

User Manual

Plaster drill

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CHAPTER 1: INTRODUCTION

HOW TO READ AND USE THIS MANUAL 1.1

This Use and Maintenance Manual provides information on the utilisation, installation and maintenance of the **euclide** plaster drill manufactured by **Zhermack S.p.A.**

- The **euclide** plaster drill must be used in accordance with the instructions in this manual: it is therefore recommended that you read it carefully prior to installation and start-up. Make sure that you read the entire manual and pay particular attention to messages written in bold type or items highlighted by boxes and/or symbols: the symbols are designed to highlight situations involving danger or requiring caution (see paragraph 1.2).
- Observance of standards and regulations shown in this manual will ensure that the machine is used properly and that maintenance work is carried out safely.
- This Use and Maintenance Manual is an integral part of the machine: it should therefore be kept together with the equipment so that it can be consulted as and when necessary (keep the booklet in a secure dry place away from sunlight, atmospheric agents, etc.). It must be available for consultation throughout the working life of the plaster drill even when the machine is sold or finally dismantled.
- It is recommended that you keep this manual constantly updated by integrating any amendments, additions or modifications made by the Manufacturer. Any notes or comments should be made on the blank pages at the rear of the booklet (see Appendices: Note).
- Use the manual properly so that it is not damaged in any way.
- Do not remove, tear or write on any part of the pages.
- If the manual is lost or damaged and its contents become illegible you can request a replacement copy from the Manufacturer.

The purpose of this Use and Maintenance Manual is to provide users with information on how to operate the plaster drill properly. The manual contains all the information needed to use the device as intended: in particular the manual includes instructions and information on the following:

- Correct plaster drill installation;
- Detailed description of how the plaster drill works and its components;
- Initial start-up;
- Scheduled maintenance;
- Basic Safety and Accident Prevention info.

This manual contains nine chapters each of which covers a specific argument. The appendices at the rear of the manual are a useful complement to these chapters.

1.2 TERMINOLOGY AND SYMBOLS

It is important that you understand the following symbols and their significance as they highlight important information such as critical situations, practical advice, or straightforward information.

If you have any doubts as to the significance of a symbol always consult this page.

- Tasks for which failure to observe instructions or tampering with machine parts may put personnel in serious danger are highlighted by the symbol:



DANGER!

This symbol refers to safety standards which must be observed at all times in order to protect both workers and machine.

- Critical situations concerning dangerous areas or tasks in which failure to observe the instructions may render the warranty null and void, or cause damage to machine, connected components or the surrounding area, are highlighted by the symbol:



WARNING!

This symbol refers to safety standards which must be observed carefully in order to guarantee your safety, other people's safety and prevent damage to the machine.

- Any work that fails to comply with instructions in this manual, or any tampering which might automatically render the warranty null and void, is highlighted by the following symbol:



FORBIDDEN!

This symbol refers to actions which must never be carried out (i.e. forbidden actions).

- Any general information and/or advice which may be useful at any time is highlighted by the following symbol:



NOTE!

This symbol highlights information and/or useful advice.

CHAPTER 2: GENERAL INFORMATIONS

RESPONSABILITY 2.1

Failure to observe the instructions in this Use and Maintenance Manual exonerates the Manufacturer from any liability whatsoever.

For any matters not covered by this manual or about which you have any doubts please contact the Manufacturer directly:

Zhermack S.p.A.
Via Bovazecchino, 100
45021 Badia Polesine · RO · Italy
Tel. +39 0425 597 611 · Fax +39 0425 53 596
<http://www.zhermack.com> e-mail: info@zhermack.com

If plaster drill maintenance work fails to comply with instructions or is done in such a way as to compromise machine integrity or modify its characteristics **Zhermack S.p.A.** shall be exonerated from any liability as regards worker safety and/or machine performance.

WARRANTY: GENERAL INSTRUCTION 2.2

Included in the Appendices to this Use and Maintenance Manual you will find the Warranty certificate and the ID Form which must be filled out in full.

In general the Warranty is rendered null and void by the following:

- Improper machine use.
- Incorrect installation.
- Serious negligence of maintenance schedules.
- Modifications to or work on the machine which has not been authorised by the Manufacturer (especially on safety devices).
- Use of non-original spare parts.

Zhermack S.p.A. cannot, as of this moment, be held liable if the machine is modified or tampered with without prior written consent from the Manufacturer. Consequently, any repairs made by unauthorised personnel, use of non-original spare parts or failure to comply with the installation standards specified in this manual shall immediately render the Warranty null and void.



AUTHORIZED PERSONNEL 2.3

Personnel may be divided into the following categories:

• **Operator-user:**

Person trained to use the plaster drill. He/she may carry out all the tasks needed to operate the machine: these tasks include starting/stopping the machine, carrying out routine inspections and any other tasks linked to everyday machine use.



The operator-user must only use the machine when it is fully assembled and the safety devices are working properly as described in this manual.



Before using this machine or carrying out any work on it, the operator must read the entire contents of this manual. This manual has been drawn up to provide the user with essential information on rational, safe utilisation of the machine. The user must comply with the information given at all times. Furthermore, the user must use the work sheets enclosed with this manual so as to keep a record of maintenance/component replacement work as well as make notes on any machine malfunctions.

• **Zhermack S.p.A. authorised maintenance technician:**

Person authorised to carry out work on the machine under all operating conditions and all safety levels. He/she is also authorised to carry out any mechanical or electrical repairs/adjustments, scheduled maintenance and any component replacement work.

2.4 GENERAL SAFETY REGULATIONS

The operator must read the advice and warnings given below and comply with such regulations at all times: doing so will ensure safe, long-lasting machine performance:

- Do not allow untrained personnel to use this machine.
- Ensure that the work area is properly prepared: it must be free from obstacles, clean and properly illuminated.
- Take measures to ensure that you are not distracted when using the machine.
- In the event of a malfunction follow the advice given in this manual: if you have any doubts shut down the machine and contact your Authorised Service Centre immediately.
- Never use a malfunctioning machine and always inform the Maintenance Manager of any faults.
- Do not open compartments containing electrical parts.
- Do not replace the power lead or tamper with the supplied plug.
- It is forbidden to use the machine on items other than those for which it has been specifically designed.
- Before doing any cleaning, routine and/or unscheduled maintenance work make sure that the machine has been unplugged from the mains socket.
- Make sure that there are no foreign objects inside the work area as these could damage the machine and/or injure personnel.
- Do not use petrol or flammable solvents as detergents; use only non-flammable, non-corrosive, and non-toxic substances (see paragraph 8 .1).



