machine and/or the occurrence of dangerous 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.

fervi.com



2 SAFETY WARNINGS

2.1 General safety rules for machine equipment

Follow the instructions contained herein, in addition to the general precautions to be observed while working. Even if the operator is already familiar with the use of manually operated lathes, it is necessary to: Particularly:

- **Acquire full knowledge of the machine.**

For safe operation, this manual must be read carefully in order to acquire the necessary knowledge of the machine and to understand: operation, safety devices and all necessary precautions.

- **Wear appropriate clothing for the job.**

The operator must wear appropriate clothing to prevent accidents.

- **Maintain the machine with care.**



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 the safety devices for safe use of the machine, it is necessary to take note of all the requirements for the prevention of accidents detailed in the various sections of this manual.



Protective equipment for the operator

Before starting any type of work, the operator must wear the appropriate personal protective equipment (PPE) such as goggles, gloves etc. (see section 5.3 of this manual).

1. Always check the efficiency and integrity of the machine.
2. 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.
3. 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.
4. Avoid starting accidentally.
5. Before starting the machine, get used to ensuring that no remaining maintenance and service keys are inserted.
6. Keep the workplace tidy and free from obstruction; disorder causes accidents.
7. Make sure that the work environment is forbidden to children, non-employees and animals.
8. 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.
9. Work without disturbances.
10. Work areas must be well lit.

11. Always wear eye protection and protective gloves while working. If dust is produced, use the appropriate masks.
12. Wear appropriate clothing. Loose clothing, dangling jewellery, long hair, etc., can get caught in the moving parts, causing irreparable injury.
13. Firmly secure the workpiece before starting the lathe, using the jaws installed on the spindle.
14. Always use the tool in an appropriate manner. Perform only the work for which the tool is made. Do not use the tool for inadequate work.
15. Only use suitable resistance tools in relation to the work that is to be done. This is to avoid risky and unnecessary overloading for the operator, which may be harmful for the life of the tools themselves.
16. Do not pick up moving tools or other moving parts. To stop the moving parts on the machine, always only use the stop command device (red button).
17. Before performing any measurement of the workpiece mounted on the spindle, turn the motor off, unplug it and wait for the spindle to stop.
18. Do not remove the shavings with your hands, even at a standstill. To do this, use tongs or a palette knife.
19. When the work tools need to be replaced or the speed needs to be changed, stop the motor and wait for the spindle to stop.
20. Do not move away from the machine until the tools and other moving parts, have completely stopped.
21. After the work is completed, clean the tool and check its efficiency.
22. Replace worn and/or damaged parts, check that the repairs and protection work correctly before operating. Eventually, if necessary, have it checked by Service staff. Use only original spare parts.
23. **Unplug the power cord of the machine from the power outlet when:**
 - not using the machine;
 - it is left unattended;
 - performing maintenance or registration, because the machine does not work properly;
 - the power cable is damaged;
 - the tool is replaced;
 - moved or transported;
 - cleaning.
24. It is recommended that users of this publication, for maintenance and repair, have a basic knowledge of the mechanical principles and procedures inherent in repair technique.
25. **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.**
26. **Management is responsible for safety and verification of the company's risk status according to Legislative Decree 81/08.**



2.2 Safety Regulations for Electrical Machine Equipment



Changes in the Electrical System

1. Do not modify the machine's electrical system in any way. Any attempt to do so may impair the operation of the electrical devices causing a malfunction or accident.
 2. Work on the electrical system of the machine must therefore be carried out only by qualified and authorized personnel.
 3. If you hear unusual noises, or notice anything unusual, stop the machine immediately. Then, carry out an inspection and, if necessary, perform any repairs as required.
-
1. Ensure supply voltage complies with the identification label and technical specifications (230 V / 50 Hz). **Never use any other type of power supply.**
 2. It is necessary to connect the machine to a system equipped with a device for the automatic disconnection of electric power in the event of a ground fault. Contact a trusted electrician.
 3. The mains power outlet should be bipolar grounded (10/16 A, 250 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 remove the plug from the socket or move the machine.

2.3 Technical Assistance

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

TAMPERING WITH SAFETY DEVICES IS FORBIDDEN

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

If any defect is detected, do not use the Gear bench lathe!

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

3 TECHNICAL SPECIFICATIONS

Description (unit of measurement)	Value
Centre height (mm)	110
Centres distance (mm)	520
Maximum swing over the bed (mm)	200
Maximum swing over the cross slide (mm)	122
Maximum swing length (mm)	520 / 350
Spindle hole diameter (mm)	20
Spindle diameter (3 + 3 self centring) (mm)	125
Spindle connector	CM 3
No. of spindle speeds	6
Spindle speed (r/min)	170 ÷ 1950
No. of metric threads	17
Range of metric threads (mm)	0.25 ÷ 3
No. of inch threads	17
Range of inch threads (mm)	8 ÷ 48
No. of longitudinal feeds	5
Range of longitudinal feeds (mm)	0.04 ÷ 0.2
Outer diameter of the feed screw (mm)	20
Spacing of the feed screw (mm)	3
Rack module	2
Cross carriage travel (mm)	70
Maximum inclination angle of the carriage	45°
Transverse movement of the carriage (mm)	115
Longitudinal movement of the carriage (mm)	520
Tailstock taper	CM 2
Maximum travel of the tailstock quill (mm)	50
Dimensions w/o base (mm)	1080 x 440 x 400 (h)
Weight (kg)	130
Voltage / power supply frequency (V / Hz)	230/50.
Power (W)	500
Acoustic pressure level (dB (A))	80
Uncertainty of measurement (dB)	0.2 ± 0.38
Vibration transmitted to the hand-arm system (m/s ²)	0.8
Uncertainty of measurement (m/s ²)	0.2



4 DESCRIPTION OF THE MACHINE

The **Gear bench lathe (Art. 0708)** is a machine tool, with a horizontal axis, for the machining of metallic materials by means of cold chip removal.

The cutting motion is given by the motion of the workpiece, rotating on its own axis, and the feed motion of the tool.

The machine is completely **manually operated**, as it can only execute movements under the direct control of the operator.

4.1 Intended use and field of application

The machine is designed and built to perform the following operations on all types of ferrous metals:

- Cylindrical turning;
- Taper turning;
- Facing;
- Profiling
- Drilling;
- Boring;
- Threading;
- Cutting / Breaking (from bar).



Intended use and materials

The machine has been designed and manufactured for the use specified. Operating the machine other than as intended and within maximum capacity does not comply with the manufacturer's specifications; the latter cannot accept any responsibility for damage resulting therefrom.

The Lathe must be installed and used on flat supporting surfaces, with adequate ergonomic and resistance features, such as a workbench or a base.

The Lathe can operate in closed work environments (production halls, warehouses, etc.), i.e. protected from the weather and where there is no danger of fire or explosion.

The operating temperature range is -20 to +50°C.

The environment must also be sufficiently illuminated so as to ensure operation in maximum safety (at least 50 lux is recommended).

The Lathe consists of two basic units:

- The spindle shaft unit;
- The sliding tool holder unit.

The first is constituted by the spindle, which is made integral with the workpiece, and by the components that transmit motion from the motor to the spindle.

The second is constituted by the components that transmit motion to the slide, which guides the tool in the feeding motion and movement of the workpiece.

