

OPERATION AND MAINTENANCE MANUAL



Pillar Drill
Art. T032DA



TRANSLATION OF THE ORIGINAL INSTRUCTIONS

PREFACE



Please ensure you have read this manual before any operation

TRANSLATION OF THE ORIGINAL INSTRUCTIONS

Before undertaking any operation on the machine, it is compulsory to have read this instruction manual. 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 in charge of using this machine must possess 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, pursuant to Article 73 of Italian Law Decree 81/08 (which adopts the EN rules).

We guarantee the Machine complies with the specifications and technical instructions described in the Manual on the date of its issuance (shown in this page). 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.



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1 INTRODUCTION

This manual is delivered with the machine, and it must be regarded as an inseparable part of it.

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.

The purpose of this manual is to convey the necessary knowledge for the use and maintenance of **Pillar Drill Art. T032DA** and to create a sense of responsibility and knowledge of the capabilities and limits of this machine entrusted to the operator.

Operators must be properly trained and prepared; therefore, please make sure this manual is read and consulted by the staff responsible for commissioning, operating and maintaining the **Pillar Drill**. This is to make all operations the safest and most effective 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 machine.

Prior to installation and use of the **Pillar Drill**, the authorized personnel shall:

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

It is the responsibility of the buyer to ensure 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 that exist while working with **Drill Presses**.

The manufacturer waives any and all responsibility for damage to people and/or things caused by non-observance of the instructions in this manual.

The Pillar Drills have 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 you have to do so temporarily (for example, for cleaning or repair requirements), please make sure that no one can use the machine.

Modifications to the machines carried out by the user must be considered their sole responsibility, therefore the manufacturer waives any and all responsibility for any damage caused to persons and/or property resulting from maintenance performed by unqualified personnel and in a manner unlike the operating procedures shown below.

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.

For a safe and effective use of **Pillar Drill Art. T032DA**, you must read this manual carefully to acquire full knowledge of the machine and the general precautions to be observed during operation. In other words, machine durability and performance are strictly dependent on how it is used.

Even if already familiar with this sort of machines, it is necessary to follow the instructions herein, in addition to the general precautions to be observed while working.

- 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, so as to prevent the occurrence of unpleasant 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 GENERAL SAFETY WARNING

2.1 General safety rules for machine tools



Accident

- The drilling or tapping operation always presents a risk of injury associated with the possibility of accidental contact of parts of one's body with the tool in motion, detachment of splinters from the workpiece, tool breakage, or ejection of a badly locked piece.
- There is no "intrinsic" means of safety, just as there is no worker who, being careful, can "always" avoid an accident. Therefore, DO NOT underestimate the risks associated with using the machine, and concentrate on the work in progress.



Risks related to 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 related to Using the Machine

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

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



Risks associated with using the machine

- During all work phases with the machine, you should proceed with great caution in order to avoid damage to persons, to the property or to the machine itself.
- Please use the machine only for its expected uses (drilling or tapping).
- Don't tamper with the safety devices equipping the machine.



Risks associated with using the machine

Before starting any work on the machine, the operator must wear the appropriate personal protective equipment (PPE) such as gloves and eye protection (see section 6.6 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 locations which are damp, wet, or even exposed to the rain.
4. Avoid starting accidentally.
5. Before starting the machine, get used to ensuring that no remaining adjustment or maintenance wrenches have remained inserted.
6. Keep the workplace tidy and free from hindrances; 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 jewelry, long hair, etc., can get caught in the spindle and in moving parts, causing irreparable injury.
13. Firmly secure the workpiece before starting the drill.
14. Always use the tool (tip or tap) 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 tools of adequate strength and type for 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 spindle on the machine, always only use the stop command device.
17. Do not remove the shavings from the table with hands, even at a standstill. To do this, use tongs or a palette knife.
18. When the cutting tools need to be replaced or the speed needs to be changed, stop the motor and wait for the spindle to stop.
19. Do not leave the machine until the spindle and the tool are completely stopped.
20. After the work is completed, clean the tool and check its efficiency.
21. Replace worn and/or damaged parts. Before operating, make sure guards and protections work correctly. If necessary, have them checked by Service staff. Use only original spare parts.
22. **Cut the mains voltage supply of the machine when:**
 - the machine is not being operated;
 - is left unattended;
 - performing maintenance or registration, because the machine does not work properly;
 - the tool is replaced;
 - moved or transported;
 - cleaning.
23. It is recommended that users of this publication, for maintenance and repair, have a basic knowledge of mechanical principles and of repair technique procedures.
24. **Management in charge of safety is to make sure that the staff responsible for using the machine has read and understood this manual in its entirety.**



25. **Management is responsible for safety and verification of the company's risk status, pursuant to the law.**

2.2 Safety regulations regarding the electric system of machine-tools



Risks associated with using the machine

1. Do not modify the electrical system in any way. Any attempt in this regard may jeopardize the operation of electrical devices, causing malfunction or accident.
 2. Work carried out in the electrical system of the machine must, therefore, be carried out only by qualified and authorized personnel.
 3. If you hear unusual noises, or you feel 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 identification plate and in the technical specifications. Namely: 400 Vac / 50 Hz
Never use any other type of power supply!
 2. The use of a circuit breaker on the electric power supply is recommended. For more detailed information, contact a trusted electrician.
 3. The power socket must be equipped with a grounding lead. The size of any extension cables must be equal to or greater than the one of the machine's own power supply cable (diameter $\geq 1.5 \text{ mm}^2$).
 4. The power cord and extension should not come in contact with hot objects, wet or oiled surfaces, and/or sharp edges.
 5. The power supply cable (and its possible extension cable) should be checked periodically, and before each use, for making sure they have no signs of damage or wear. If these are not in good condition, do not use the machine and replace the damaged cable.
 6. Do not use the power cord to detach its plug from the socket.

2.3 Technical Assistance

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

2.4 Other provisions

IT IS FORBIDDEN TO TAMPER WITH SAFETY DEVICES

The first thing to do when starting work is to check for the presence and integrity of the protections and the operation of the safety devices.

If any defect is detected, do not use the Pillar Drill.

Even more so, it is strictly forbidden to modify or remove guards, safety devices, labels and indication signs.

3 TECHNICAL SPECIFICATIONS

Description (unit of measurement)		T032DA
General Characteristics	Drilling capacity (mm)	32
	Morse taper	MT 3
	Spindle stroke (mm)	130
	Number of speeds	8
	Spindle speed range (rpm)	160-2200
	Feed speed range (mm/turn)	0.10 – 0.16 – 0.26
	Column diameter (mm)	115
	Column and spindle axis distance (mm)	223
	Maximum distance between spindle and table (mm)	696
	Distance between machine nose and base (mm)	1135
	Maximum table stroke (mm)	510
	Usable work area (mm)	400 x 470
	Working dimension of base (mm)	400 x 310
	Power of refrigeration pump (W)	40
	Flow rate of refrigeration pump (l/min.)	12
	Sound pressure level (dB (A))	< 70
Motor	Power (W)	1100 – 850
	Voltage (V)	400
	Frequency (80 - 16000 Hz)	50
Weight and size	Weight (kg)	260
	Overall size (mm)	902 x 540 x 1765
	Packing dimensions (mm)	970 x 570 x 1910



4 INTENDED USE AND DESCRIPTION OF THE MACHINE

Pillar Drills Art. T032DA are machine-tools designed for executing some simple mechanical operations, such as:

- drilling (maximum drilling capacity: 32 mm);
- threading;
- boring and spot-facing.

The machines are made to perform such machining of different materials, changing the tool depending on the operation to be performed and the material of the workpiece.

These machines have 8 different spindle rotation speeds. The motor runs at constant speed: the machine is equipped with a specific power transmission system by belts for varying the spindle rotation speed.

This speed is changed by displacing the belts on the grooves of the transmission system pulleys. In all cases, spindle speed is to be changed always with the machine stopped and off.

With model T032DA, feed can be selected to be manual or automatic. Moreover, model T032DA is equipped with a refrigeration system of the workpiece. It consists of an electric pump, a collecting tank located in the support base and plastic pipes.



Intended use and materials

The machine has been designed and manufactured for the use specified. Any use and lack of respect for the technical parameters established by the manufacturer may be dangerous to operators; therefore, the manufacturer cannot assume any liability for resulting damages.

4.1 Usage environment and support surface

This drilling machine is equipped with a support base and must be installed and used on a flat surface having ergonomic features and adequate strength.

It is very important to remember that machine weight is of about 300 kg. For this reason, before installing the machine it is necessary to identify an area having a surface of adequate hardness and strength, capable of supporting such weight.

You should leave enough space around the machine to ensure proper maintenance and cleaning of all parts of the machine.

Drills 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 of +5 to +50°C.

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



Risks associated with the work environment

ALWAYS comply with instructions about the machine's work environment, especially about the security and strength features of the surface.