Zhermack S.p.A. cannot be held liable for any damage to persons or objects caused by incorrect maintenance carried out by unqualified personnel or maintenance work that does not comply with the instructions in this manual. Zhermack S.p.A. is, as of this moment, exonerated from any liability concerning injury to persons or damage to objects that may result from using this machine in a way other than that described in this manual.

This machine has electrical parts: therefore, in the event of a fire, no matter how small, use only powder-type extinguishers. Never attempt to put out an electrical fire with water.



CHAPTER 3: DESCRIPTION OF MACHINE

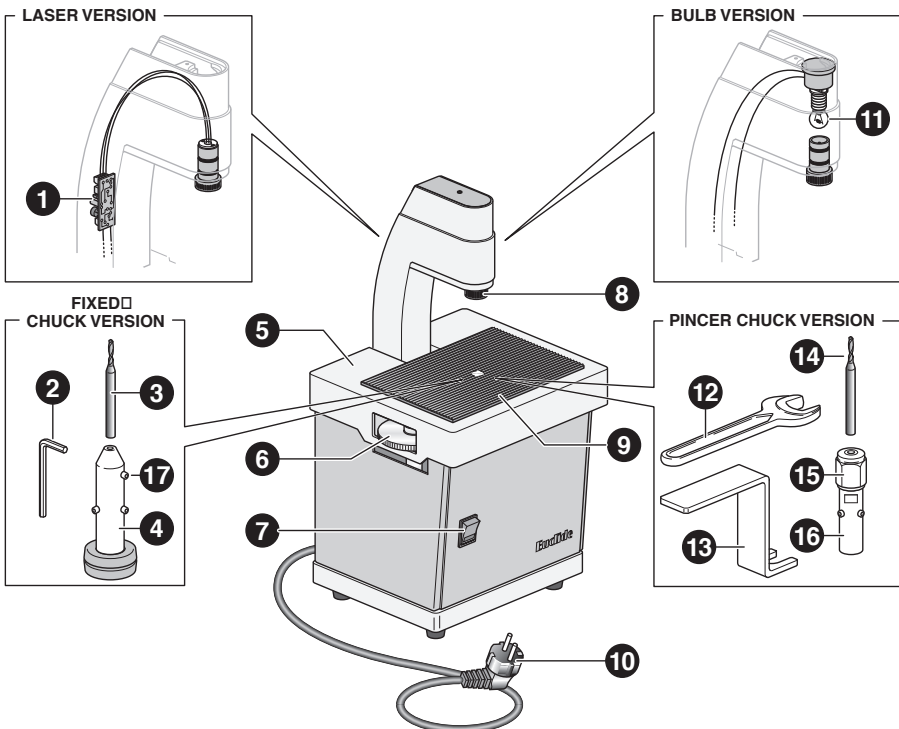
3.1 GENERAL DESCRIPTION OF MACHINE

This manual describes the **euclide** plaster drill. The drill has been designed to apply the “Dowel Pins”, technique, based on parallel positioning of dowel pins.

The **euclide** plaster drill is available in the following versions (see “Table of components”):

- with fixed chuck and bulb-type light guide (Cod. A0200010);
- with fixed chuck and laser-type light guide (Cod. A0200020);
- with pincer chuck and bulb-type light guide (Cod. A0200030);
- with pincer chuck and laser-type light guide (Cod. A0200040).

3.2 TABLE OF COMPONENTS

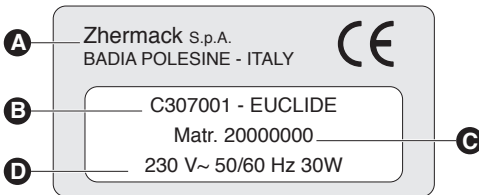


Description of components 3.2.1

- | | |
|---|--|
| 1. Laser system | 10. Power lead |
| 2. Allen key n°2 | 11. Light bulb |
| 3. Drill bit for fixed chuck (see section. 4.2.1) | 12. Wrench n°14 |
| 4. Fixed chuck | 13. Wrench n° 10 |
| 5. Mobile support top | 14. Drill bit for pincer chuck (see section 4.2.1) |
| 6. Hole depth regulator | 15. Pincer chuck lock |
| 7. Main switch | 16. Pincer chuck shaft |
| 8. Binocular | 17. Bit fixing grub screw |
| 9. Rubber mat | |

IDENTIFICATION DATA 3.3

The machine described in this manual has an ID platelet giving information about both the machine and the manufacturer.



- A. Name and address of manufacturer
- B. Machine code and model
- C. Serial number
- D. Power supply information

The **euclide** plaster drill has been built in compliance with the EC directives listed in the enclosed "EC declaration of conformity". When requesting spare parts, information or assistance from your Authorised Servicing Centre always quote the data on the ID plate. Should the ID plate deteriorate and become illegible, even partially, order a replacement plate from the manufacturer: remember to quote the relevant data.

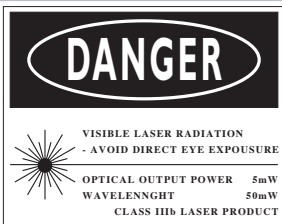
Do not remove and/or the damage the plate as you must be able to read the data at all times.



Danger signs on the machine 3.3.1

On the rear of the machine there is a label with the following symbol. It reads:

ATTENZIONE! DANGER OF AN ELECTRICAL CURRENT. DO NOT OPEN DOORS OR REMOVE PROTECTION BEFORE YOU HAVE DISCONNECTED THE PLUG FROM THE ELECTRICAL SOURCE



DANGER! VISIBLE LASER RADIATION. AVOID DIRECT EYE EXPOSURE.



CHAPTER 4: TECHNICAL CHARACTERISTICS

4.1 TECHNICAL CHARACTERISTICS AND MACHINE OPERATING PRINCIPLE

Zhermack S.p.A. designs and manufactures work instruments that provide cutting-edge technology and first-rate quality. They are specially designed to provide made-to-measure solutions that offer long-lasting performance every single day of their working life.