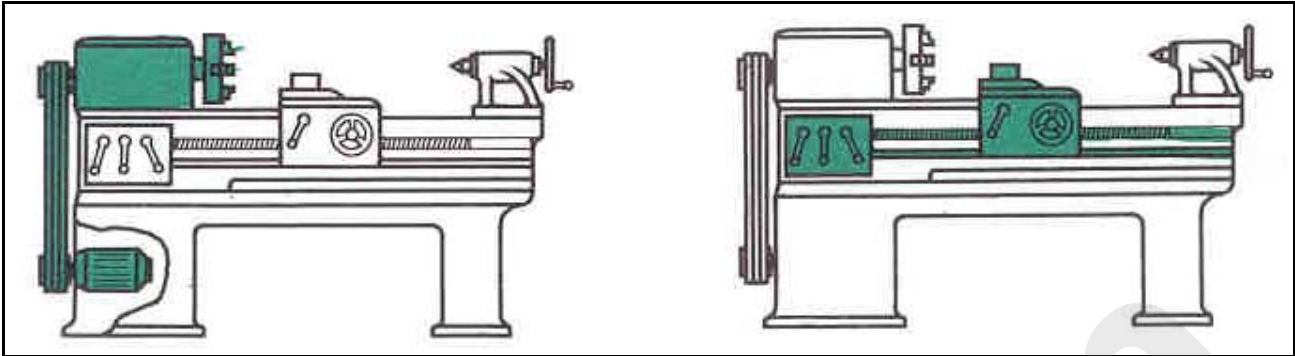


Figure 1 – Characteristic units of the bench lathe.



4.2 Description of the Main Parts

The **Gear bench lathe (Art. 0708)** consists of the following main parts (see Figure 2):

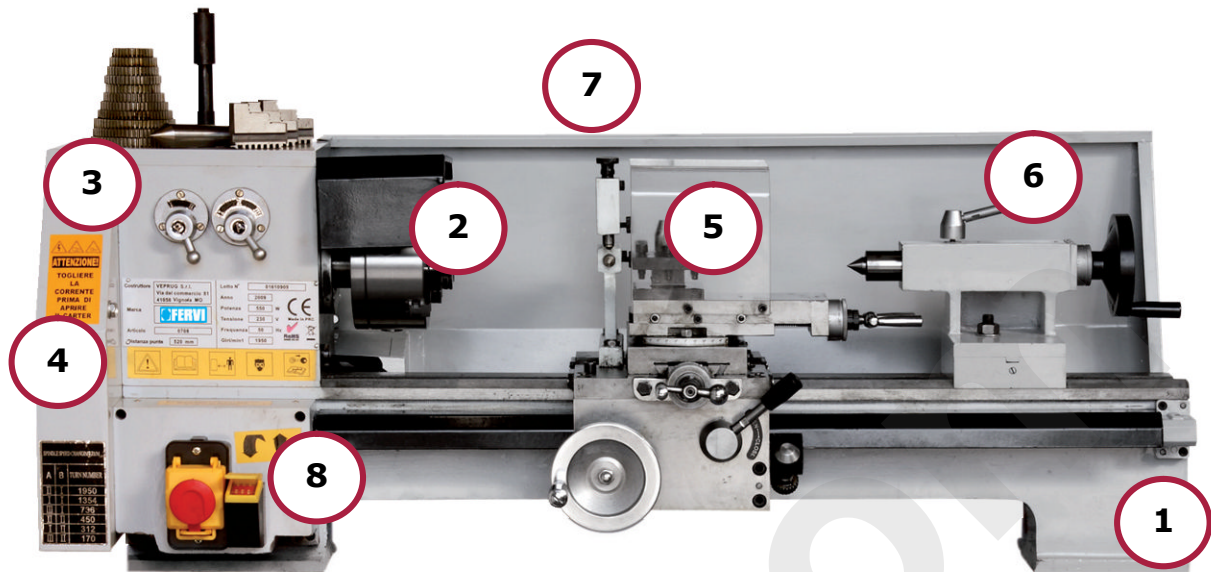


Figure 2 - Main Parts

- 1** Frame
- 2** Head and spindle
- 3** Spindle speed adjustment levers
- 4** Feed speed change gearbox (with replaceable gears)
- 5** Carriage and tool holder guide
- 6** Tailstock
- 7** Rest
- 8** Electric control panel

4.2.1 Supporting table

The supporting table (ref. 1 in Figure 2) is made of cast iron; the casting has been stabilized to avoid twisting and/or deformation due to the internal stresses in the material. In the upper part there are prismatic guides that ensure the movement and alignment of the drive head with the carriage and the moving head (tailstock). The guides are hardened and ground. Reinforcement ribs have been incorporated that increase rigidity.

4.2.2 Head and spindle

The head is made of high strength cast iron, in addition two internal protrusions which have been introduced that increase rigidity, reducing vibration during high speed machining.

The different spindle speeds are obtained by means of a gear speed change (see also section 4.2.3 of this manual).

The spindle is installed on the head shaft, and is supported by two precision bearings. It is **self-centring**, with three terminals (jaws) which permit the clamping of the workpiece in a safe and stable way. For the opening / closing of the jaws it is necessary to insert a special key in the housing (square cross-section), on the outer contour of the spindle. For a more detailed explanation on this subject, see chapter 10 of this manual.



Figure 3 – Spindle.

The danger zone, in the vicinity of the spindle, is protected by an interlocked mobile guard, composed of a screen with micro-safety switch.

4.2.3 Spindle speed adjustment panel

The panel for the adjustment of the spindle rotation speed, is positioned at the left part of the machine, between the spindle and the feeding speed change gearbox. It is equipped with two rotary knob switches for selection of the desired rotation speed, depending on the type of processing and the material.



Figure 4 – Speed adjustment panel.

4.2.4 Feeding speed change gearbox

The feeding speed change gearbox (with replaceable gears, ref. 4 in Figure 2), is positioned at the left end of the machine. The lathe is provided with gears able to guarantee a considerable availability of feeds and threads (metric and inch). Spacing selection is performed through the application of the corresponding gears. During the rotation of the gears, they are automatically lubricated.



4.2.5 Tool holder guide carriage

The carriage, which slides along the rails of the table, is used to fix the tool, and to drive the movement and feeding actions. The various parts are made of cast iron, with hardened and ground guides for greater stability. The carriage is equipped with a system that ensures the lubrication of the moving parts.

The handwheels for the feeding of the carriage and the lever for engaging the lead screw are easily accessible and easy to use.



Figure 5 – tool holder carriage.

4.2.6 Tailstock

The tailstock is constituted by a cast iron body that ensures rigidity and stability in any conditions of use. The tailstock body is equipped with a locking system on the lathe guides, with a lever. An adjustment screw, allows axial alignment of the tailstock to be achieved. Inside a steel sleeve has been fitted. Movement is applied via a handle equipped with a micrometer.



Figure 6 – Tailstock.

4.2.7 Electrical and control panel

The electrical panel is constructed in such a way that the electrical components are not in contact with dust, oil, coolant and other contaminants.

The electrical panel has the following controls (see **Figure 7**):

- electric motor start button (green, **Figure 7/B**);
- electric motor stop button (red, **Figure 7/B**);
- emergency button (with red cap, **Figure 7/A**);
- button for reversing the direction of rotation of the electric motor (red, **Figure 7/B**).

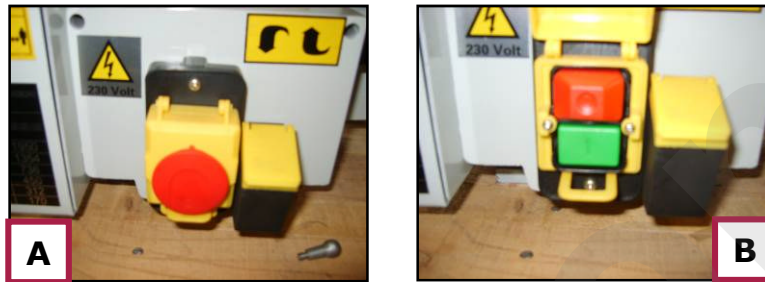


Figure 7 – Electrical and control panel.