4.2 Main units of the drill

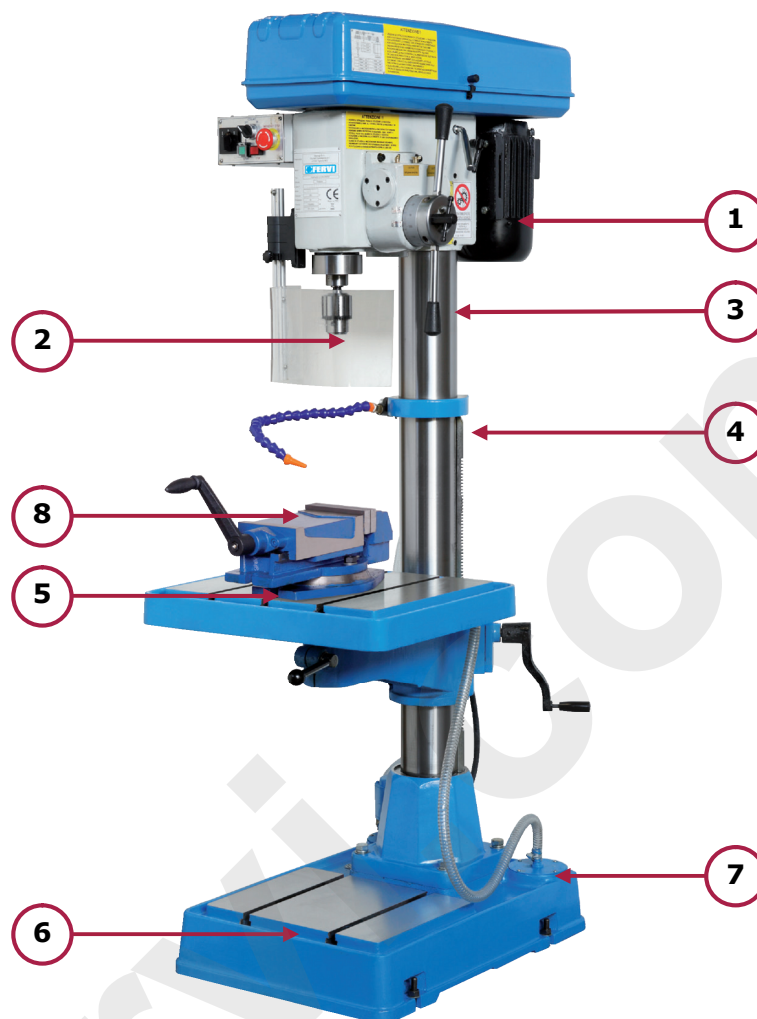


Figure 1 - Overview of the Machine

- 1** Electric motor
- 2** Spindle and tool
- 3** Spindle feed handwheel
- 4** Vertical support column
- 5** Work table
- 6** Support base
- 7** Cooling circuit and pump
- 8** Vice



4.3 Identification label

On drill-mills, the identification plate is located on the front of the head (see figure 2).

Fabbricante	Fervi S.r.l. Via del Commercio 81 41058 Vignola MO		
Marca			
Tipo	TRAPANO A COLONNA		
Articolo	T032DA		
Lotto n°			
Anno	2013		
Tensione	400	V	
Frequenza	50	Hz	
Potenza	1100	W	
Velocità	160 – 2200	giri/min	

CE
Made in PRC
RoHS

Figure 2 – CE label.

4.4 Symbolic signs and written labels

4.4.1 Caution and warning symbols.

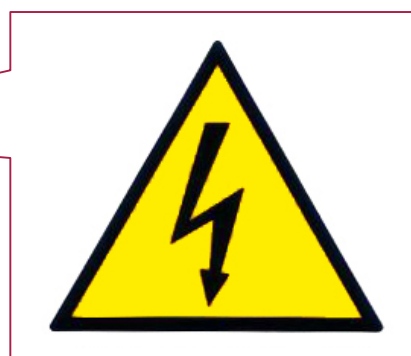
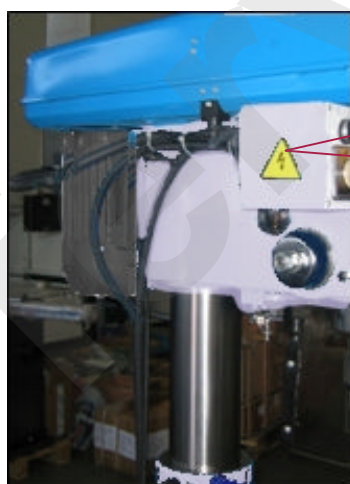


Figure 3 Symbol on electric board.

Danger label: electrocution.

Warning for the danger of electric shock.

4.4.2 Spindle speed labels

The shield of the pulley compartment (on the right hand side of the machine) carries labels that indicate the possible spindle rotation speeds and the corresponding belt-and-pulley configurations for achieving each of them (figure 4).

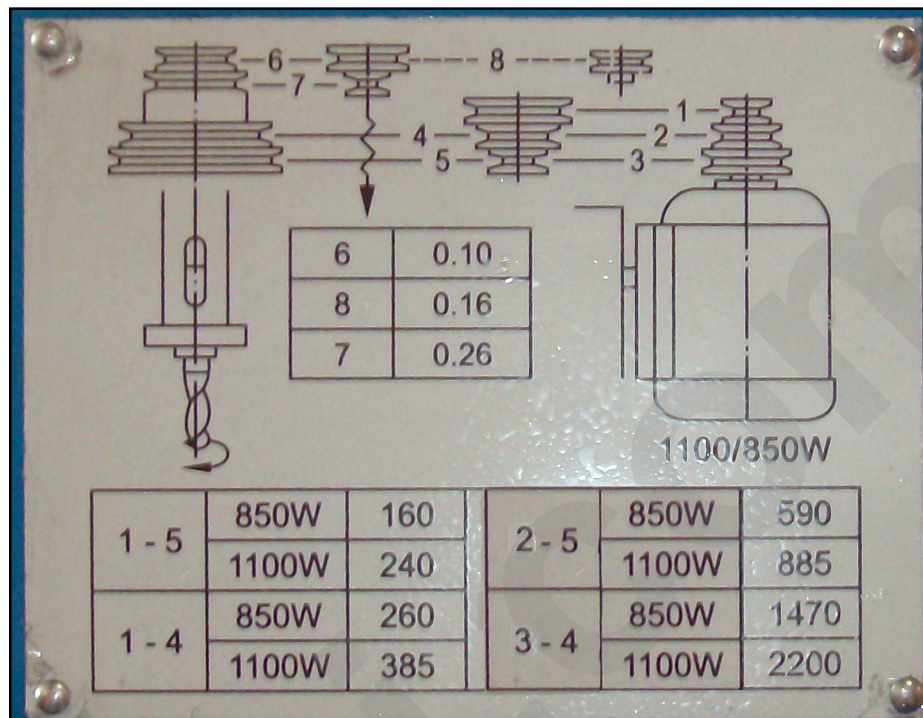


Figure 4 - Spindle speed change labels.

Minimum speed:

T032DA: 160 rpm – Motor power 850 W - Configuration of pulleys: 1-5

Maximum speed:

T032DA: 2200 rpm – Motor power 1100 W - Configuration of pulleys: 3-4



4.4.3 Indication label for the automatic feeds

The label of spindle speeds indicates also the automatic feeds of the spindle toward the piece being machined (for the threading operations).

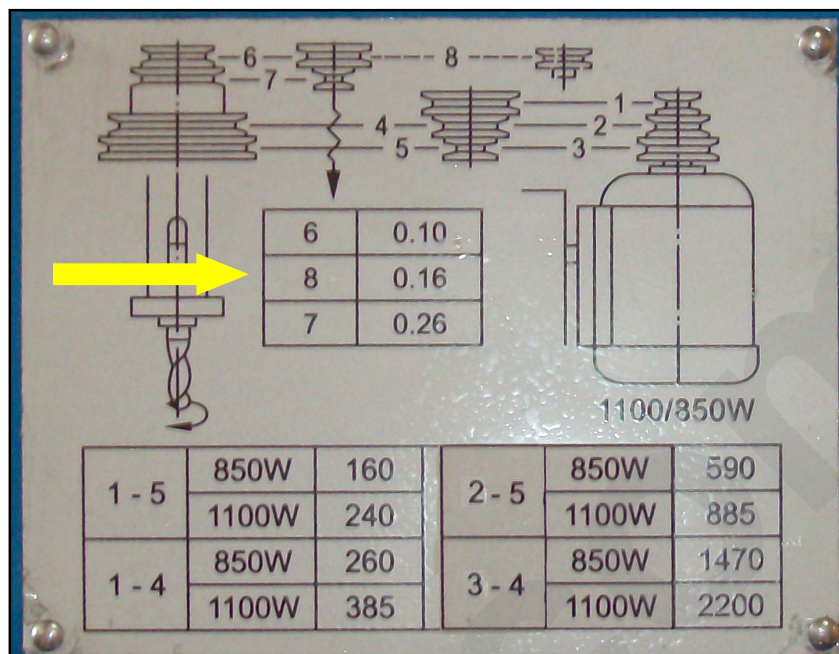


Figure 5 – Label of automatic spindle feeds.

Minimum feed speed:

0.10 mm/turn – Configuration of pulleys: 6.

Maximum speed:

0.26 mm/turn – Configuration of pulleys: 8.

5 DESCRIPTION OF CONTROLS AND ADJUSTMENTS

5.1 Control panel buttons and lights

At the front part of the **Pillar Drill**, on the left of head and spindle there are the following control panels.

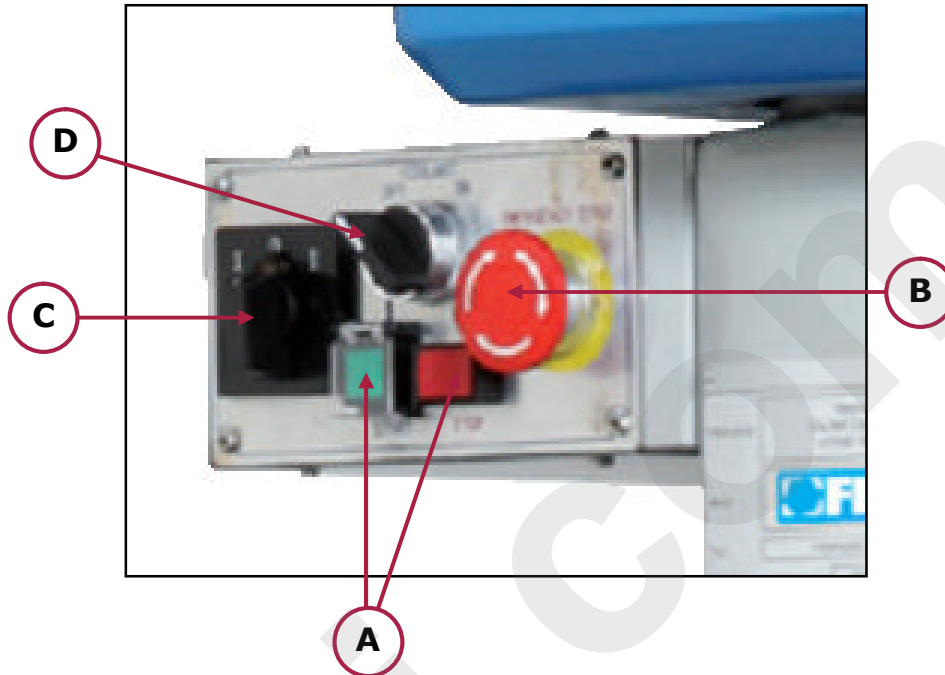


Figure 6 – Machine control board.