In making these products **Zhermack S.p.A.** makes use of the latest design tools, thus ensuring that all finished machine is as functional as possible. Use of only top-quality materials and thorough testing aimed at providing maximum user safety are an **Zhermack S.p.A.** constant, making our products safe and internationally competitive.

The **euclide** plaster drill is a machine that has been designed to improve the dowel-pins technique (i.e. the technique of applying removable dowel pins).

The **euclide** plaster drill is simple and easy to operate. It allows you to position pins precisely as desired.

The guide light (bulb/laser) aids precision during drilling.

By providing parallel positioning of the pins the machine guarantees superb end-of-job precision, ensuring that your work reaches its maximum potential at all times.

A vast range of drill bits, together with the depth adjustment feature, allows the operator to use all dowel pin types, whether with smooth rounded heads or knurled heads.

Easy to use, this machine requires no maintenance other than periodic cleaning of the plaster dust collection tray.

A rubber mat provides more stable support for the plaster/resin models on the mobile work top.

4.2 TECHNICAL DATA

Technical data on the **euclide** plaster drill:

Power supply	230 V~ ± 10% 50/60 Hz (opp. 115 V~ ± 10% 50/60 Hz)
Absorption	30 Watt
RPM	2800
Protection rating IP	IPX0
Noise level	<70 dB

4.2.1 Standard accessories

In addition to this Use and Maintenance Manual, the **euclide** plaster drill also comes with the following items:

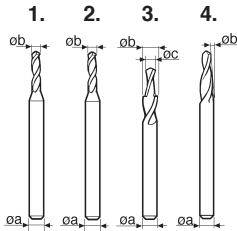
COMPONENTS	QUANTITY	ORD. CODE*
Allen key n°2 (with fixed lock system)	1	XH9900005
Wrench n°14 (with pincer lock system)	1	XI0200210
Wrench n°10 (with pincer lock system)	1	XI0200220
Bit: stem Ø 3mm - drill bit 2mm	1	XR0200040
Pins	100	XR0202010
Sheaths	100	XR0202070
Position plugs	100	XR0202050

Accessories available on request 4.2.2

The following material is supplied on request:

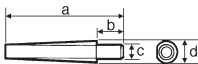
COMPONENT (BITE TYPE)	QUANTITY	ORD. CODE*
1-bit pack STEM. 3.17 - DRILL BIT 2mm	1	XR0200020
1-bit pack STEM. 3.17 - DRILL BIT 1.5mm	1	XR0200030
1-bit pack STEM. 3 - DRILL BIT 2-3mm	1	XR0200070
1-bit pack STEM. 3 - DRILL BIT 2mm T.10mm	1	XR0200080
1-bit pack STEM. 3 - DRILL BIT 2mm Tung	1	XR0200040
1-bit pack STEM. 3 - DRILL BIT 2.0x3mm	1	XR0200050
1-bit pack STEM. 3 - DRILL BIT 1.5mm	1	XR0200060

* Please quote the order code when ordering a spare part. You may order parts from your local Authorised Servicing Centre.

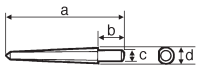


$\varnothing a$	diameter STEM
$\varnothing b$	diameter DRILL
Bit diameter:	
1. Cod. XR0200060	1,5 mm
2. Cod. XR0200040	2 mm
3. Cod. XR0200070	double diameter (2 mm. e 3 mm.)
4. Cod. XR0200050	conical bit for SATOPINS SYSTEM

COMPONENT (PINS FOR EUCLIDE)	a (mm)	b (mm)	c (mm)	d (mm)	ORD. CODE*
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	18,5	4,5	$\varnothing 2$	$\varnothing 3,3$	XR0202010
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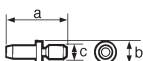
	18,5	4,5	$\varnothing 1,5$	$\varnothing 2$	XR0202030
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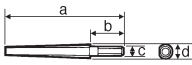
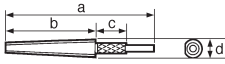
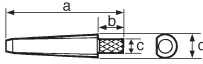
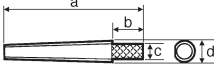

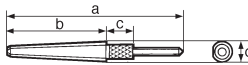
	10	$\varnothing 2$			XR0202050
--	----	-----------------	--	--	-----------

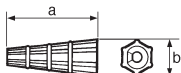



	20	$\varnothing 3$	$\varnothing 2$		XR0202110
--	----	-----------------	-----------------	--	-----------



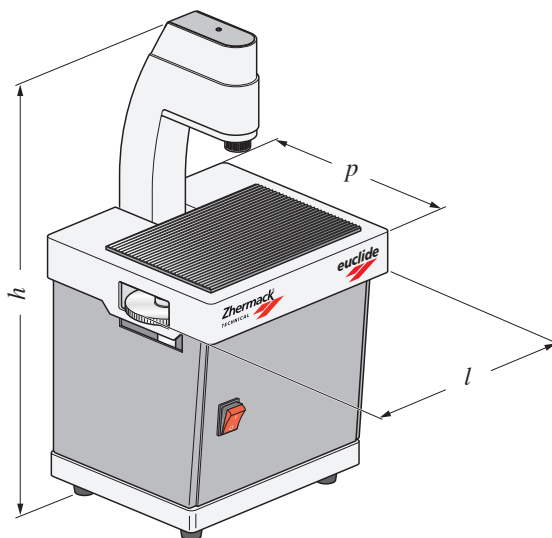
	10	$\varnothing 3$	$\varnothing 2$		XR0202130
--	----	-----------------	-----------------	--	-----------

COMPONENT (PINS FOR DOWEL)	a (mm)	b (mm)	c (mm)	d (mm)	ORD. CODE*
	18,5	4,5	Ø1,5	Ø2	XR0203010
	25	15	5	Ø2,6	XR0203030
	18,5	4,5	Ø2	Ø3,3	XR0203050
	21,5	5	Ø2	Ø3,3	XR0203070
	26	14	4,5	Ø3,3	XR0203090
	28,5	14	4,5	Ø3,3	XR0203110

COMPONENT (SHEATHS)	a (mm)	b (mm)	c (mm)	d (mm)	ORD. CODE*
	14	Ø4,8			XR0202070
	14	Ø3			XR0202090

* Please quote the order code when ordering a spare part. You may order parts from your local Authorised Servicing Centre.