4.3 Identification plate

On the machine, and in particular on the feed speed change gearbox, there is the following identification plate:

Fabbricante	FERVI S.r.l. Via del commercio 81 41058 Vignola MO	Lotto N°	
Marca		Anno	2013
Articolo	0708	Potenza	550 W
Distanza punte	520 mm	Tensione	230 V
		Frequenza	50 Hz
		Giri/min	1950

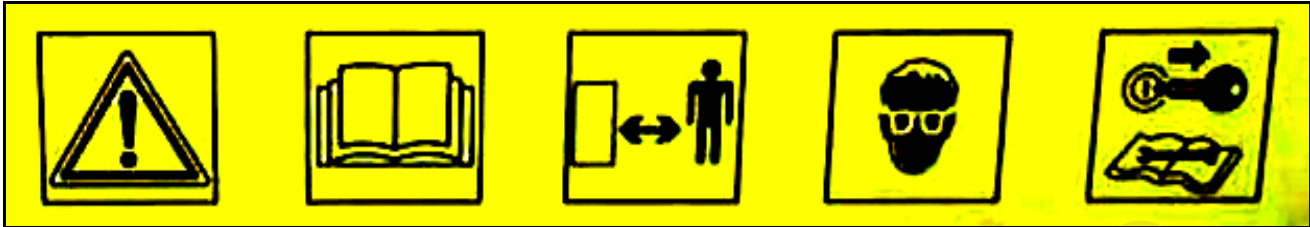
CE
Made in PRC
RoHS

Figure 8 – Identification Plate.

4.4 Pictograms and plates

The machine has the following pictograms:

CAUTION AND WARNING PICTOGRAMS.



A

B

C

D

E

A: Hazard / warning plate.

Indication to pay attention near the danger zones.

B: Operation and maintenance manual consultation plate

Indication of the obligation to consult the manual before starting the machine.

C: Operating range safety plate.

Indication of the obligation to ensure that any people in the surrounding area of the workplace, are out of range of the machine.

D: PPE use plate.

Indication of the obligation to use suitable personal protective equipment (PPE) when working with the machine, in particular goggles and/or protective shields for the eyes.

E: Moving components safety plate.

Indication of the obligation to stop the motor before opening doors and/or protective guards to carry out inspections, cleaning and maintenance.

Caption in Italian

Caption in English



F



F



G



G

F: Electrical and control panel warning plate.

Indication of the obligation to disconnect the electric power before opening doors and/or protective guards to carry out inspections, cleaning and maintenance.



G: Spindle speed adjustment prohibition plate

Indication of the prohibition of changing the spindle rotation speed while the electric motor is in rotation.

4.4.1 Control markings

H: Plate for the reverse rotation button.

Marking for the button for reversing the direction of rotation of the electric motor.



H

4.4.2 Spindle rotation speed plate

VELOCITA' DEL MANDRIN g/m'		
A	B	NUMERO DEI GIRI
II	I	1950
I	I	1354
III	I	736
II	II	450
I	II	312
III	II	170

I: Spindle rotation speed plate.

Indication of the spindle rotation speed corresponding to the six different positions of the speed selection knobs.

Minimum speed: 170 (r/min)

Maximum speed: 1,950 (r/min)

I

5 MACHINE SAFETY DEVICES

5.1 Electrical Safety

The control device inserted in the electrical circuit of the Lathe is a **magnetic switch** with two buttons (see Section 9 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.

Furthermore, the start button is at a lower height than the stop button.

The machine is also equipped with an emergency stop button (such as those with a cap). When, in an emergency, pressure is applied to the cap, the stop button is pressed and the dangerous functions stop.

In the event of malfunction or breakdown, the Lathe 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.

The use of a **lifesaving device** on the power supply line is recommended. For more detailed information, contact a trusted electrician.

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



5.1 Mechanical safety devices

The screens and guards have the role of protecting the operator by preventing coolant, chips, splinters, tool fragments or even the workpiece, which may detach, from being projected towards the face or torso. The screens are either the movable type (simple or interlocked) or the fixed type (see Figure 9).

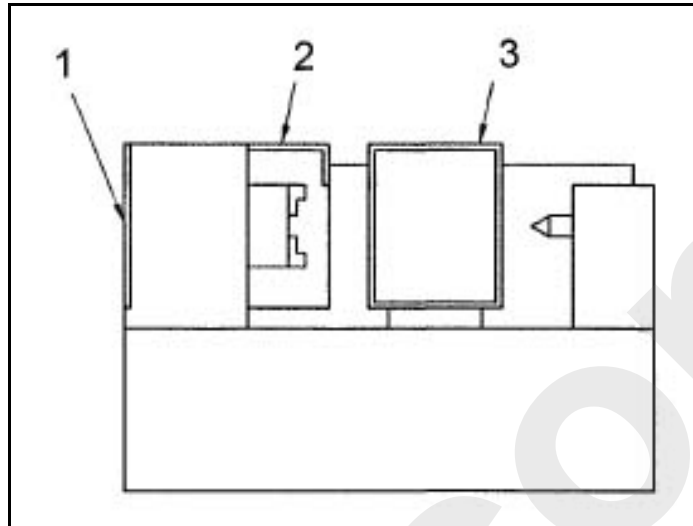


Figure 9 – Position of the protective screens.

LEGEND:

- 1:** Guard for the feed speed change gearbox (fixed);
- 2:** Protective screen for the spindle (movable interlocked);
- 3:** Screen for "spray" from the tool (movable simple).

The interlocking movable guards, are equipped with suitable safety switches, connected to the machine's control system (electric circuit), so that the opening of the movable screen causes the motion of the spindle and the dangerous moving parts to stop.



Checking the Safety devices

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

5.2 Personal Protective Equipment (PPE)



Use of PPE.

ALWAYS use appropriate personal protective equipment (PPE) such as (see Figure 10):

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



PROTECTIVE
GLOVES



PROTECT YOUR
EYES



PROTECTIVE
SCREEN



PROTECTIVE
CLOTHING



PROTECTIVE
FOOTWEAR

Figure 10 - Personal Protective Equipment.

6 FORBIDDEN USES AND HAZARDS

The modes of use specified in this manual as incorrect, ***should never be permitted***, under any circumstances.

Using the machine for turning non-ferrous materials, for unauthorised manoeuvres, its misuse and lack of maintenance can result in serious danger to the safety of the staff, especially the operator, as well as affecting the functionality and the intrinsic safety of the machine itself.

The following actions described, which obviously can not cover the entire range of potential possibilities of "misuse" of the machine, are those which are "reasonably" more predictable and should be considered strictly prohibited.



THE FOLLOWING IS STRICTLY PROHIBITED!

- Supplying the machine with voltage from the mains that is different from that shown on the identification plate (230 V, 50 Hz).
- Using the machine for services other than those for which it is intended;
- Using the machine without having read the operating instructions and without due care.
- Using the machine, and in particular carrying out manual loading without the use of appropriate personal protective equipment (PPE) according to the instructions given in this manual.
- Using the machine and the tool improperly.
- Picking up moving tools or other moving parts.
- Taking measurements of the workpiece mounted on the spindle, without turning the motor off, unplugging it and waiting for the spindle to stop.
- Removing chips with your hands.
- Replacing the work tools or carrying out the speed change, without stopping the motor, disconnecting the plug and waiting for the machine to stop.
- Modifying and/or tampering with the safety devices of the lathe.
- Using the machine as a support and/or work surface.
- Climbing on the machine.
- Touching the machine with wet and/or damp hands.
- Using the machine when barefoot.
- Exposing the machine to the elements (sun, rain, etc.).
- Using jets of water
- Using the machine without securing it properly.
- Cleaning and/or maintaining the machine without securing it properly.
- Installing and using the machine on surfaces that not sufficiently flat and smooth.
- Installing and using the machine on a surface with sufficient resistance and hardness to support its weight.
- Installing and using the machine outdoors.
- Using the machine in a dark place.
- Allowing untrained personnel to use the machine.
- Operating this machine without being psychophysically fit;
- Allowing untrained and unqualified personnel to carry out maintenance, and without complying with the procedures specified in this manual.
- Performing maintenance operations in insufficient conditions of lighting and/or visibility.
- Performing cleaning and/or maintenance without disconnecting the power plug.
- Changing the machine's electrical system.
- Moving the machine without using suitable lifting equipment.