A. START / STOP BUTTONS

Pressing the green Start button will start spindle rotation. Conversely, pressing the red Stop button will stop spindle rotation by interrupting power supply to the machine.

B. EMERGENCY STOP BUTTON (RED, MUSHROOM-HEAD)

When pressed, it interrupts power supply to the machine.



Risk of injury

Before starting the Drill, make sure all guards are properly in place.
When you press the green start button, the spindle starts rotating immediately.

Upon pressing the ordinary stop button or the emergency stop button, the spindle will keep rotating by inertia for a few seconds before stopping completely. Don't approach the tool until it isn't fully stopped!



Risk of injury

It is absolutely forbidden to by-pass, inhibit or modify the safety established by the emergency stop button and its circuitry.



C. ROTARY SWITCH OF MOTOR SPEED

This selector switch allows choosing the electric motor rotation speed between:

- fast rotation (position 1, left);
- slow rotation (position 2, right).

Motor speed is to be selected only with machine off.

D. ROTARY SELECTOR SWITCH OF COOLANT PUMP (ART. T032DA)

This selector switch allows turning the coolant pump on and off: activation or stop of the cooling liquid flow.

5.2 Spindle speed adjustment



Risk of injury

Before changing the spindle rotation speed, stop the machine and disconnect its electric power supply.

For changing the spindle rotation speed, proceed as follows:

1. Undo the screw which locks the pulley compartment shield, located on the upper part of the drill. For this, use the Allen wrench (supplied as outfit) as shown in figure 7.



Figure 7 – Undoing the screw of the shield.

2. Lift the top shield to be able to gain access to the belts and pulleys (figure 8).



Figure 8 – Opening the shield.

3. Manually loosen the two locking screws placed on the sides of the head (figure 9).
Remember to undo both screws!

For a better understanding, see also the following drawing (figure 10).



Figure 9 – Undoing the locking screws.

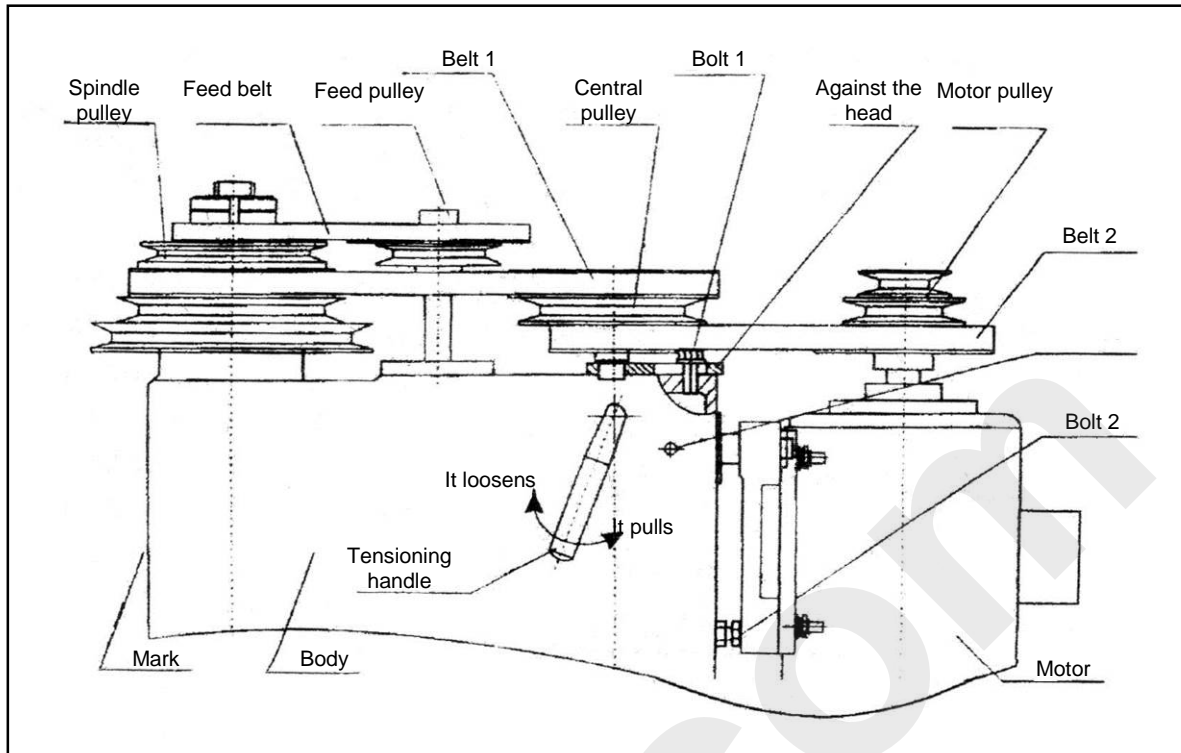


Figure 10 – Main items of the power transmission system.

4. Unlock the counter-nuts and tighten the bolts (2) which press against the rear part of the head (figure 11), by using a wrench for hexagonal nuts.

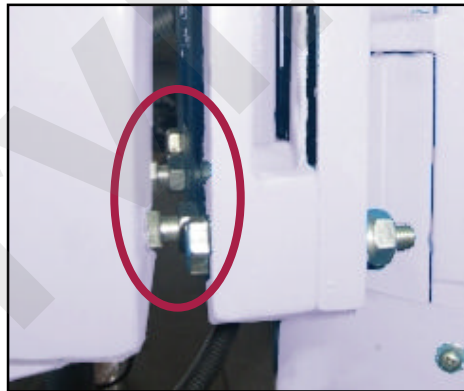


Figure 11 - Close-up of the bolts (2).

5. Unscrew the bolts (1) which lock the central pulley, by using a wrench for hexagonal nuts (figure 12).

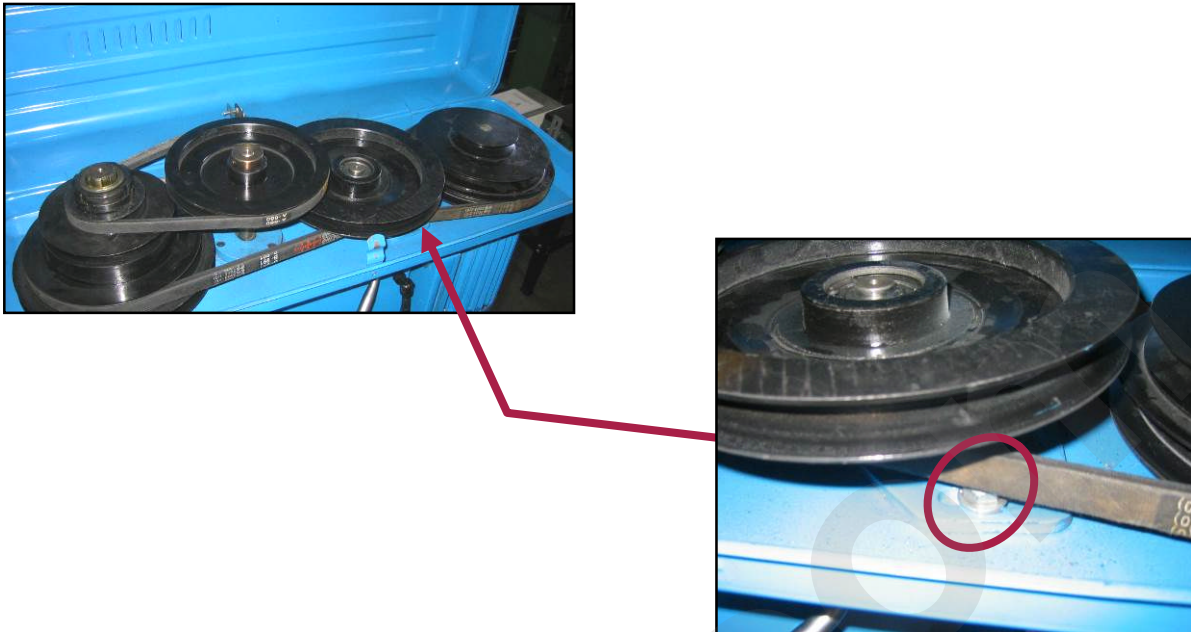


Figure 12 - Close-up of the bolts (1).

6. Loosen the tension of the belts by turning the tensioning handle clockwise, as shown in figure 13.



Figure 13 - Loosening the belt tension.

7. Set the desired speed by changing the position of the belts according to the indications shown on the spindle speed label attached to the machine (figure 4/B).
8. Put the belts under tension by turning the tensioning handle anticlockwise.
9. Tighten the bolts (1) which lock the central pulley, by using a wrench.
10. Manually tighten the two locking screws placed on the sides of the head.
11. Check for the correct belt tension by exerting a light pressure with your fingers.



Belt tension

It is very important that the belts are under tension, in order not to compromise the efficiency of the Drill.



12. Loosen the bolts (2) so that their top will press against the back part of the head; then tighten the locking counter-nuts. To do so, use a wrench for hexagonal nuts.



Lower support of the motor

- It is very important that the bolts (2) touch against the rear part of the head so that the motor lays there.
- If the motor is not supported on its lower side too, the machine may produce excessive noise and vibration.

13. Close again the top shield and lock it by tightening its screw.



Motor rotation speed

For model T032DA, remember to always set the correct rotation speed of the electric motor by means of the rotary selector switch located on the control panel (re. C in figure 6).

5.3 Adjusting the automatic feeds

Drill T032DA affords a range of three automatic feeds.

By changing the position of the feed belt in the two upper grooves of the spindle pulley, it is possible to achieve feeds of 0.10 mm/turn and 0.26 mm/turn.

It is also possible to set a feed of 0.16 mm/turn by using pulley (B) feed belt A-670 supplied as outfit.

For changing the spindle rotation speed, proceed as follows:

1. Undo the screw which locks the pulley compartment shield, located on the upper part of the drill. For this, use the Allen wrench (supplied as outfit) as shown in figure 14.



Figure 14 – Undoing the screw of the shield.

2. Lift the top shield to be able to gain access to the belts and pulleys (figure 22).



Figure 15 – Opening the shield.

3. Undo the locking screw of the feed pulley which is located under the pulley, by using the Allen wrench delivered as outfit.
4. For a better understanding, see also the following drawing (figure 16).