Weight and overall dimensions 4.2.3



DIMENSIONS	WITHOUT PACKING	WITH PACKING
Height (<i>h</i>)	cm. 40	cm. 50
Width (<i>l</i>)	cm. 20	cm. 41
Depth (<i>p</i>)	cm. 18,5	cm. 36
Weight when empty (without water)	kg. 7	kg. 10

CHAPTER 5: TRANSPORT AND MOUNTING

5.1 WARNING



To prevent any injury to persons or damage to things always proceed with the utmost care and attention when mounting the machine. Observe all the precautions and instructions contained in the following paragraphs.

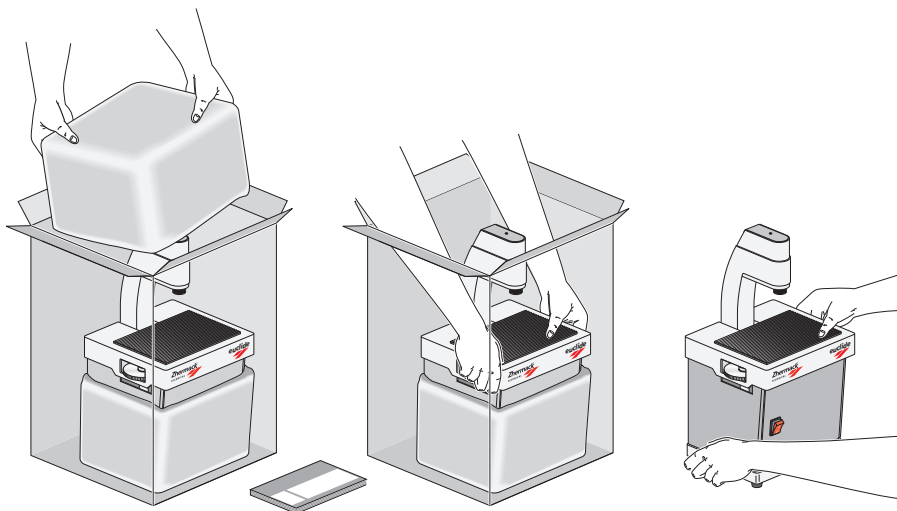
5.2 PACKING AND UNPACKING

All the material is thoroughly checked by the Manufacturer prior to shipment. When you receive the goods make sure they have not been damaged during transit and that no-one has tampered with the packaging and removed any of the parts contained therein.

Should you note any damage or missing parts please inform your Dealer and the shipping carrier immediately: take photographs and send them on to both dealer and carrier.

The packaging, consisting of a cardboard box with internal expanded plastic padding, contains:

- the **euclide** plaster drill;
- the accessories (see section 4.2.1);
- this Use and Maintenance Manual.



It is recommended that you keep the original packaging so that, if necessary, it can be re-utilised; doing so ensures that you do not use unsuitable packaging materials during transport and mounting which might lead to accidental damage (see section 5.3).

TRANSPORT AND MOUNTING 5.3

If it is necessary to move the machine, you must:

1. Dis-connect the machine from the electrical system;
2. Grip the machine from the bottom, making sure that you always keep it vertical. Take the weight and overall dimensions of the machine into careful consideration before moving it (see section 4.2.3) so as to prevent the damage that might result from inobservance of size/weight.
3. Pack the **euclide** plaster drill in its original box or, if this is not possible, take all the necessary precautions to protect the machine against knocks or drops, in that the goods are transported at the owner's risk.

Failure to observe the above exonerates the Manufacturer from any liability concerning machine malfunction and consequently renders the Warranty null and void.



When shipping/delivering the machine to your Authorised Servicing Centre always enclose a copy of the purchase document and a copy of the properly compiled ID form.



If the unit is to be transported by courier, the postal service or rail it is recommended such shipments be insured.

**ELIMINATION / DISMANTLING 5.4**

When disposing of the **packaging materials** the user must comply with the standards in force in his/her country regarding the following materials:

- Wood/paper: non-polluting materials, but must be recycled properly.
- Polystyrene/plastic: pollutants which must not be burnt (toxic fumes) nor dispersed into the environment, but disposed of in compliance with the standards in force in the country of use.

If the machine is to be **dismantled** the user must, in compliance with EC directives and the laws in force in the country of use, effect elimination and recycling of the following materials:

- Plastic and glass parts, insulated electrical wiring, rubber parts.
- There are no toxic or corrosive parts.

This product must not be disposed of as household waste but rather, when no longer used, must be collected separately according to EC Directive 2002/96.



CHAPTER 6: INSTALLATION AND FIRST-TIME USE

6.1 WARNINGS AND PRECAUTIONS

Before proceeding with installation make sure that all relevant safety conditions prevail and follow the instructions below carefully.



So as to provide greater clarity the numbers given in the diagrams in this chapter correspond exactly to the numbering in the Components Table (Ch. 3).

6.2 PERMITTED AMBIENT CONDITIONS

Unless stated otherwise at the time of order the machine will be configured to operate properly under the following ambient conditions:

Place of Use	Indoors
Altitude	Up to 2000 m
Working temperature	From 5°C to 40°C
Humidity	Max 80%

Ambient conditions other than those listed above may cause malfunctions or sudden breakdowns. Lighting in the installation area must be sufficient to provide good visibility at every single point on the machine.

More specifically, luminosity must not be less than 200 lux, lighting must be as uniform as possible and there must be no reflected light as this could dazzle the operator.



The machine must not be used in workplaces having an atmosphere which is explosive and/or at risk of fire as it has not been designed for use in such areas. Nevertheless, should a fire accidentally break out follow the procedure described in paragraph 2.4.



Work area lighting is an important factor in both personnel safety and the ultimate quality of the work being done. In Italy lighting must comply with a Ministerial Decree Law that clearly defines minimum lighting requirements. In other countries lighting requirements form part of the accident prevention and workplace hygiene standards.