7 LIFTING, TRANSPORTATION AND STORAGE IN WAREHOUSE

7.1 Lifting

To lift the Lathe, proceed as follows:

1. To achieve perfect balance, move the tailstock all the way to the end on the right side of the table and securely fix it with the locking lever;
2. At the same time, slide the tool holder carriage until the perfect machine balance is obtained.



Cleaning of the guide rails

Do not move the tool holder carriage and/or the tailstock until the relative guide rails have been cleaned.

3. When lifting, use lifting accessories (ropes, steel cables or chains) of sufficient length and capacity and in good condition.

Recommended minimum load: 300 kg approx.

4. Harness the lathe at its two lateral ends, passing the harness accessories under the supporting table.



Breaking of the guide rails

Make sure that the harnessing accessories are not touching the guide rails and the lead screw, which could be damaged beyond repair.

5. Attach the hook of the lifting equipment (crane, overhead cranes etc.) to the centre of harnessing accessories (between the two side ends) and lift slowly and smoothly.

The manufacturer declines all responsibility for any damage to people and/or objects caused by the improper lifting of the machine performed by unsuitable personnel, with inappropriate lifting means and without following the instructions in this manual.



7.2 Transportation;

The transport of the machine can be carried out through the aid of vehicles and/or industrial transportation vehicles, such as trucks, with containers of sufficient size to hold the machine itself. The machine must be suitably anchored to the means of transport (for example, through the aid of ropes).

During transport, the machine must be protected from rain, snow, hail, wind, and any other adverse weather conditions. In this regard, it is advisable to use means of transport with closed compartments (vans, trucks etc.) or possibly covered with tarpaulin.

7.3 Warehouse storage

In the event that the machine is to be stored and unused for some time before being put into service again, proceed as follows:

1. Disconnect the power supply cable;
2. Protect the machined parts (such as the guides, the carriage and the tool holder slides, spindle, the tailstock quill etc..) with protective liquid and/or grease;
3. Store in a dry place, free from dust and contaminating agents. Climatic conditions recommended for storage:

Temperature: - 15° / + 55° C;

Maximum humidity: 95% (in the absence of condensation).



Precautions during transport

Make sure the Lathe is protected from knocks and vibrations.

8 ASSEMBLY AND COMMISSIONING

8.1 Identification of the installation site

To install the machine, identify an area that is well lit, away from wet areas and has no sources of vibration nearby.

The lathe must be positioned in such a way that adequate spaces are available for the operator, in order for it to be used to its full potential, and to allow the adjustment, maintenance and cleaning operations to be performed safely. In this regard, an area of at least two square metres must be kept free in front of the machine.



Installation of the machine

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

8.2 Support base

It is essential that the machine is positioned on a uniform, flat supporting surface that has sufficient strength to support it in any condition which may occur during normal use. In this regard, use a base, a bench or a similar support.



Loss of Stability

Mount the Lathe on a support base that is solid and strong to avoid it falling over and so it does not cause vibrations;



Supporting surfaces

It is recommended to install the machine on the appropriate BASE FOR GEAR BENCH LATHES (Art. 0710), available from the catalogue as an optional accessory.

8.3 Securing the machine



Cleaning the work bench

Before placing the lathe and starting to secure it, clean any dirt on the table.

Secure the machine to the base with bolts and nuts (of 8.8 resistance).

In the case of using a steel bench, it is advisable to place between the Lathe and the supporting surface a layer of suitable material which will reduce the vibrations (anti-vibration pads).



8.4 Levelling the machine

For this operation, it is recommended to use a precision spirit level (0.001 mm).

8.4.1 Preliminary phase

The preliminary phase serves to eliminate the presence of torsions in the lathe table. Proceed to reset the head by adjusting the relative screws and then locking the tailstock with the relative adjustment screws moving the reference mark to zero.

8.4.2 Transverse levelling of the table

Position the spirit level in the transverse direction on the lathe guides under the spindle and check the bubble.

Position the spirit level in the transverse direction on the table guides under the tailstock and check the bubble.

Frequently repeat these operations and, if necessary, make small corrections, increasing or decreasing the number of anti-vibration pads under the table.

8.4.3 Levelling of the lathe guides

Place the spirit level on the sides of the carriage and move it slowly along its entire travel checking the bubble does not undergo any changes.

If the bubble moves adjust the levelling of the table, adding / removing shims, to reach a uniform level throughout the entire travel of the carriage.

Periodically check these measurements (at least every six months).

Levelling the machine perfectly is one of the first and most essential steps to carry out before using the machine.

8.5 Operations before starting the machine.

8.5.1 Lubrication and greasing

Before you start the machine, it should be lubricated and greased as described in section 11.1, on "Lubrication".

8.5.2 Connecting the power supply plug

Insert the power plug into a grounded bipolar wall socket.



Connection

Ensure the perfect connection of the power plug.

8.5.3 Operating test run

Manually rotate the handwheels of the carriage, the tool holder slides and the tailstock quill making sure that they move freely and without friction.

Start the machine by pressing the green start switch and make sure that the electric motor and the spindle are working properly.

Test the operation of the button for reversing the rotation direction of the electric motor.

Test the emergency stop button, the whole machine should stop.

Operate the machine for a few minutes, checking the entire series of spindle speed change gears, starting with low speeds.



Ejection of objects

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

Before starting to work see section 11.3, on "Machine adjustment".



9 DESCRIPTION OF CONTROLS

9.1 Control buttons

9.1.1 On switch (start)

To start the electric motor, lift the red cap (emergency) and press the green start button (see Figure 11). By pressing this button, the electric motor is powered and the spindle starts to rotate.



Figure 11 – Start switch.

9.1.2 Off switch (stop)

To stop the rotation of the electric motor, lift the red cap (emergency) and press the red stop button (see Figure 12). By pressing this button, power to the electric motor is switched off and the spindle stops rotating.

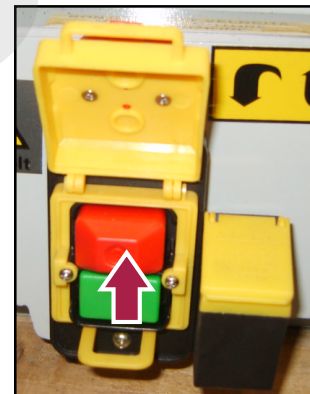


Figure 12 – Stop switch.

9.1.3 Switch for reversing the rotation direction of the electric motor.

To reverse the rotation direction of the electric motor, lift the cover and press the red button to the right of the emergency button (see Figure 13). If pressed first time downwards, the spindle will rotate in a clockwise direction, while if pressed again, the spindle will rotate anticlockwise.

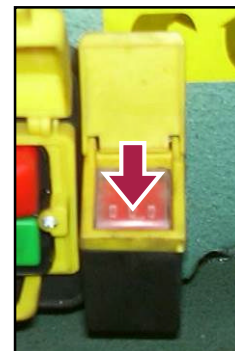


Figure 13 – Reversing the rotation direction.

9.1.4 Emergency Button

To stop the machine, in cases of emergency, press the red cap shaped button.

When pressure is applied, the stop button is pressed and the machine stops.

Before beginning work, always make sure that the cap is lowered and ready to be pressed.

Press this button in case of emergency.



Figure 14 – Emergency stop.



Checking the Emergency Button

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



In case of emergency

In an emergency, press the red emergency button to stop the machine.



Risk of abrasion and/or cutting

- After pressing the stop or emergency switch, the spindle will continue to rotate by inertia.
- Do not hold body parts near the moving spindle!

9.2 Levers and control wheels

9.2.1 Spindle speed adjustment knobs

The panel for the adjustment of the spindle rotation speed (see Figure 15), is positioned at the left part of the machine, between the spindle and the gearbox. It is equipped with two rotary knob switches, marked with the letters A and B, for selection of the desired rotation speed, depending on the type of processing and the material to be processed.

VELOCITA' DEL MANDRIN g/m'		
A	B	NUMERO DEI GIRI
II	I	1950
I	I	1354
III	I	736
II	II	450
I	II	312
III	II	170



Figure 15 – Spindle speed adjustment knobs.