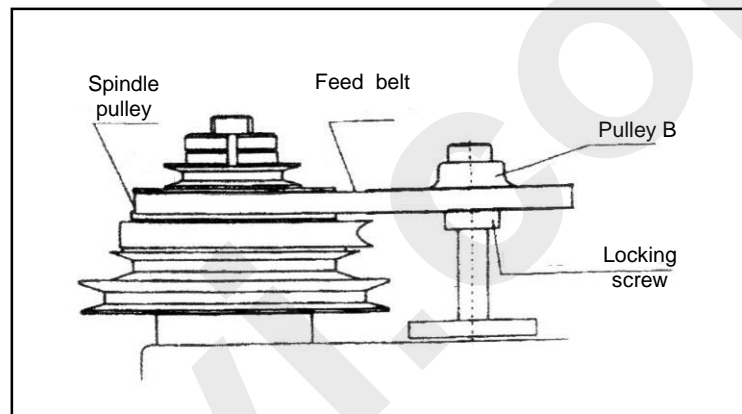


Figure 16 – Main items of the feed system.

5. Extract the pulley by drawing it upward.
6. Insert pulley (B) on the shaft; put belt A-670 in position; then tighten the locking screw which is located under the pulley.
7. Close again the top shield and lock it by tightening its screw.



Theoretical drilling capacity

- The work capacity of automatic feeds is calculated considering standard conditions (material to be drilled, drilling diameter, accuracy, cooling conditions, etc.)
- The following table lists the relationship between drilling diameter, spindle speed and automatic feeds.



DON'T USE THE AUTOMATIC DESCENT IN EXCESS OF 1000 RPM

Speed	160	240	260	385	590	885
Hole Dia.						
32	0.26	0.26				
27		0.26	0.26			
25		0.26	0.26			
22			0.26	0.26		
18				0.16	0.16	
16				0.16	0.16	
14				0.16	0.16	
12					0.16	0.16
10					0.16	0.16
8						0.10
6						0.10
5						

5.4 Handwheel for vertical displacement of the spindle

On the right hand side of the head there is a handwheel for vertical (upward or downward) displacement of the spindle in manual mode (re. D in figure 17).

For lowering the spindle, namely for approaching the tool to the workpiece, fetch one of the knobs and rotate the handwheel anticlockwise; vice versa, for raising the spindle, namely for separating the tool from the workpiece, rotate the handwheel clockwise.



Figure 17 – Feed handwheels.



Adjusting the automatic feeds

The handwheel which displaces the spindle vertically has also the function of start and stop of the automatic feed.

For starting the automatic feed of the spindle, fetch one the two knobs and pull the handwheel rightward; conversely, for stopping the automatic feed, push the handwheel leftward (toward the head).



5.5 Adjusting the Work Table

These Drills allow adjusting the work height (the table). This feature is afforded by a rack on the bearing column of the machine.

Table height is adjustable manually by means of:

- a handle located on the right hand side of the table ("F" in figure 18);
- two locking bolts located on the left hand side of the table ("G" in figure 18).

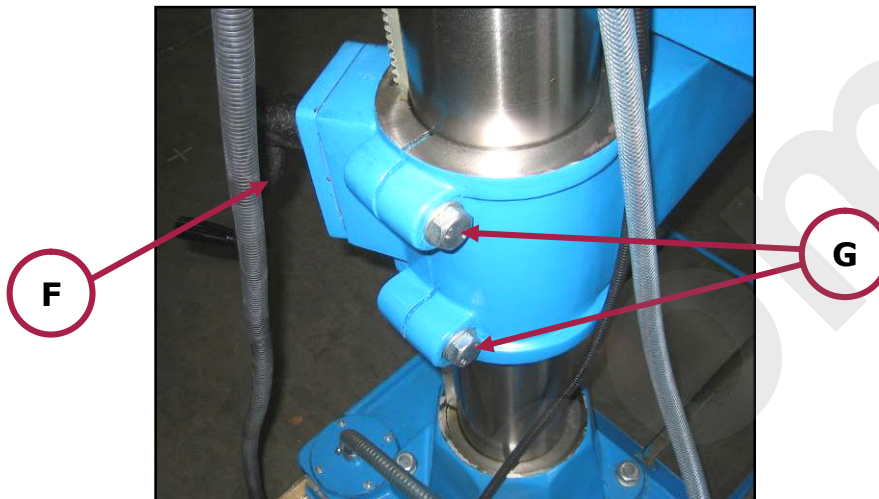


Figure 18 – Table height adjustment parts.

To adjust the table height, proceed as follows:

1. Manually undo the locking screws (G), as shown in figure 19.



Figure 19 – Unlocking the screws.

2. Fetch handle (E) and turn it clockwise for raising the table, or anticlockwise for lowering it, until reaching the desired height (figure 20).

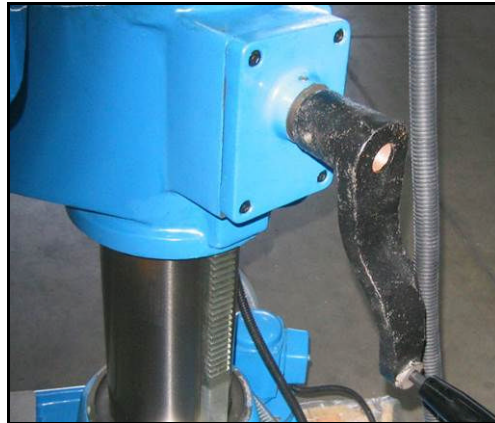


Figure 20 – Adjusting the table height.

3. Manually tighten the locking screws (G).

Moreover, the work stand (table) can be rotated to any position from 0 to 360°.

To adjust the table around itself, proceed as follows:

1. Unlock the locking handle (H) located under the table (figure 21).
2. Fetch the table and rotate it until reaching the desired position.
3. Tighten the locking handle (H).

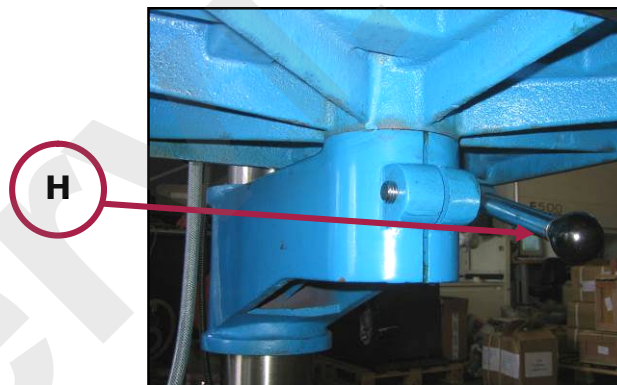


Figure 21 - Rotating the table.



Modifying the table height and angle

It is absolutely forbidden to change the work table height while the spindle is moving.



6 MACHINE SAFETIES



Risk of injury

UNDER NO CIRCUMSTANCES SHOULD PROTECTION AND SAFETY DEVICES BE MODIFIED OR REMOVED!

Before using the machine, always check the condition and correct safety device operation provided by the manufacturer.

6.1 Spindle guard

A plexiglass guard (figure 22) protects the operator against contacts with the rotating tool or against parts ejected during the process.

This guard is equipped with a micro-switch, which stops the power supply to the machine when it is not in closed position (protection of the spindle).



Figure 22 – Spindle Guard



Risk of injury

Before using the machine, always check the status and the proper operation of the spindle guard.

6.2 Pulley compartment guard

A mobile guard made of metal sheet (figure 23) protects the operator against contacts with pulleys, belts and other moving parts of the power transmission system and of the speed change.

This guard is equipped with a micro-switch, which stops the power supply to the machine when it is not in closed position (protection of the pulleys).



Figure 23 – Guard with micro-switch on the power transmission system.

6.3 Emergency stop switch

Emergency stop is activated by pressing a red mushroom-head pushbutton: it interrupts the power supply to the machine.



Figure 24 - Emergency pushbutton.

Upon pressing the emergency stop button, the spindle will keep rotating by inertia for a few seconds before stopping completely. Don't approach the tool until it isn't fully stopped!



Checking the Emergency Button

Before starting any work on the machine, the operator must ensure that the emergency stop button works.



In case of emergency

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



6.4 Electrical Safeties

In the event of its malfunction or failure, the machine is equipped with an electric cable which has an **earthing lead** to protect the operator from electrocution (electric shock). This lead provides a path of minimal resistance to the electric current; thus it reduces the danger of electrocution.



Electric shock

Improper connection of the machine's grounding conductor can result in the risk of electric shock. Don't bring any modification to the electric system.

If you are not sure that the factory's electrical system – to which you are going to connect the machine – is equipped with earthing or if you doubt about its effectiveness, you should perform a check with a qualified electrician.

Repair or replace damaged or worn cables immediately.

6.5 Protection against overload (Art. T032DA)

A device in the feed pulley (see following drawing in figure 25) prevents overloading the tool and the machine during work with automatic feeds.

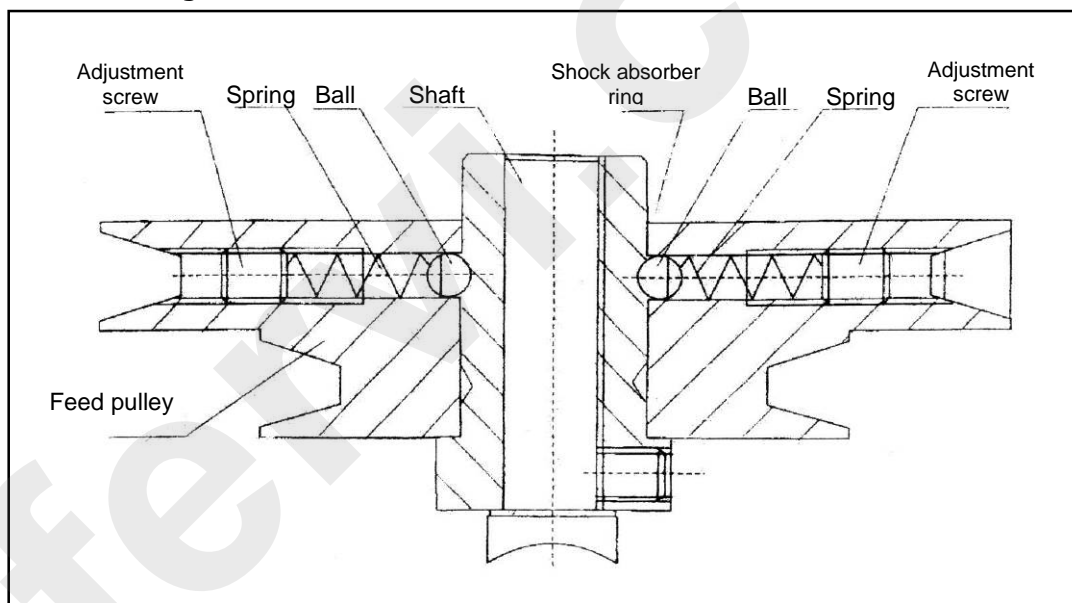


Figure 25 – Device against overload.