6.2.1 Aspiration

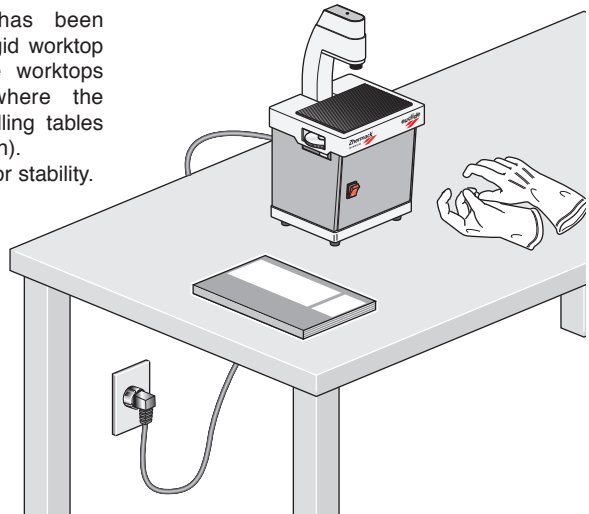
The **euclide** plaster drill requires no special aspiration device as the plaster dust or resin swarf produced during drilling of the models is gathered in the waste collection tray.

REQUIRED WORK SPACE 6.3

Choosing a good workplace with an appropriate amount of space available for machine installation is an essential factor in personnel safety, the quality of the work and proper maintenance. This zone must not only be spacious enough to allow for optimum machine operation but must also be well illuminated, aired, not dusty and not exposed to direct sunlight. Note also that the unit must be positioned so the connection plug can be handled/manipulated with ease.

Worktops 6.3.1

The **euclide** plaster drill has been designed for operation on a rigid worktop parallel to the floor. Suitable worktops include service furniture (where the operator is standing) or modelling tables (where work is done sitting down). All worktops must be checked for stability.

**CONNECTING UP TO THE POWER SUPPLY 6.4**

The user must provide a power connection with relative socket near the machine installation point. The user must also install an adequate electrical circuit breaker upstream from the socket as well as efficacious overload/indirect contact safety devices.

Connection is effected via the safety plug (16A in compliance with European standards) at the end of the power lead: this must be inserted in the mains socket.

When connecting check:

- that mains voltage and frequency are as indicated on the identification plate (incorrect power supply voltage may damage the machine);
- that the mains supply has a proper, efficient earth connection.

It is forbidden to tamper with the power lead and its plug.

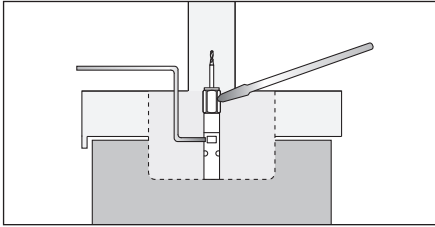


A proper earth connection is compulsory. Should it temporarily be necessary to use an extension lead the latter must comply with the standards in force in the country of use.

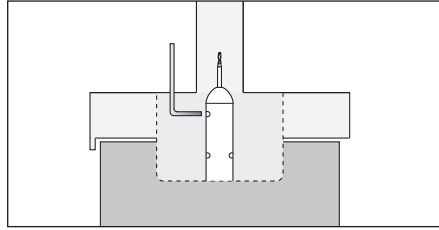


6.5 ASSEMBLING THE BIT

The **euclide** plaster drill is supplied without the drill bit assembled and the rubber mat without holes. Bit assembly varies according to the type of precision chuck.



Pincer locking system (follow the instructions in section 6.5.1, especially Fig.2).



Fixed locking system (follow the instructions in section 6.5.2, especially Fig.6).



When assembling the bit make sure that the plug is disconnected from the mains socket.
Follow the instructions below carefully.

6.5.1 Pincer lock system

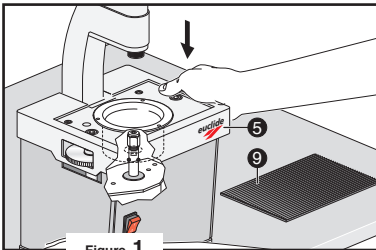


Figure 1

Fig. 1: Remove the rubber mat (9); lower the mobile support top (5) until the bit-holding chuck is completely free.

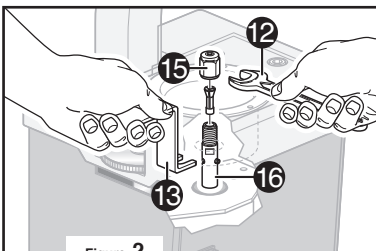


Figure 2

Fig. 2: Lock the chuck shaft (16) with the n°10 wrench (13) and release the chuck lock (15) with the n°14 wrench (12).

Fig. 3: Insert the bit (14) in the chuck and lock it in place by re-tightening the stay (15) with the n°14 wrench (12) (see Fig. 2). Then release the mobile support top (5) and reposition the rubber mat (9).

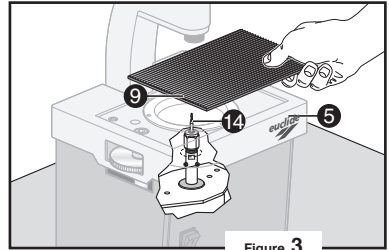


Figure 3

Fig. 4: To make bit assembly even easier it is possible to remove the mobile top (5) and re-insert it after assembling the bit.

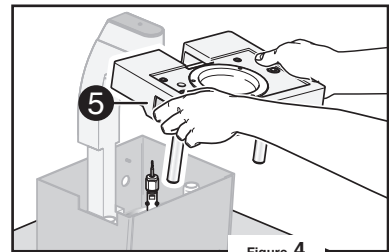


Figure 4

When reinserting the mobile top (5), it is essential that you align the two slide guides in their seats and check that the bit is assembled on the chuck with the hole at the centre of the dust/swarf tray: failure to observe the above could cause the just-inserted bit to break immediately.



Failure to observe any of the above installation instructions may lead to malfunctions and render the warranty null and void.



Fixed locking system 6.5.2

Fig. 5 : Remove the rubber mat (9); lower the mobile support top (5) until the bit-holding chuck is completely free.