To select the desired rotation speed, turn the knobs to the corresponding positions, according to the instructions given in this manual or on the rotation speed plate attached directly to the



machine (see Figure 15). For example, to set the speed at 736 r/min., turn the knob A to III and Knob B to I.



Spindle speed adjustment

Before changing the spindle speed, always stop the electric motor of the machine.

9.2.2 Levers and handwheels of the carriage and tool holder slides

On the tool holder carriage there are five manual controls (levers and handwheels) for carrying out fine adjustments and feeding (see the Figure 16).

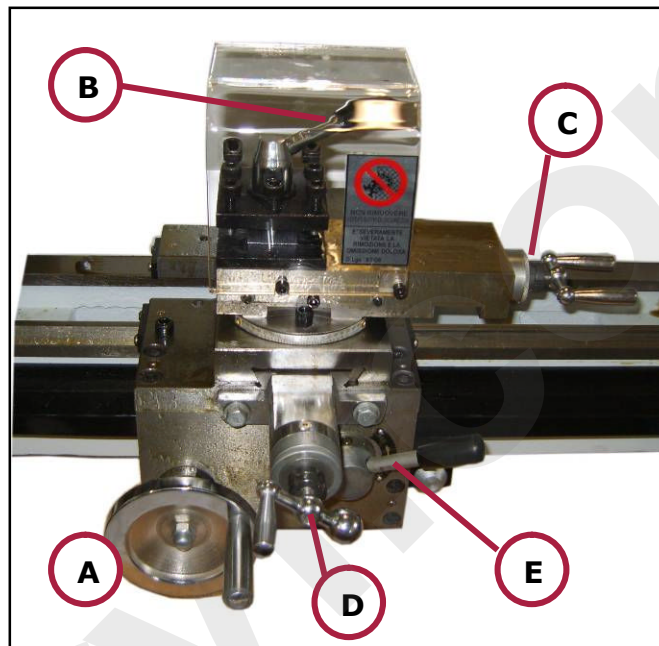


Figure 16 – Levers and handwheels of the carriage and tool holder slide.

(A) Handwheel for longitudinal movement of the carriage: The handwheel allows the quick longitudinal displacement, to the right and left, of the tool holder carriage.

To move the carriage to the right (towards the tailstock), turn the handwheel clockwise and vice versa to move the carriage to the left (towards the spindle), rotate the handwheel anticlockwise.

(B) Tool locking lever: The lever allows locking of the cutting tool, to the tool holder base (turret).

(C) Handwheel for longitudinal displacement of the tool holder slide: The handwheel allows the quick longitudinal displacement, to the right and left, of the tool holder slide. To move the slide to the left (towards the spindle), turn the handwheel clockwise and vice versa to move the slide to the right (towards the tailstock), rotate the handwheel anticlockwise.

(D) Handwheel for transversal displacement of the tool holder slide: The handwheel allows the transversal displacement, forward and backward, of the tool holder slide. To move the slide forward (towards the workpiece), turn the handwheel clockwise and vice versa to move the slide backward (towards the operator), rotate the handwheel anticlockwise.

(E) Lead screw casing lever: The lever allows the closing / opening of the lead screw casing to select the automatic feeding of the carriage in a longitudinal direction. To close the lead screw casing, for the automatic feeding of the carriage lower the lever, conversely to open the casing, lift the same lever.

9.2.3 Lever and handwheel of the tailstock

On the tailstock there are four manual controls (levers, handwheels and screws) which allow fine adjustments and feed adjustments (see Figure 17).

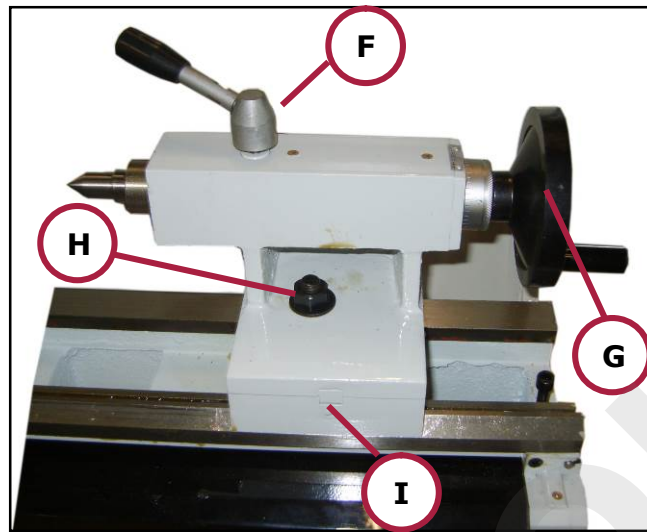


Figure 17 – Lever and handwheel of the tailstock.

(F) Quill locking lever: The lever allows the locking of the tailstock quill.

(G) Handwheel for longitudinal movement of the quill: The handwheel allows the quick longitudinal displacement, to the right and left, of the tailstock quill. To move the quill to the left (towards the spindle), turn the handwheel clockwise and vice versa to move the quill to the right, rotate the handwheel anticlockwise.

(H) Locking screw for the transverse adjustment of the tailstock: The screw locks the tailstock, once it has been transversally centred.

(I) Screw for the transverse adjustment of the tailstock: The screw allows the transverse centring adjustment of the tailstock. To move the tailstock forward (away from the operator), turn the screw clockwise and vice versa to move the tailstock backward (towards the operator), rotate the screw anticlockwise.



10 OPERATION



Intended use

The Gear bench lathe (Art. 0708) has been designed and constructed for the machining of metallic materials by means of cold chip removal. Operating the machine other than as intended and non-observance of the technical parameters laid down by the Manufacturer may be dangerous for operators; therefore the former cannot accept any responsibility for resulting damage.



Risk of abrasion and accident

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



Environment of Use

- The Lathe can operate in closed work environments (production halls, warehouses, etc.), protected from the weather and where there is no danger of fire or explosion.
- The operating temperature range is $-10 / +50^{\circ}\text{C}$.
- The working environment must be sufficiently well lit to ensure maximum operational safety (at least 50 lux).



Working close to the spindle

Before starting work in the vicinity of the spindle, ALWAYS check that the machine is stopped.

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

1. Lift the movable protective screen of the spindle.
2. Place the workpiece on the spindle and secure it by tightening the jaws, with the appropriate key.
Insert the key into one of the holes with a square cross-section on the spindle, and to close the jaws, turn it clockwise (see [Figure 18](#)).

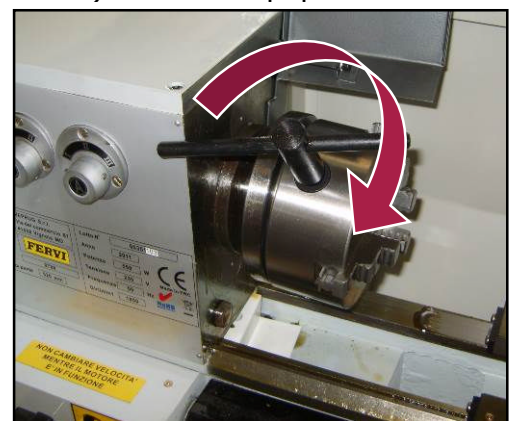


Figure 18 – Spindle key.



Locking the piece

Lock the workpiece onto the self-centring spindle in a stable and secure manner, by tightening

the jaws with the necessary force.

3. If necessary, secure the opposite end of the workpiece using the tailstock. For this purpose, adjust the position of the tailstock and the quill, using the lever, and the appropriate fastening handwheel (see Figure 17).
4. If necessary, check the eccentricity of the workpiece, using a comparator and by rotating the piece slowly (by hand) after it is fixed between the tips (see Figure 19).