In the course of drilling, if the tool work load exceeds the maximum one expected on the machine, the safety device will trigger, so that the feed pulley will slide on the rotation shaft.

You can perceive this situation also by the typical noise emitted by the machine!

Should that happen, please reduce the automatic feed speed or the spindle rotation speed.

Normally, the safety device is delivered already calibrated as it should, therefore it does not need any adjustment. However, after a long period of machine use, it may need to be adjusted.

If maximum machine load is insufficient, please turn the adjustment screw a little clockwise; or, for decreasing the load, anticlockwise.

6.6 Use of PPE

Even if the **Pillar Drill** is equipped with safety devices, dangers of injury remain, related to execution of the work.

It is therefore imperative that the operator wear the following personal protective equipment before starting work:

- wear goggles or face shield to prevent splinters or other parts from damaging your eyes or face;
- wear gloves to protect your hands from burrs on the piece;
- wear safety shoes to protect your feet from falling objects;
- use suitable clothing at work, close-fitting and free of dangling parts.



Use of PPE

ALWAYS use appropriate personal protective equipment (PPE) such as (see Figure 26):

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



PROTECTIVE GLOVES



PROTECT YOUR EYES



PROTECTIVE CLOTHING



PROTECTIVE FOOTWEAR

Figure 26 - Personal Protective Equipment.



7 TRANSPORT AND LIFTING

Use suitable lifting equipment to move the machine. Please remember that the machine weighs about 300 kg, so please use lifting equipment with a higher maximum load capacity. Lifting cranes, cranes and hoists with sufficient load capacity may be considered appropriate.



Means of transport

For choosing a adequate lifting equipment, you should take into account the weight of the machine and of its packaging (if any).

8 INSTALLING THE MACHINE

8.1 Assembly

Drills are supplied completely assembled, with the exception of:

- spindle taper;
- spindle;
- table height adjustment handle;
- spindle adjustment handwheels.

Upon delivery of the machine, check that all parts are present and check them for damage !

8.1.1 Spindle taper and spindle assembly

Proceed as follows to assemble the spindle cone and the spindle:

1. With a dry cloth, clean the internal surface of the coupling of the spindle cone. Similarly, clean also the spindle and the spindle cone.
2. Insert the end with the two flat surfaces of the spindle taper inside the coupling by pressing firmly upwards.
3. Insert the spindle shaft into the bore of the spindle taper, then beat the tip of the spindle with a hammer made of rubber or wood (as shown in figure 27).

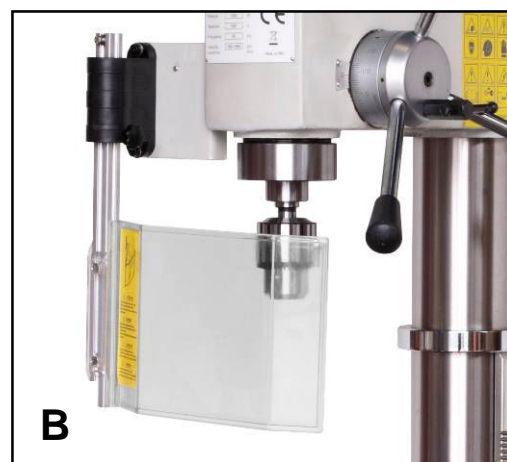
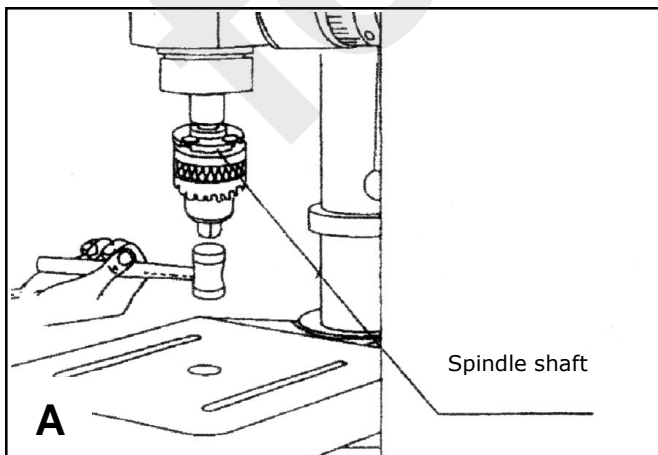


Figure 27 – Mounting the spindle (A: beat with a hammer – B: Overall view).

Proceed as follows to assemble the spindle cone and the spindle:

1. Lower the spindle in order to uncover the slit on the side of the barrel.
2. Insert the spindle dismounting "knife" into the slit and beat such knife it with a hammer.

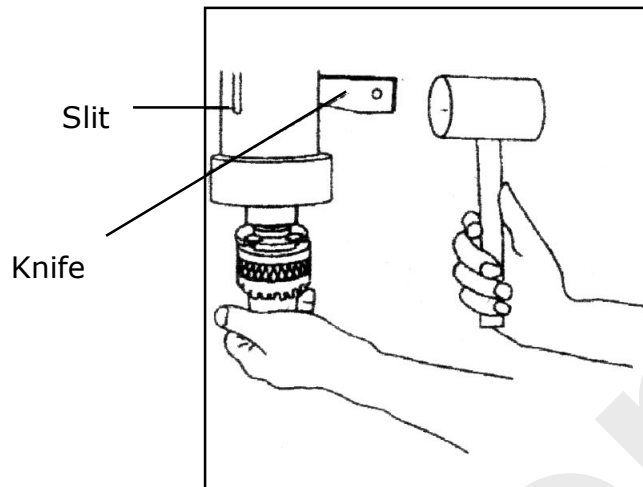


Figure 28 – Dismounting the spindle.



Hold the spindle

- Hold the spindle with one hand, while tapping the knife with the hammer, as shown in figure 28.
- Do not drop the spindle on the worktable, so as not to damage these parts.

8.1.2 Mounting the table height adjustment handle

For mounting the table height adjustment handle, proceed as follows:

1. Engage the handle onto the shaft located at the rear part of the work table; then tighten the locking screw by using the Allen wrench delivered as outfit (figure 29).
2. Screw the knob on the adjustment handle.



Figure 29 – Dismounting the spindle.



8.1.3 Mounting the spindle adjustment handwheel

Proceed as follows to assemble the spindle adjustment handwheel:

1. Screw by hand the 2 "rods" of the handwheels on the central hub.

At the end, tighten the rods by means of a wrench for hexagonal nuts !

2. Screw by hand a knob at the end of each rod (handle), as shown in figure 30.



Figure 30 – Installing the handle.

8.2 Installation



Cleaning

Before installing the machine, clean with care all its components and the area where it will be installed.

Install the machine in a building having a flat and sufficiently strong floor.

1. The area for the machine and the spaces around it must be enough to work safely.

Recommended area: 2.5 m × 2 m.

2. Secure the machine to the floor (figure 31).

First of all, bury the anchor bolts in the concrete of the foundation or of the support base, while checking for correct positioning in respect of the holes through the machine base. Once the concrete has hardened, install the machine, making sure it is positioned horizontally. Finally, tighten the fixing nuts which are present at the base of the Drill.

3. Check the stability and safety of the Drill.

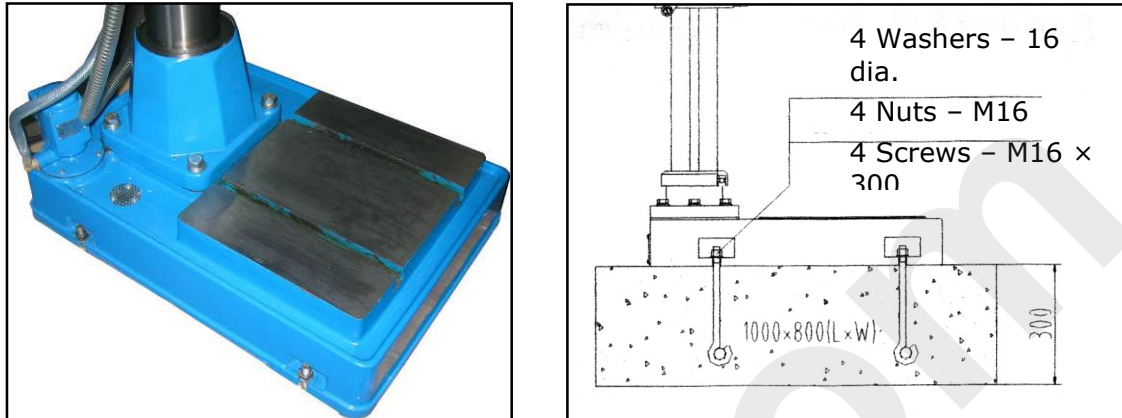


Figure 31 - Securing the machine to the floor.



9 OPERATION



Machine operation

The Pillar Drill must be used only for executing the expected processes, with suitable tools.



Risk of Crushing

Before using the machine, make sure that the base is fixed rigidly to the floor to prevent movement or loss of stability.



Machine operation

The Pillar Drill should be used only by skilled, trained staff: the machine is to be used only after having read and understood this manual.



Risk of Injury

The workpiece must be firmly fixed to the table (with the vice) while the machine is running. Never hold the workpiece in place with your hands while it is being machined.

9.1 Preliminary checks

Make sure that the tool holder spindle is securely fastened. Use only appropriate tool holders. Clean the machine and lubricate where required (see chapter "Maintenance"), to turn the machine starting from the lowest speed up to the maximum, making sure that everything is working properly.