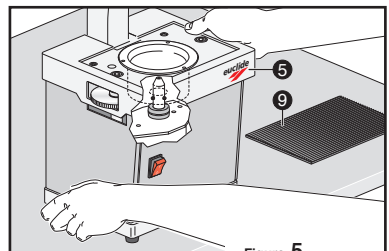


Figure 5

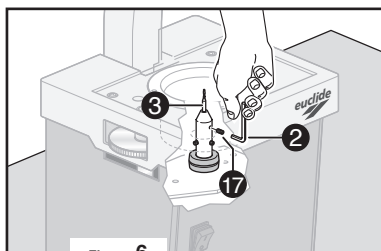


Figure 6

Fig. 6: Unscrew the lock grub (17) with the supplied Allen key (2). Insert the bit in the chuck and lock it in place (3). Release the mobile support top (5) and reposition the rubber mat (9) (see Fig.3). To make bit assembly easier the mobile top (5) can be removed and reinserted after fitting the bit (see Fig. 4).



Never unscrew the three chuck grub screws which hold the chuck to the drive shaft: doing so could put the shaft out of alignment.

6.6 FIRST-TIME USE

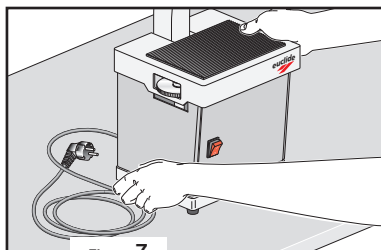


Figure 7

Fig. 7: After assembling the bit properly, set the unit down on the horizontal work top (see section 6.3.1).

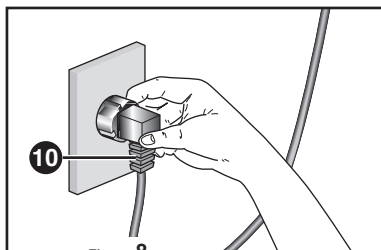


Figure 8

Fig. 8: Connect the power lead (10) to the mains: follow the instructions in section 6.4.

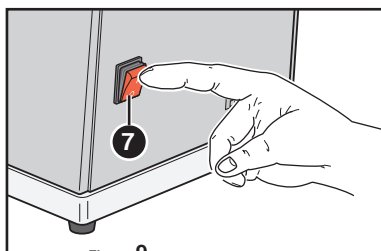


Figure 9

Fig. 9: Press the main switch (7).

ADJUSTING DRILLING DEPTH 6.7

Fig. 10: Push the mobile support top (5) slowly downwards so as to create a hole in the rubber mat (9). Once the hole has been made release pressure on the top and switch off at the main switch (see Fig. 9).

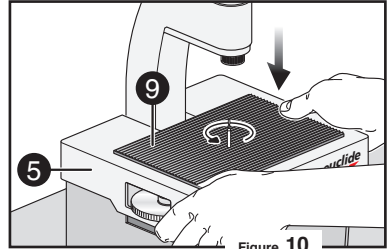


Figure 10

Fig. 11: With the unit switched off lower the mobile top (5) as far as it will go by turning the drilling depth adjuster (6).

Make sure that the length of bit which protrudes from the rubber mat corresponds to the desired drilling depth (i.e. desired depth of hole). The protruding length of bit can be modified by acting on the adjuster wheel (6).

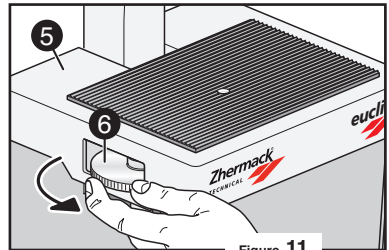


Figure 11

Fig. 12: If, with the bit adjuster wheel (6) at its limit stop, protrusion is still insufficient or excessive act on the chuck to lower or raise the bit.

When you have completed adjustment of the bit switch on at the main switch (see Fig. 9).

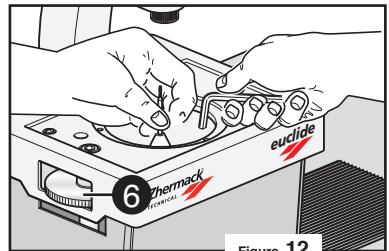


Figure 12

Failure to observe any of the above installation instructions may lead to malfunctions and render the warranty null and void.



6.8 PURPOSE OF THE MACHINE

The **euclide** plaster drill has been designed to:

- apply the "Dowel Pins" technique.

6.9 IMPROPER USE / FORBIDDEN USE



Using the machine for any purpose other than that described in section 6.6 (Purpose of the Machine) shall be considered improper and thus forbidden.



Improper use renders the Warranty null and void and **Zhermack S.p.A.** shall not be liable for any damages to objects, workers or third parties.

The main reasons for which the Warranty may be rendered null and void are given in section 2.2 and in the "Warranty Certificate" enclosed with this Manual.

CHAPTER 7: USING THE MACHINE

WARNING 7.1

To ensure that work is done in absolute safety always make sure that you follow the described procedures with caution.



To provide greater clarity the numbers given in the diagrams in the following paragraphs correspond exactly to the numbering in Chapter 3 in the "Machine Description" section.



SAFETY SYSTEMS 7.2

To ensure optimum working reliability, **Zhermack S.p.A.** employs only top quality materials and components for the manufacture of the machine. The machine is also thoroughly tested before delivery.

All materials are of only the highest quality and are checked on arrival at our plant, during storage and when they are used so as to guarantee a product that is free from damage, deterioration and/or malfunctions.

In particular, the **euclide** plaster drill has an electrical safety system consisting of a protection fuse (fitted on the rear of the machine) designed to protect both the operator and the machine itself from any overloads.

PREPARING THE MODEL 7.3

To ensure that the **euclide** plaster drill performs well the model must be prepared properly. Proceed as follows:

1. mix the modelling plaster or resin.
2. pour the prepared mix into the mould but without constructing the horseshoe-shaped support.
3. once it has hardened eliminate the excess plaster (or resin) until you have a horseshoe-shaped model. The model should have a base at least 1.5 mm thick.

Pay special attention to the base of the model: make sure that it is perfectly flat.

If the base is uneven/irregular in a way that stops the model resting evenly on the top the model or bit could break during drilling.