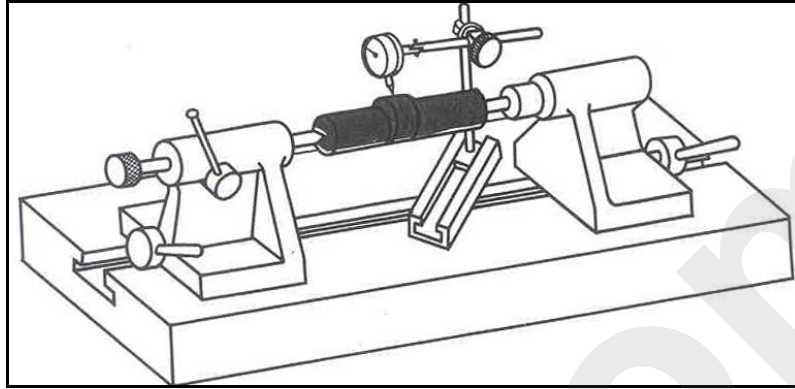


Figure 19 – Checking the eccentricity of the workpiece.

5. Insert the tool on the turret of the tool holder carriage, and secure it with the relative locking lever (ref. b in Figure 16).
6. Adjust the position of the carriage and tool holder slide, using the relative levers and handwheels (see Figure 16).
7. Lower the movable protective screen of the spindle.



Machine operation

Before starting the machine, ALWAYS close the movable protective screen of the spindle. This is to provide adequate protection for the operator, in relation to mechanical hazards in the "danger zone" of the spindle.

8. Set the correct spindle rotation speed, using the two knobs on the control panel of the machine (see Figure 15).
9. Press the start button of the machine (in green, see Figure 11) to start the rotation of the spindle.
10. If necessary, set the rotation direction of the electric motor desired, using the rotation direction button (in red, see Figure 13).
11. Perform the machining of the workpiece, by moving the tool towards the workpiece, in rotation, only using the handwheels that regulate the fine movement of the tool holder slides (ref. c / d in Figure 16). Use, where appropriate, the controls for the automatic feeding of the carriage, for threading operations (see section 10.1 below).
12. When finished, move the tool away from the workpiece, then turn off the machine by pressing the stop button (in red, see Figure 12).



Risk of abrasion and/or cutting

- After pressing the stop or emergency switch, the spindle will continue to rotate by inertia.
- Do not hold body parts near the moving spindle!



13. After waiting for the spindle to stop, lift the movable protective screen and remove the piece from the spindle itself, opening the jaws, with the appropriate key. For this purpose, insert the key into one of the holes with a square cross-section on the spindle (see [Figure 18](#)) and turn it anticlockwise.

10.1 Automatic feed of the tool holder carriage

The automatic longitudinal feed of the carriage is derived from the spindle, which transmits its motion to the lead screw, connected to the spindle itself by means of gears that allow its rotation speed to be varied (see [Figure 20](#)).

The lead screw, with its rotation motion, exerts a thrust on the fixed casing of the carriage, determining the automatic feed, in a longitudinal direction.

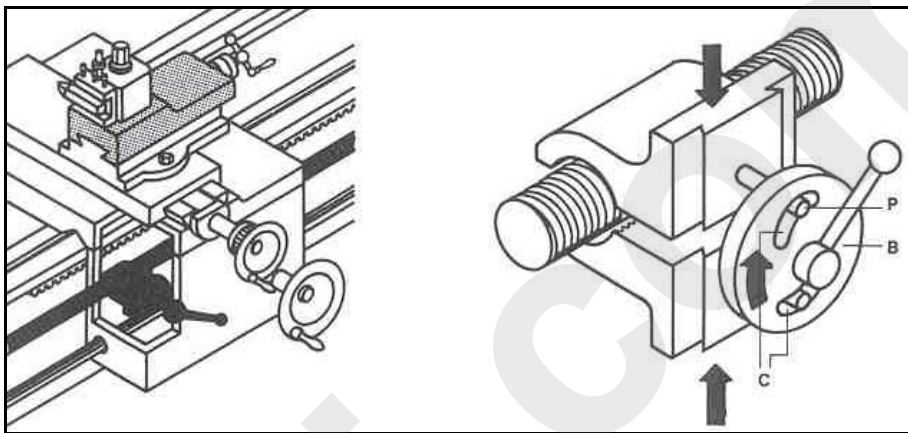


Figure 20 – Longitudinal feed with the lead screw.

The change of feeding speed of the **Gear bench lathe (Art. 0708)** is, in fact, obtained with the type with replaceable gears. Therefore, the gears that execute the desired feed rate must be replaced from time to time.

To do this, proceed as follows:



Risk of Crushing

Before replacing the gears, turn off the machine and ALWAYS remove the plug from the power outlet.

1. Open the guard for the feed speed change gearbox, placed on the left part of the machine (ref. 4 in [Figure 2](#));
2. Unscrew the fastening nuts and disassemble the gears;
3. Position the relative gears for the feed desired, check they fit perfectly and tighten the fastening nuts;
4. Close the guard of the gearbox.

11 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.

Use a compressor to blow off shavings, chips, filings and dust that has accumulated on the floor of the machine and on the workbench at the end of each machining operation.



Working with compressed air

ALWAYS wear the protective goggles when using compressed air.

Check the state of the Lathe and the plates, including the warning plates, at the same time; If they are no longer legible ask for more.

Do not use the Lathe if there are any defects!

Daily Checks	
1	Check that all moving parts are well lubricated .
2	Clean the surface of the spindle, the turret and the body of the machine.
3	Check that there are no objects / tools near the moving parts .
4	Check the operation of the manually operated handwheels .
5	Check the wear of the guide rails .



11.1 Lubrication

It is good practice to clean the machine, especially the guides, removing all chips produced by the work.

Apply, with a rag or a brush, a thin layer of oil on the guides and on the spindle to prevent corrosion.

The next day, remember to remove the oil before starting the machine.

The perfect efficiency of the lathe is guaranteed over time with the perfect lubrication of its moving parts.



Lubrication

Do not use the machine if oil leaks are detected or if the levels are not perfect.



Working with compressed air

- Only use the lubricants listed in the following table below.
- DO NOT use any other types apart from those listed, DO NOT use too much and DO NOT allow the level to fall below that set by the indicators.

For proper lubrication, proceed as follows (see [Figure 21](#)):

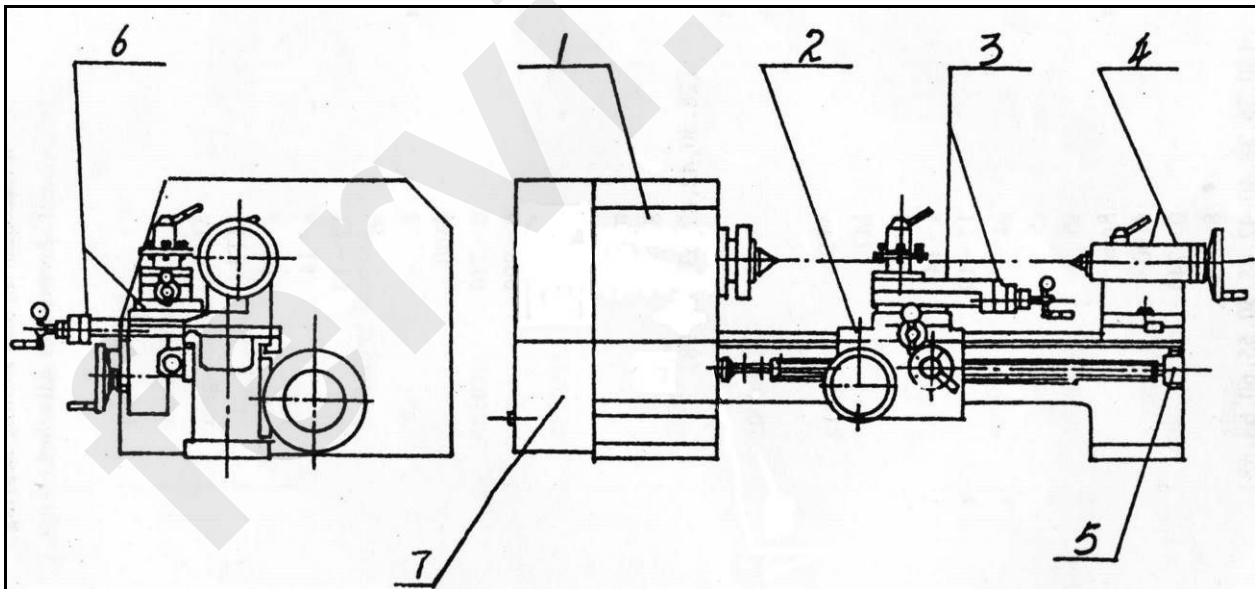


Figure 21 – Points on the machine to be lubricated.