9.1.1 Manual mode

1. Choose an appropriate tool for the next process and insert it between the jaws of the spindle.
2. With the wrench delivered as outfit, secure the tool by tightening the spindle as shown in figure 32.



Figure 32 – Spindle wrench



Machine assembly

Make sure that the tool is properly and securely assembled before starting the machine.

3. Set the rotation speed of the spindle (and thus of the tool) as a function of the operation to be performed, by displacing the power transmission belts as indicated in paragraph 5.2.1.
4. Secure the workpiece on the work surface by tightening it with the spindle.
5. Adjust the height of the work surface, as well as its rotation.
6. Close the spindle's interlocked guard protection.
7. Start the machine by pressing the green "Start" pushbutton on the control panel (re. A in figure 6/A).
8. Lower the spindle using the hand-wheel for vertical displacement (E) and drill the hole.
9. When finished, release the wheel.



Drilling depth

Check drilling depth on the graduated scale on the spindle feed hand wheel.

9.2 Automatic mode

For drilling in automatic mode, proceed as follows:

1. Choose an appropriate tool for the next process and insert it between the jaws of the spindle.
2. With the wrench delivered as outfit, secure the tool by tightening the spindle as shown in figure 32.



Machine assembly

Make sure that the tool is properly and securely assembled before starting the machine.

3. Set the rotation speed of the spindle (and thus of the tool) as a function of the operation to be performed, by displacing the power transmission belts as indicated in paragraph 5.2.2.
4. Secure the workpiece on the work surface by tightening it with the spindle.
5. Adjust the height of the work surface, as well as its rotation.
6. Close the spindle's interlocked guard protection.
7. Unscrew manually the locking knob of the ring nut which adjusts the work depth, then lower the tool till onto the surface of the piece.
8. Turn the ring nut to its 0 (zero) in correspondence of the automatic zero-scale index (see figures 33 and 34).
9. Turn the ring nut for positioning the number relative to work depth in correspondence of the automatic zero-scale index, then tighten the knob.

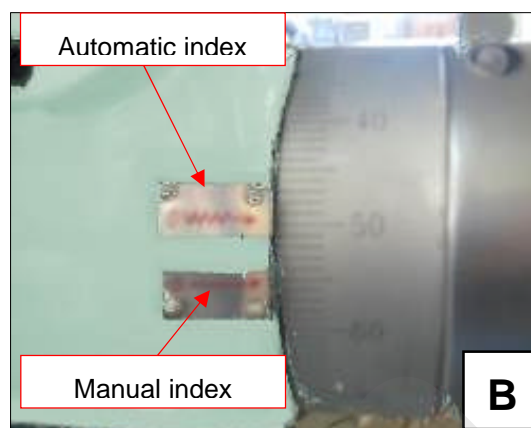
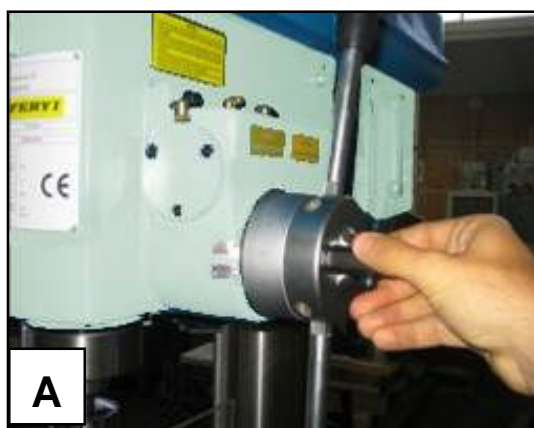


Figure 33 – Operation in automatic mode.

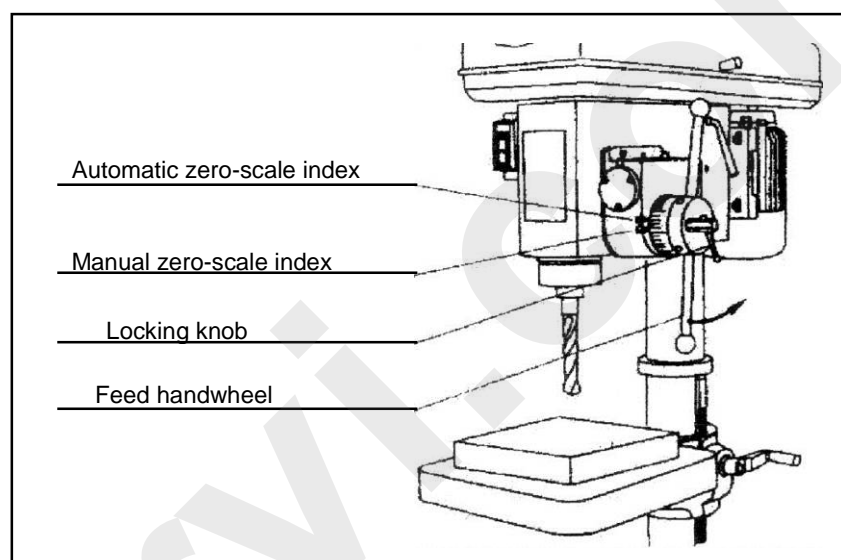


Figure 34 – Operation in automatic mode.

For instance:

If you want to set a work depth of 30 mm, place the mark relating to number 30 in correspondence of the automatic zero-scale index, identified by the following symbol:



10. Choose the motor speed by means of selector switch (C).
11. Start the machine by pressing the green "Start" pushbutton on the control panel (re. A in figure 6/B).
12. Pull the spindle feed handwheel outward (as in figure 35) for commencing the automatic work cycle.

Once the automatic zero-scale index is reached, the spindle stops its feed, and it returns automatically backward !

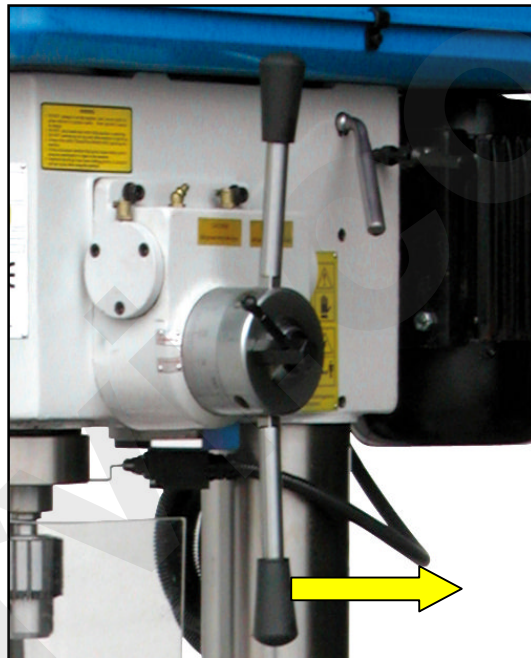


Figure 35 – Operation in automatic mode.

**Operating the machine**

Before executing the process, start the coolant pump.



10 MAINTENANCE

10.1 Routine maintenance

Remove dust accumulated inside the motor and machining residues on the work surface using compressed air.

Every 300 hours or every 6 months during the life of the machine, a thorough check of operation, and wear and tear on the machine is to be carried out by a qualified technician.

10.2 Lubrication

10.2.1 Lubrication points and frequency

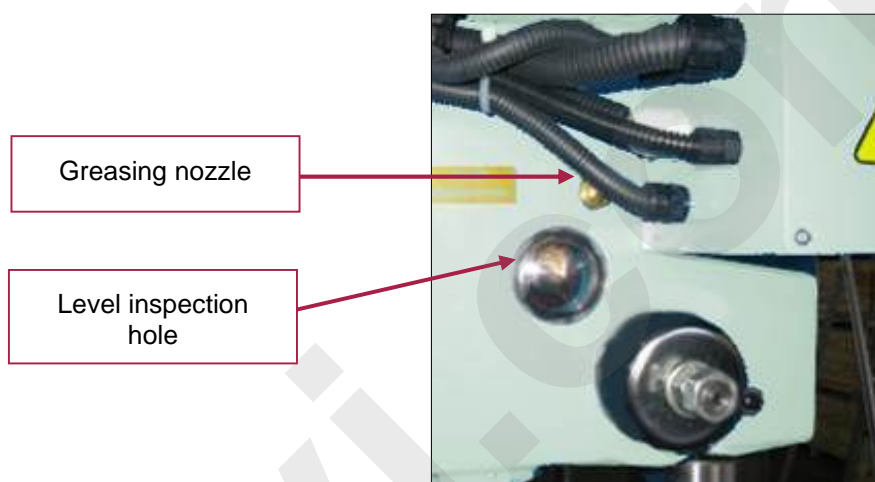


Figure 36 – Control panel side head.

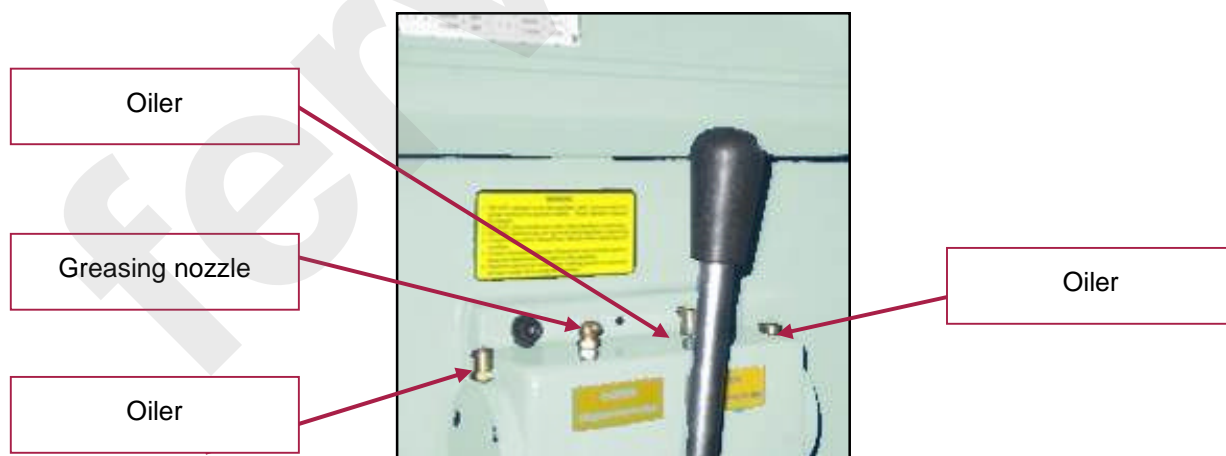


Figure 37 – Handwheel side head.