7.4 USING THE PLASTER DRILL: DRILLING THE MODEL

After preparing the machine for use (see section 6.6) and preparing the model (see section 7.3), proceed as follows:

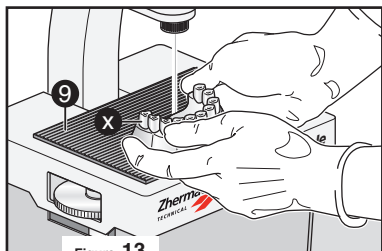


Figure 13

Fig. 13 : Switch on the plaster drill at the main switch (see fig. 9).

Position the work model on the rubber mat (9). Keeping it in perfect contact with the mat with both hands, shift the model so that guide light coincides with the point at which you wish to drill the hole.

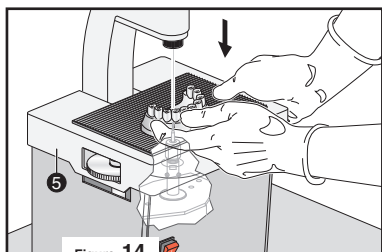


Figure 14

Fig. 14: Pressing the mobile support top (5) slightly downwards switches on the drill bit motor.

Increase downward pressure until the mobile support top (5) will go no further, thus drilling a hole in the lower part of the model.

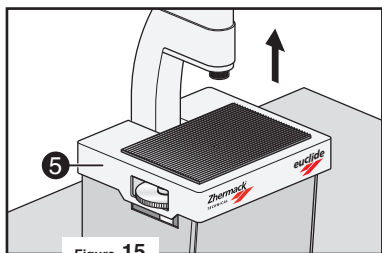


Figure 15

Fig. 15: Release downward pressure on the top (5): a pair of springs brings it back to its home position, switching off the machine.

Repeat the procedure for each pin you wish to insert in the model.



With this technique it is compulsory to insert a dowel pin or two position plugs in the free saddles too.

7.5 COMPLETING THE MODEL

After drilling the holes with the **euclide** plaster drill the dowel pins must be inserted. We recommend that you secure the pins inside the holes using liquid cyanoacrylic adhesive (self-activating or activatable) with minimum thickness. After securing all the pins and the position plugs, isolate the horseshoe-shaped model with

an appropriate insulating liquid and cast the horseshoe-shaped support in plastery material. After complete hardening of the horseshoe-shaped support, square the model (we recommend use of the SQM) and separate the dowels (TALETE hacksaw recommended).

***euclide* plaster drills allow the user to obtain removable dowel pin models with all the pins perfectly parallel.**



Proper separation of the dowels (try to ensure that gaps are parallel to each other and the pins themselves) gives models of maximum precision and practicality.

RESIDUAL RISK 7.6

Residual risk is:

- a danger that cannot be completely eliminated through design and application of safety devices.
- a potential danger which cannot be highlighted.

Residual risks on the ***euclide*** plaster drill are linked to the following situations:

- **accidental contact with the working drill bit could cause cuts to hands.**
- **when work is carried out on the machine interior by unauthorised personnel or with the plug connected to the mains.**



To prevent accidents always observe the instructions in this manual. Should you have any doubts at all please contact the Manufacturer or your Authorised Servicing Centre.



The above residual risks are highlighted by the on-machine labels as described in paragraph 3.3.1.

CHAPTER 8: MAINTENANCE

8.1 CLEANING

The machine exterior can normally be kept clean just by wiping it with a dry cloth. If necessary, wet the cloth just a little water or use a non-degreasing detergent.

The operator must ensure that the machine is kept clean and free from any foreign bodies such as dirt, water, non-conducting liquids etc..

Cleaning should be carried out at the end of every work session and must be done with the machine switched OFF and stable.

To clean the dust/swarf tray proceed as follows:

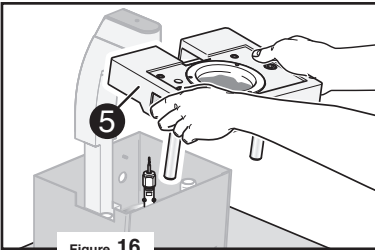


Figure 16

Fig. 16: Remove the rubber support top (9). Remove the mobile support top (5) by sliding it upwards, taking care not to break the bit. Empty the dust/swarf tray. After emptying the tray reposition the mobile support top (5), making sure that the two lower pins are housed in their guides.



Before cleaning the machine exterior always turn the main switch to OFF. It is strictly forbidden to clean the machine while it is connected to the mains power supply.



Never use inflammable, corrosive, alkaline or toxic liquids when cleaning the machine.

8.2 ROUTINE MAINTENANCE

Once the machine has been cleaned (see section 8.1) the operator must check for worn, damaged or loose parts. If any such anomalies are discovered contact your Authorised Servicing Centre.



Should any of the above anomalies be discovered it is strictly forbidden to restart the machine before such faults have been set right.

More precisely, should the operator note any defects or problems of any kind whatsoever he/she must place a warning sign on the machine indicating that maintenance work is in progress and that using the machine is forbidden (EC-compliant signs can be purchased from the relevant suppliers).

Routine maintenance, cleaning and proper machine use are essential factors in guaranteeing long-lasting machine performance and safety.

Machine safety devices/guards must never be removed except for repair and maintenance purposes. Such items must be replaced as soon as the situation which led to their removal no longer exists and in any case before the machine is used again.



UNSCHEDULED MAINTENANCE 8.3

Unscheduled maintenance includes repair of any accidental breakage and replacement of worn or malfunctioning parts.

All electrical and mechanical work must only be carried out by an authorised *Zhermack S.p.A.* maintenance technician.



Modifications which alter the machine characteristics from a safety and risk prevention viewpoint may only be made by the Manufacturer who shall then issue a certificate stating that the machine conforms to safety standards. Therefore any modification or maintenance tasks not actually described in this manual are to be considered forbidden. If the machine is modified, tampered with or repaired by unauthorised personnel or non-original spare parts are used the manufacturer is relieved of all responsibility. If a maintenance task is required but is not described in this manual you must contact an Authorised Servicing Centre.



RESTARTING AFTER A LONG PERIOD OF INACTIVITY 8.4

Should the machine need to be restarted after a particularly long period of inactivity proceed as described in Chapter 6 (First-time Use).

If there are any faults or malfunctions proceed as described in Chapter 9 (Troubleshooting). If the problem persists or is not covered by the information in this chapter contact your Authorised Servicing Centre immediately.