Ref .	Parts of the machine	Lubrication point	Lubrication method	Frequency
1	Spindle head box	Spindle head bearings	Spray	After 10 days of commissioning, and thereafter every 60 days.
2	Tool holder carriage	Longitudinal guides	Oiler	Daily
3	Longitudinal slide	Screw and longitudinal guides	Oiler	Daily
4	Tailstock	Screw and quill guides	Oiler	Daily
5	Lead screw supports	Lead screw	Oiler	Daily
6	Transverse slide	Screw and transverse guides	Oiler	Daily
7	Threading gears	Gears	Oiler	Daily

Type of oil recommended
Mobil Vectra n° 2
Shell – Tonna – T68/TX68
Chevron – Vistac – 68X
Esso – Febis – K68



Lubrication

DO NOT discard used oil into the environment. Please contact authorized centres for the collection and disposal of waste oil.



11.2 Periodic checks

Every 6 months of the machine's life, perform a thorough inspection of operation and wear and precisely level the table.

The gear transmission does not require any maintenance.

11.3 Machine adjustment

11.3.1 Motor belt tension adjustment

Make sure the motor belt tension is at an appropriate level. In this regard, make a simple check by pressing down firmly on the individual belts (approximately in the middle), which should move by a maximum of 5 mm. If the belts are loose or too tight, loosen the belt adjustment system bolts until the correct tension is achieved.

Proper belt tension reduces wear and increases the performance of the machine.

11.3.2 Tailstock alignment

When the tailstock is off-axis it is necessary to correct its position, following these instructions:

1. Loosen the locking screw (ref. I in Figure 22);
2. Turn the adjustment screw (ref. II in Figure 22) to align the reference marks on the rear plate (ref. III in Figure 22);
3. Tighten the locking screw, fixing the body of the tailstock onto the guide rails and test the alignment.

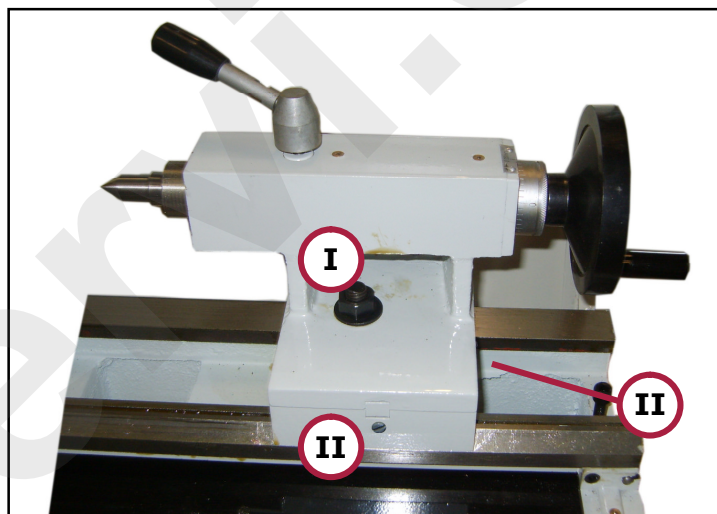


Figure 22 – Tailstock alignment.

11.3.3 Spindle alignment

When the spindle rotates off-axis or if particularly heavy machining operations must be carried out, make an adjustment to the bearings.

The bearing that supports the spindle is tapered, to carry out the adjustment, proceed as follows (see Figure 23):

1. Loosen the bearing lock nut;
2. Tighten the bearing adjustment nut;
3. Test the spindle by turning it, and make sure it rotates perfectly, with the use of a comparator (see point 4, Chapter 10);
4. Tighten again the bearing lock nut.

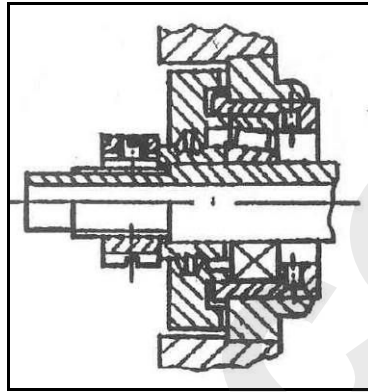
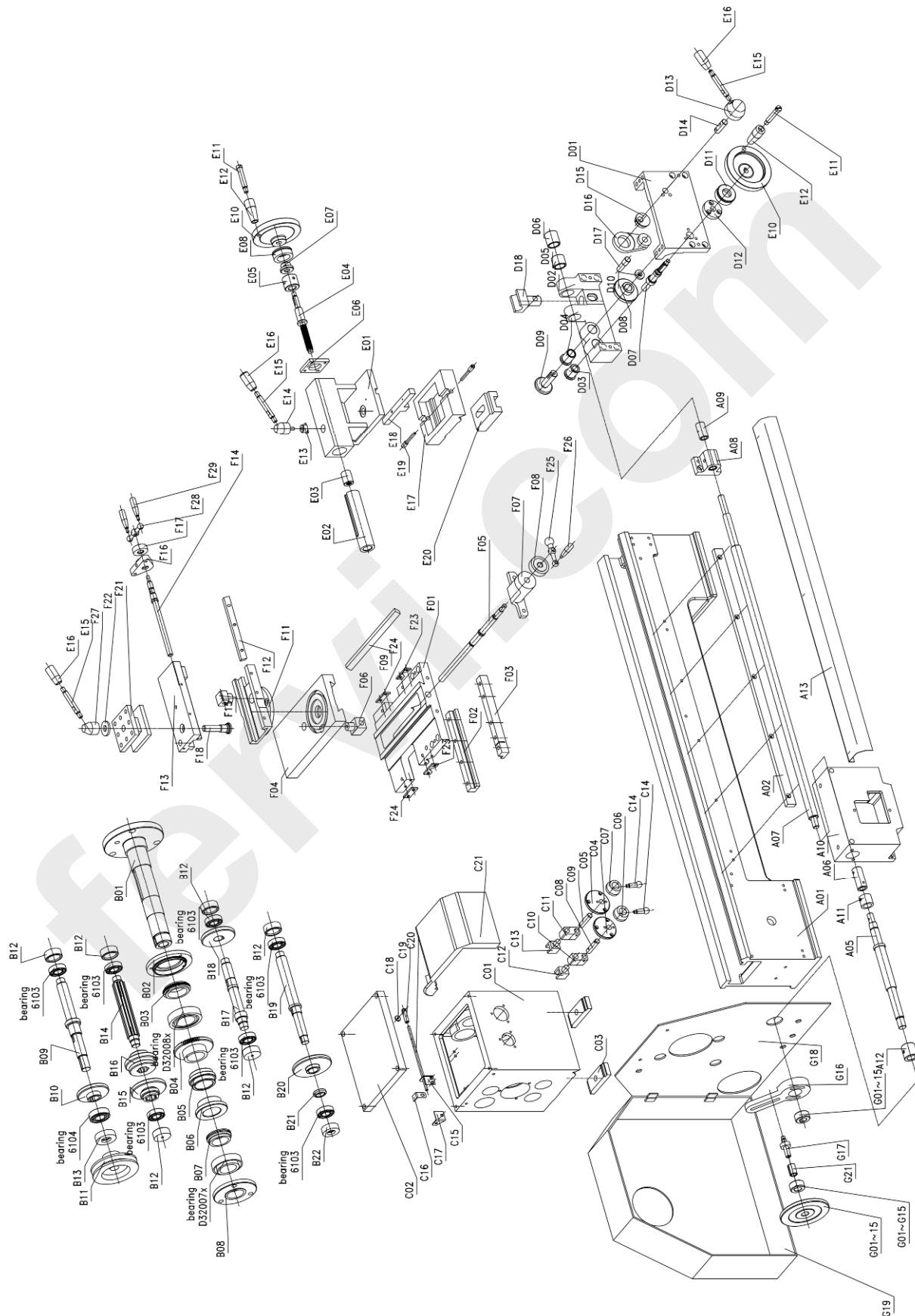


Figure 23 – Spindle alignment.