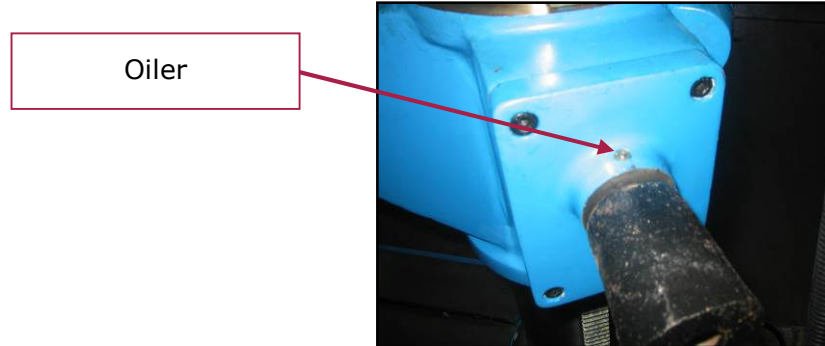


Figure 38 – Table adjustment handle.

	Oil Type	Quantity	Frequency
Oilers	Oil for machines	4 – 5 times	Every day
Oilers of cover	Oil for machines	8 – 10 drops	Every day
Conical joint	Special white oil	4 – 5 times	Every 3 days
Sliding surfaces	Oil for machines	3 – 4 times	Every day

10.3 Bearings

After a long period of use, the bearings may become quite noisy: this means that the bearings are worn and need lubrication.

No.	Location	Model	Quantity
1	Sleeve coupling	6009 – Z	2
2	Sleeve coupling	6006 – Z	1
3	Sleeve coupling	51107	1
4	Sleeve coupling	6207 – Z	1
5	Central pulley	6203 – 2Z	2
6	Feed shaft	6004 – 2Z	2
7	Feed shaft	51102	1
8	Bevel gear	51102	1

* (See the drawing in the following page).

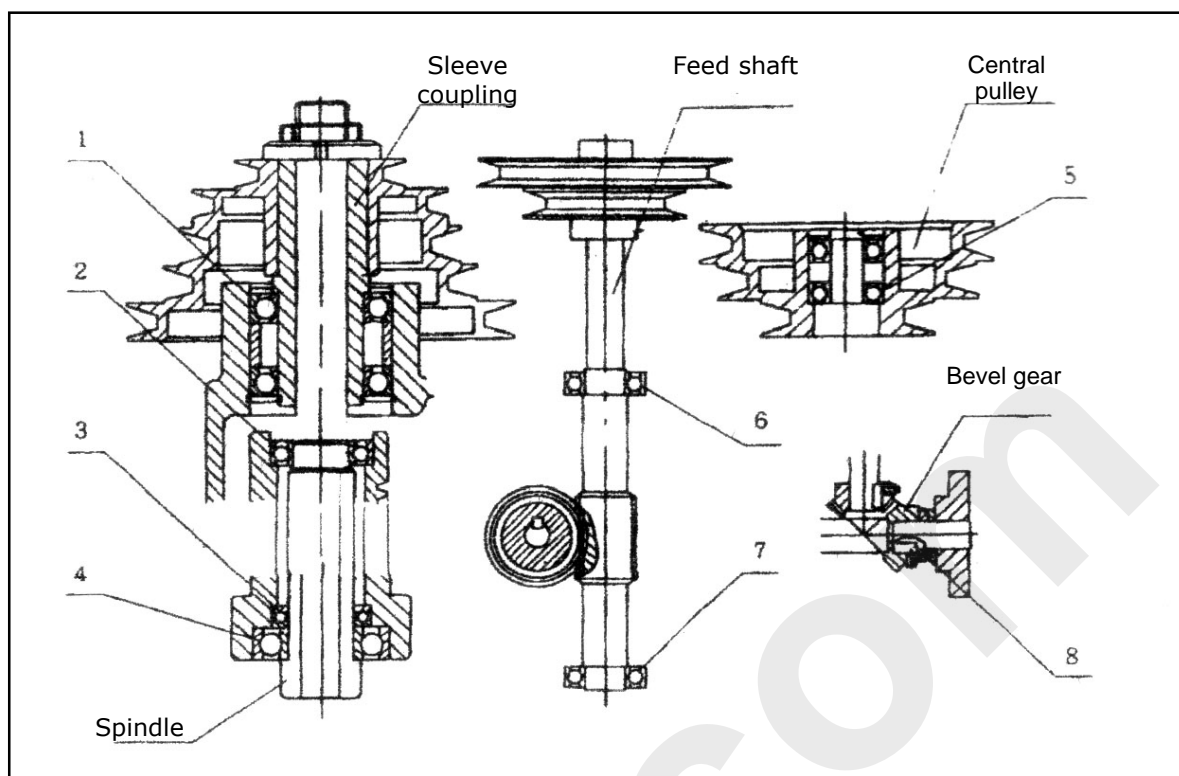


Figure 39 – Replacing the bearings.

11 TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Noisy operation	A) Dry spindle B) Broken bearing C) Motor bolts loose D) Belts loose	A) Remove the spindle and lubricate B) Replace the bearing C) Tighten the screws D) Pull the belts
Excessive wobbling (eccentric rotation) of the spindle.	A) Loose spindle. B) Worn spindle shaft or bearings C) Broken spindle	A) Tighten the spindle B) Replace the shaft or the bearing C) Replace the spindle
The motor will not start	A) Power supply B) Motor connection C) Connections of the switches D) Burnt motor windings. E) Broken switch	A) Check the mains power supply B) Check the motor connections C) Check the switch connections D) Replace the motor E) Replace the switch
The tip is jammed in the workpiece	A) Excessive pressure on the feed hand-wheel B) Loose tip C) Speed is too fast	A) Apply less pressure B) Tighten the tip C) Change the speed
The tip is burning or smoking	A) Incorrect speed. Revolutions per minute. B) Shavings will not discharge C) Tip is worn or does not cut the material well D) Needs lubrication E) Incorrect feeding pressure	A) See table speed B) Clean the tip C) Check the sharpness and taper D) Lubricate while drilling E) Apply less pressure
The tip vibrates, the hole is not round	A) The tip was sharpened off centre B) Bent tip.	A) Sharpen the tip correctly. B) Replace the tip.
The temperature of the spindle holder is too high	A) Insufficient lubrication	A) Lubricate the spindle holder
The spindle will not stick to the sleeve	A) Dirt, grease or oil in the morse taper B) Running in an unauthorized mode	A) Use detergents (alcohol, etc.) to clean the conical part of the spindle B) Milling operations causing the fall



12 DISPOSAL OF COMPONENTS AND MATERIALS

If the machine is to be scrapped, its parts must be disposed of differently so that they can be recycled if possible.

Machine materials include:

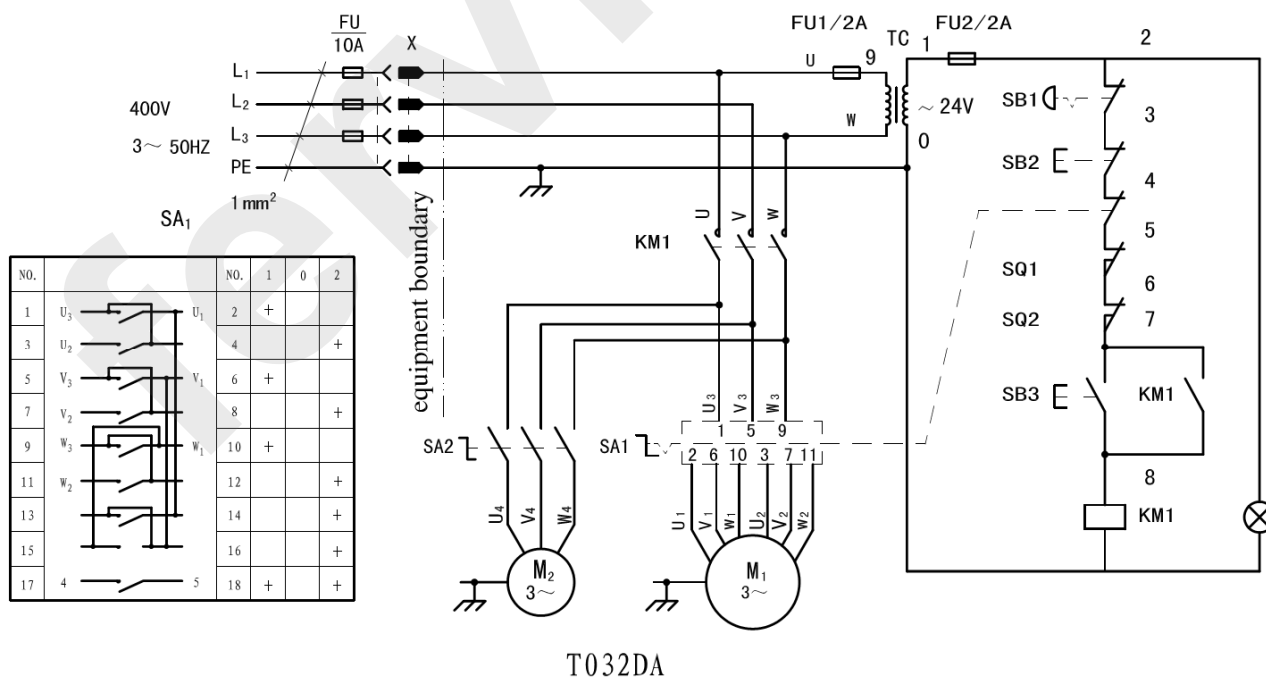
- Steel, aluminum and other metal components.
- Plastic materials.
- Cables, motors and electric components made of copper.



Respect the environment!