REQUESTING TECHNICAL ASSISTANCE 8.5

To obtain technical assistance choose one of the following options:

1. contact your Authorised Servicing Centre.
2. telephone the ***Zhermack S.p.A.*** Customer Assistance Service on the number **+39 0425.597.611** and proceed as follows: give personal data (e.g. address and telephone n.), state the information on the equipment ID plate (see paragraph 3.3) and explain the problem clearly.
3. fax all the above information and a properly filled out ID Form (see Appendix 2) to **+39 0425.53.596**.

CAPITOLO 9: TROUBLESHOOTING

9.1 WARNING



Should any of the anomalies described below occur try setting the situation right, as far as is permissible, by following the instructions contained in this manual. Should the problem persist contact your Authorised Servicing Centre.

9.2 PROBLEMS, CAUSES AND REMEDIES

PROBLEM	CAUSE	REMEDY
Bit breaks.	<ol style="list-style-type: none"> 1. Incorrect squaring of the model (model base not flat or uneven). 2. Lateral movement during drilling. 	<ol style="list-style-type: none"> 1. Square the model properly (lateral movement during drilling). 2. Grip the model more firmly during drilling.
Model breaks.	<ol style="list-style-type: none"> 1. Model not fully hardened. 2. Model base too thin. 3. Lateral movement during drilling. 	<ol style="list-style-type: none"> 1. Allow the model to harden properly. 2. Make the model base thicker. 3. Prevent lateral movement during drilling.
Dowels not parallel.	<ol style="list-style-type: none"> 1. Incorrect securing of pins (hole in the model probably too big for the pin head). 	<ol style="list-style-type: none"> 1. Use bits and pins of same diameter.

APPENDICES

CE DECLARATION OF CONFORMITY **A.1**

WARRANTY CERTIFICATE AND IDENTIFICATION FORM **A.2**

MAINTENANCE AND REPAIR WORKSHEET **A.3**

AUTHORIZED SERVICE PARTNERS **A.4**

NOTES **A.5**

A.1 DECLARATION OF CONFORMITY CE

The Manufacturer:

Zhermack S.p.A.
Via Bovazecchino, 100
45021 Badia Polesine • RO • Italy
Tel. +39 0425 597 611 • Fax +39 0425 53 596

Declares that the equipment described below:

EUCLIDE

Conforms to the legislative dispositions established in the following laws:

- EC Directive 2004/108 EC (EMC Directive) and subsequent amendments.
- EC Directive 2006/95 (Low Voltage Directive) and subsequent amendments.
- EC Directive 2006/42 (Machinery Directive) and subsequent amendments.

Please note that manufacturer's liability for damages caused by a defective product expires 10 years from the date in which the manufacturer put such product on the market and that such liability is transferred to the user as stated in EC Directive 85/374.

Badia Polesine, 29/12/2009

Tiziano Busin
Managing Director



WARRANTY CERTIFICATE AND IDENTIFICATION FORM **A.2**

1. This document certifies that the Manufacturer has built the product correctly using only top quality materials, carried out all the necessary tests and that the product complies with EC directives. This product Warranty is valid for 12-months as from date of delivery to the customer. Proof of such date shall be provided by a purchase document or the completed identification form. These documents must be handed over together with the equipment to the Servicing Centre. Persons wishing to make use of warranty coverage must make the fault known within eight days of its discovery as per Italian civil code art. 1495. Warranty cover is limited to replacement or repair of individual components or pieces with manufacturing defects and does not cover costs related to transfer of technical personnel, transport, packing etc. Breakdowns, faults or damages which derive from poor maintenance, incorrect power supply, negligence, inexperience and other causes not imputable to the Manufacturer and parts subject to normal wear are not covered by the Warranty. The Warranty does not cover breakdowns caused by failure to carry out routine maintenance or customer negligence. This Warranty does not provide for any awards for direct or indirect damages of any kind caused to persons or things by any equipment inefficiency.
2. The Warranty is instantly rendered null and void if the equipment is repaired, modified or tampered with by the purchaser or any unauthorised third parties. Responsibility for damages caused by defective products expires 10 years after the Manufacturer puts them on the market: after such time damages are the user's responsibility, as stated in EC Directive 85/374.
3. To have work carried out under Warranty the purchaser must only contact the retailer, the Manufacturer-authorized servicing centres, or the Manufacturer. The Warranty entitles the purchaser to free replacement of defective parts. It does not entitle the purchaser to replacement of the entire equipment.
4. In the event of disputes over application of the Warranty, the quality or condition of the equipment, the purchaser shall not suspend payment or delay payment of the price or price instalment.
5. The purchaser shall not be entitled to damages for any loss of production.
6. The Warranty is rendered null and void if:
 - a. the equipment is damaged by a fall, exposed to fire, spilt liquids, lightning, natural disaster or any other cause not imputable to the Manufacturer.
 - b. installation has not been carried out properly.
 - c. power supply is incorrect (e.g. rated mains voltage incorrect). Erroneous mains connection (rated mains voltage incorrect), or failure to install proper protection devices.
 - d. the serial number has been removed, cancelled out or altered.
7. Any components to be replaced under the terms of the Warranty shall be sent back to **Zhermack S.p.A.** which shall then send the appropriate spare parts. Should the changed part not be replaced it shall be charged to the person who ordered it.
8. The Manufacturer and the Dental Deposit are not required to provide replacement equipments while repairs are carried out.
9. Spare parts shall, for tax purposes, only be provided under warranty where the relevant limitations set out in the terms and conditions of the warranty are observed.
10. For any other eventuality not provided for by this Warranty Certificate and the regulations consult the Italian Civil Code.
11. Labour, travel and call-out invoices must be paid for on their receipt.
12. The manufacturer and the dealer shall comply with all data processing laws, including proper observance of data security standards in compliance with the specifications given in the data processing information sheet.

IDENTIFICATION FORM

MACHINE MODEL:	MACHINE SERIAL NUMBER:
PURCHASER:	ADDRESS:
TOWN / POSTCODE:	TEL:
TAX CODE / VAT NUMBER RETAILER:	RETAILER:
	PURCHASER'S SIGNATURE:



Zhermack S.p.A. - Via Bovazecchino, 100
45021 Badia Polesine (Rovigo) Italy
Tel. +39 0425 597 611 - www.zhermack.com