12 EXPLODED VIEW AND PARTS LIST



Ref.	Description
0708/A01	Table
0708/A02	Rack
0708/A03	Motor housing
0708/A04	Pulley
0708/A05	Transmission shaft
0708/A06	Connection bushing
0708/A07	Main lead screw
0708/A08	Support
0708/A09	Screw support bushing
0708/A10	Gear box
0708/A11	Transmission shaft bushing (1)
0708/A12	Transmission shaft bushing (2)
0708/A13	Screw guard
0708/B01	Spindle
0708/B02	Front guard
0708/B03	Front oil ring
0708/B04	Gear (1) Z:53 m:1,5
0708/B05	Gear (2) Z:35 m:1,5
0708/B06	Gear (3) Z:42 m:1,5
0708/B07	Rear oil ring
0708/B08	Rear guard
0708/B09	Shaft I
0708/B10	Gear (4) Z:42 m:1,5
0708/B11	Pulley (neutral)
0708/B12	Cap
0708/B13	Bearing 42x20
0708/B14	Shaft II
0708/B15	Double gear
0708/B16	Triple gear
0708/B17	Shaft IV
0708/B18	Gear (5) Z:45 m:1,5
0708/B19	Shaft V
0708/B20	Gear (6) Z:63 m:1,25
0708/B21	Split washer
0708/B22	Bearing 35x17
0708/TE	Head assembly
0708/C01	Box
0708/C02	Box cover
0708/C03	Pad
0708/C04	Knob guard (double)



Ref.	Description
0708/C05	knob guard (triple)
0708/C06	Knob holder (double)
0708/C07	Knob holder (triple)
0708/C08	Small shaft (double)
0708/C09	Small shaft (triple)
0708/C10	Swivel block (double)
0708/C11	Swivel block (triple)
0708/C12	Fork (double)
0708/C13	Fork (triple)
0708/C14	Knob
0708/C15	Bracket 1
0708/C16	Bracket 2
0708/C17	Bracket 3
0708/C18	Wheel
0708/C19	Wheel bracket
0708/C20	Pole
0708/C21	Spindle guard
0708/D01	Guard
0708/D02	Support block
0708/D03	Bushing 1
0708/D04	Bushing 2
0708/D05	Lead screw bushing 1
0708/D06	Lead screw bushing 2
0708/D07	Gear shaft
0708/D08	gear
0708/D09	Gear shaft
0708/D10	Washing adjustment
0708/D11	Scale
0708/D12	Flange
0708/D13	Knob holder
0708/D14	Connection shaft
0708/D15	Eccentric wheel
0708/D16	Connection fork
0708/D17	Pin
0708/D18	Split nut
0708/BC	Tailstock block assembly
0708/E01	Tailstock
0708/E02	Quill
0708/E03	Tailstock nut
0708/E04	Tailstock screw
0708/E05	Stop

Ref.	Description
0708/E06	Flange
0708/E07	Plain bearing
0708/E08	Base
0708/E09	Elastic piece
0708/E10	Hand wheel
0708/E11	Knob shaft
0708/E12	Knob
0708/E13	Positioning block
0708/E14	Block lever
0708/E15	Shaft lever
0708/E16	Knob
0708/E17	Tailstock surface
0708/E18	Tailstock guide
0708/E19	Adjustment screws
0708/E20	Support
0708/E21	Scale
0708/STG	Large cross movement assembly
0708/F01	Carriage
0708/F02	Carriage surface 2
0708/F03	Carriage surface 1
0708/F04	Intermediate head
0708/F05	Intermediate head screw
0708/F06	Intermediate nut
0708/F07	Intermediate lead screw
0708/F08	Intermediate head scale
0708/F09	Intermediate head barrier
0708/CA	Turret carriage assembly
0708/F11	Tool holder slide
0708/F12	Barrier
0708/F13	Slide upper base
0708/F14	Small screw
0708/F15	Nut
0708/F16	Support
0708/F17	Scale
0708/F18	Upper shaft
0708/F19	Positioning bushing
0708/F20	Positioning pin
0708/F21	Tool holder
0708/F22	Washer
0708/F23	Guide guard 1
0708/F24	Guide guard 2



Ref.	Description
0708/F25	Knob holder
0708/F26	Knob
0708/F27	Tool locking lever
0708/F28	Tool locking lever rod
0708/F29	Tool locking lever knob
0708/F30	Tool holder guard
0708/G01	Gear Z: 21 spares
0708/G02	Gear Z: 24 spares
0708/G03	Gear Z: 30 spares
0708/G04	Gear Z: 35 spares
0708/G05	Gear Z: 38 spares
0708/G06	Gear Z: 40 spares
0708/G07	Gear Z: 42 spares
0708/G08	Gear Z: 45 spares
0708/G09	Gear Z: 50 spares
0708/G10	Gear Z: 55 spares
0708/G11	Gear Z: 60 spares
0708/G12	Gear Z: 63 spares
0708/G13	Gear Z: 65 spares
0708/G14	Gear Z: 80 spares
0708/G15	Gear Z: 100 spares
0708/G16	Spare gear bracket
0708/G17	Spare gear shaft
0708/G18	Internal guard
0708/G19	External guard
0708/G20	Bracket
0708/G21	Spare gear shaft bushing

13 ACCESSORIES SUPPLIED

The **Gear bench lathe** is available with the following accessories:

- 1 spindle with 3 jaws, \varnothing : 125 mm + 3 spare jaws;
- 1 turret key, 8 mm;
- 1 fixed tailstock (morse taper 2);
- 1 fixed tailstock (morse taper 3);
- 1 belt 740 mm long;
- 11 threading gears, module 1.25
(30 – 35 – 38 – 40 – 42 – 45 – 50 – 55 – 60 – 63 – 65 teeth);
- 5 assembled gears, module 1.25
(18 – 21 – 24 – 80 – 100 teeth);
- 6 service keys.

14 DISPOSAL OF PARTS AND MATERIALS

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

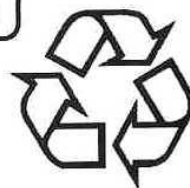
The Lathe is composed of the following materials:

- the head, the table, the tailstock, the slides and the carriages are made of cast iron;
- the gears, shafts, bearings, slideways and spindle are made of steel.



Respect the environment!

Contact a specialist centre for the collection of metallic materials.





15 TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Noisy operation.	<ul style="list-style-type: none"> A) Damaged bearings. B) Bearings not lubricated. C) Blunt tool. D) Loose tool. 	<ul style="list-style-type: none"> A) Contact Technical Support. B) Lubricate. C) Remove / sharpen the tool. D) Tighten the fastening lever.
The motor will not start.	<ul style="list-style-type: none"> A) Electrical power supply. B) Wiring connections C) Burnt motor windings. D) Blown fuses. E) Broken switch. 	<ul style="list-style-type: none"> A) Check the mains power supply. B) Check the wiring connections. C) Contact Technical Support. D) Replace the fuses. E) Contact technical support.
The tool "softens" or overheats too much.	<ul style="list-style-type: none"> A) Excessive pressure on the workpiece. B) Shavings will not discharge. C) Tool is worn or does not cut the material well. D) Needs lubrication. 	<ul style="list-style-type: none"> A) Apply less pressure. B) Clean the machine. C) Check the tool sharpness and wear. D) Lubricate as you work.

16 WIRING PLAN