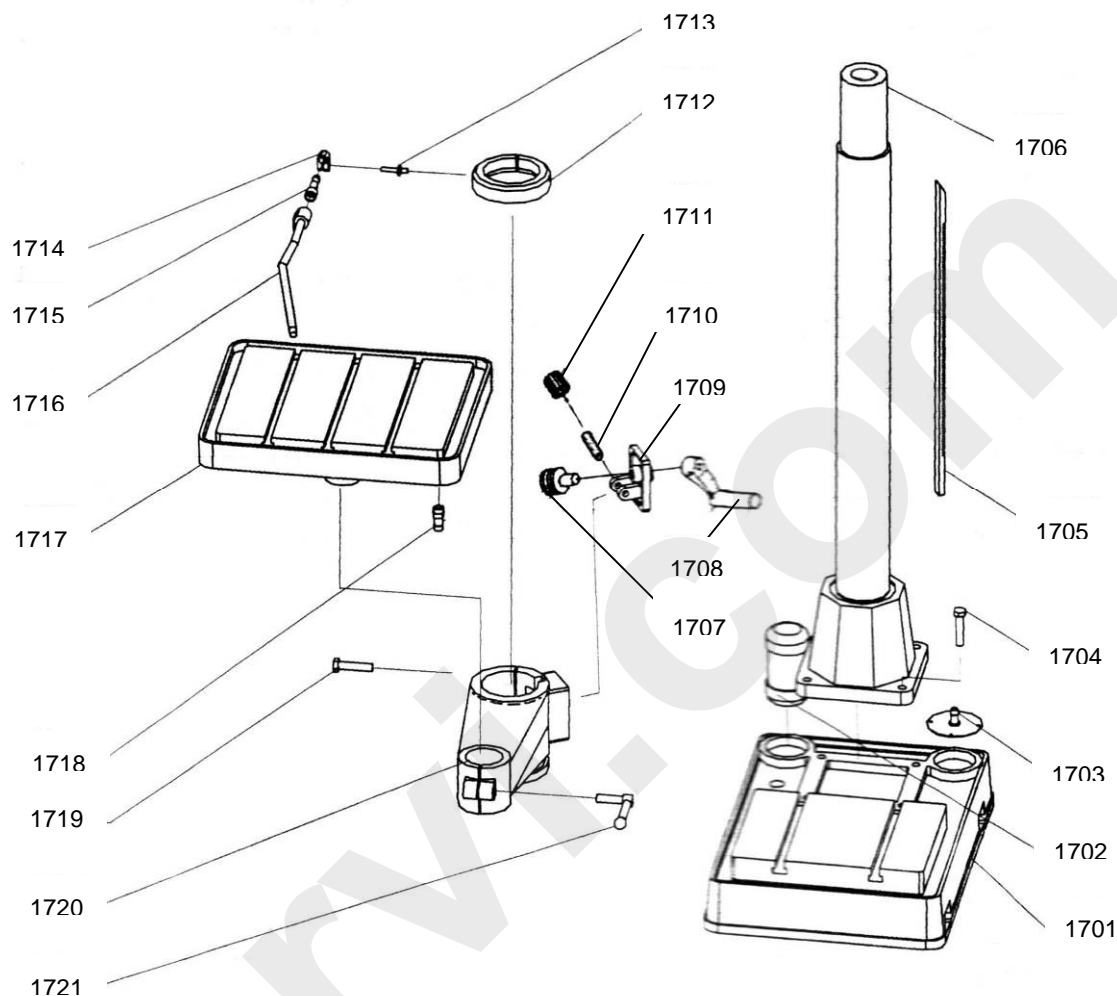
Contact a specialist centre for the collection of waste materials.

13 ELECTRICAL CIRCUIT



14 SPARE PARTS

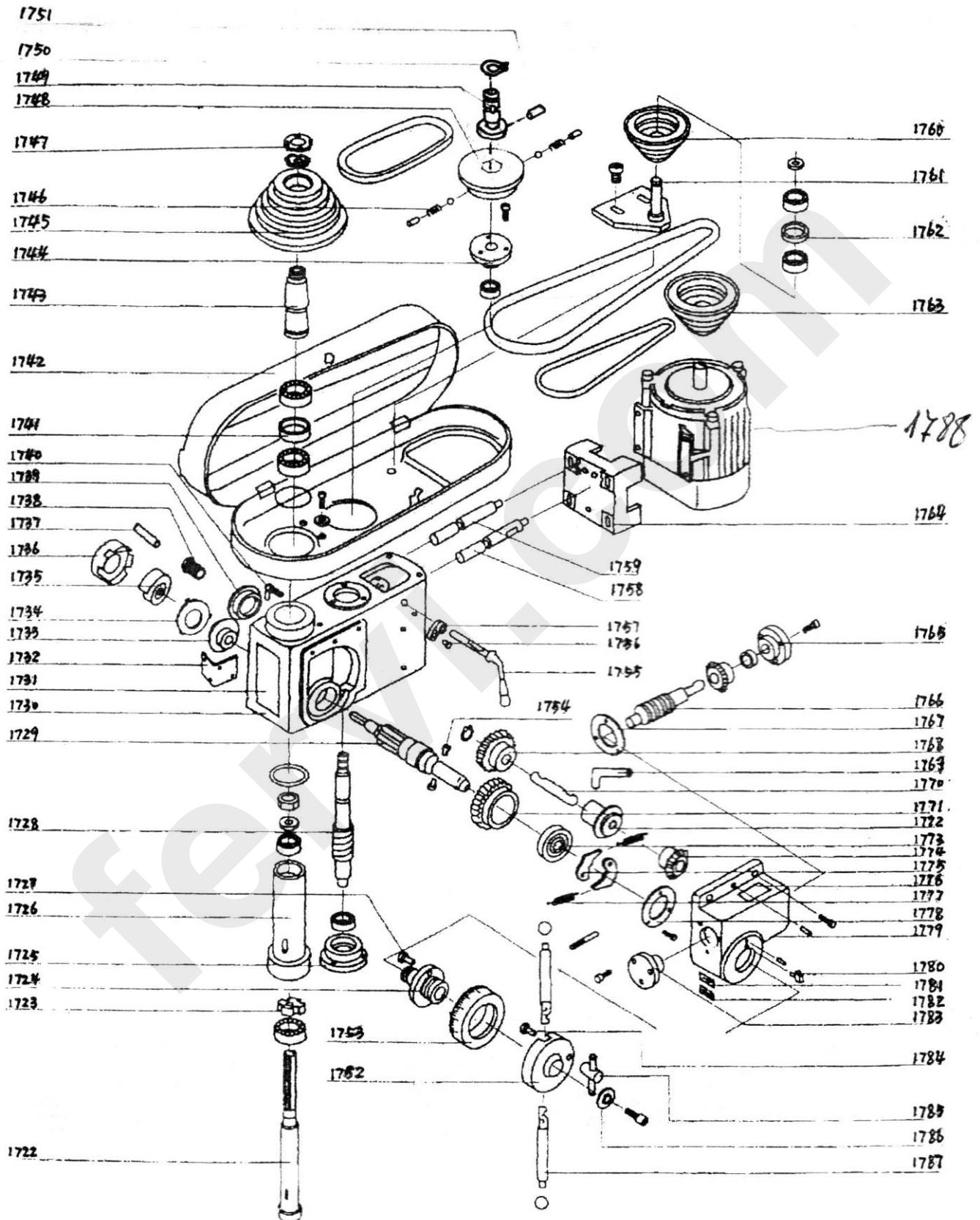
14.1 Base and Work Table



No.	Description	No.	Description	No.	Description
T032DA/1701	Base	T032DA/1708	Crank	T032DA/1715	Pipe connector
T032DA/1702	Coolant pump	T032DA/1709	Frame	T032DA/1716	Coolant pipe
T032DA/1703	Cover	T032DA/1710	Shaft	T032DA/1717	Square table
T032DA/1704	Bolt	T032DA/1711	Gear	T032DA/1718	Connector
T032DA/1705	Rack	T032DA/1712	Ring	T032DA/1719	Bolt
T032DA/1706	Column	T032DA/1713	Double screw	T032DA/1720	Table support
T032DA/1707	Shaft	T032DA/1714	Fork		



14.2 Head and Motor



No.	Description	No.	Description	No.	Description
T032DA/1721	Locking	T032DA/1744	Feed shaft base	T032DA/1767	Spacer
T032DA/1722	Spindle shaft	T032DA/1745	Spindle pulley	T032DA/1768	Gear
T032DA/1723	Nut	T032DA/1746	Overload spring	T032DA/1769	Oil pipe A
T032DA/1724	Screw-type coupling	T032DA/1747	Nut	T032DA/1770	Transmission shaft
T032DA/1725	Feed shaft base	T032DA/1748	Feed pulley	T032DA/171	Big gear
T032DA/1726	Sleeve coupling	T032DA/1749	Conical shaft	T032DA/1772	Base
T032DA/1727	Locking	T032DA/1750	Sealing ring	T032DA/1773	Transmission plane
T032DA/1728	Feed shaft	T032DA/1751	Screw	T032DA/1774	Bevel gear
T032DA/1729	Gear shaft	T032DA/1752	Handwheel body	T032DA/1775	Toothing
T032DA/1730	Spindle box	T032DA/1753	Ring nut	T032DA/1776	Caution label
T032DA/1731	Label	T032DA/1754	Feather key	T032DA/1777	Spring
T032DA/1732	Control box	T032DA/1755	Tension handle	T032DA/1778	Plate
T032DA/1733	Gear shaft base	T032DA/1756	Shaft fusion	T032DA/1779	Feed box
T032DA/1734	Cover spring	T032DA/1757	Curved shaft	T032DA/1780	Inclined block
T032DA/1735	Spring	T032DA/1758	Fixing bolt 1	T032DA/1781	Auto. 0 index label
T032DA/1736	Cover spring	T032DA/1759	Fixing bolt 2	T032DA/1782	Man. 0 index label
T032DA/1737	Oil pipe B	T032DA/1760	Central pulley 1	T032DA/1783	Gear base
T032DA/1738	Oil cap	T032DA/1761	Pulley base	T032DA/1784	Locking screw
T032DA/1739	Oil level inspection	T032DA/1762	Pulley ring	T032DA/1785	Locking
T032DA/1740	Locking screw	T032DA/1763	Motor pulley	T032DA/1786	Washer
T032DA/1741	Separation ring	T032DA/1764	Motor base	T032DA/1787	Rod
T032DA/1742	Cover	T032DA/1765	A bearing base	T032DA/1788	Motor
T032DA/1743	Pulley shaft	T032DA/1766	2-step shaft		