COMPACT MT5

Key Cutting Machine

User Operation Manual

MUL-T-LOCK®

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Israel

Machine № 800207

First Edition

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1. Introduction

This manual is intended as a practical guide for correct, safe use and proper maintenance of the machine.

It is important to carefully read the manual before operating the machine. Doing so will ensure proper use of the machine and prevent accidents that may occur during work or maintenance.

As **MUL-T-LOCK® Ltd**. continuously develops its machines to their maximum potential, this manual, though completely up to date when issued, is subject to future changes.

The machine serial number is marked on the machine label.

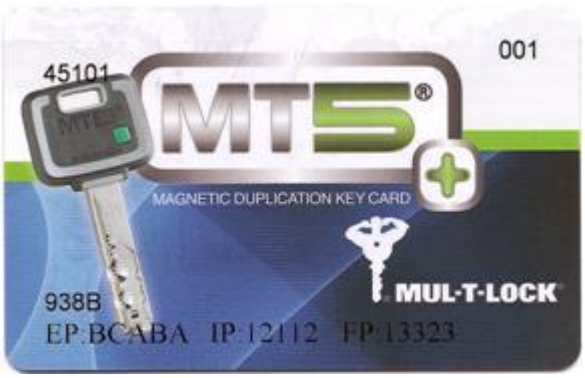
1.1. Massage From MUL-T-LOCK® Technology Ltd:

The MACHINE represents a new generation of high efficiency key cutting machines. As a world leader in the field, **MUL-T-LOCK® Ltd**. takes the pride in providing the best quality, and the most efficient high security products, for locksmiths.

The machine offers fully automated CNC technology. The machine is delivered to your premises fully pre-programmed and calibrated. It is suitable for cutting of all previous platforms of **KC5 and KC5+** key types.

1.2. Terms of Usage:

The right and License to cut keys for **MUL-T-LOCK® Ltd**. products is subject at all time to the terms in the agreement between the buyer of the **Key Cutting Machine** and **MUL-T-LOCK® Ltd**. Refer to yours agreement.



1.3. User Language Translation:

After purchasing the machine from **MUL-T-LOCK® Ltd**. the buyer can contact **MUL-T-LOCK® Ltd**. **Service Department** and ask for the permission to translate this manual to the user language.

The request shall send in filled form that can be received from **MUL-T-LOCK® Ltd**. **Service Department** (tech.support@mul-t-lock.com).

The form is simple and concerning copyrights only. After receiving the filled and signed form, we will send to the buyer, by email, the file of this manual in two formats: a *file*. PDF for record and *Microsoft® Word file*.doc file to edit.

When translation complete the user must return by mail two copies: (a) *file.doc* (c) color printed file (hardcopy), and if you can another (c) copy of *file.PDF*

2. Safety Notices

2.1. Safety notes in manual

The following safety notations are used in this manual:

Operating procedures, practices and conditions, this must be strictly observed to prevent **equipment** damage or destruction.

Operating procedures, practices and conditions, this must be strictly followed to prevent **personnel** injury or death.

It is therefore vitally important to carefully read this manual before proceeding with start up, use, maintenance or any other machine jobs. The machine is equipped with all the safety devices necessary to ensure risk-free use under standard conditions.

Machine installation, maintenance and adjustment must be carried out in observance of all safety standards and in observance of all the precautions deemed suitable for each task. The operator must be qualified. He must have expert machine knowledge and must have read this manual.

Extreme care must be taken to ensure constant operator safety standard.

We advise strict observance of the work safety standard as defined by the relative authorities in each nation.

The makers cannot accept responsibility for damage to persons or objects resulting from inobservance of safety standard.

2.2. Safety notes for machine use:

The following safety practices must be complied with:

- **CAUTION** and **WARNING** notices posted on the machine and safety notes in this manual must be complied with.
- Only qualified and certified personnel may operate the machine and/or perform maintenance on the machine. Operating personnel must not remove covers or panels.
- Do not start the system if any safety cover is missing. Safety covers are located around the machine and around cutting tools.
- Ensure that all control panels and electrical panels are covered.
- When maintaining the system post highly visible warning signs.
- Before turning on the system, the operator must survey the machine doing the following steps:
- Perform a visual test of the system components (e.g. ensure that the equipment is properly placed; view any messages on the display, etc.).
- Verify that the system is not undergoing maintenance.
- The operator must always directly check for perfect operation of the emergency commands.
- Never leave the machine unattended when in use except in cases where this is allowed.
- During a pause in the work cycle, switch OFF the machine. During prolonged pause, turn the main switch to OFF and remove the machine key from the switch and take it with you.
- The machine may stop during work cycle for any number of reasons. Whenever this happened and the situation required access to the inside of the machine containing the electrical equipments and electrical connection, always set the general switch to OFF.

- MOVING PARTS – Moving parts may bruise and cut.

Keep away from moving parts

- Do not wear rings, wristwatches, or other jewelry while working on live electrical circuitry.
- Do not permit smoking or food in the working area.
- Replace and close all safety shields after completing set-up, troubleshooting and maintenance procedures.
- Report any unsafe conditions to the supervisor.
- Secure electrical wires and cables to prevent damage.
- Ensure that all personnel know the main power switch and main emergency switch locations and reaction ways in case of an electrical, mechanical and other emergency.
- Locate approved types of fire extinguishers near the equipment.
- Arrange the material to be worked in a rational manner so that it does not hinder the work cycle.

- **HOT SURFACES**: Some motors might be with **hot surface** after running, do not remove covers if unauthorized to and if cover was removed **do not touch**.

2.3. Safety notes concerning Maintenance

Don’t allow unauthorized personnel to carry out repair or maintenance or tools replacement tasks. Carefully read the use and maintenance instructions manual before starting or using the machine or effecting machine or plant maintenance or tools replacement tasks.

Use only **MUL-T-LOCK® Machinery Ltd** original spare parts, cutting tools and accessories supplied with the machine or purchased directly from **MUL-T-LOCK®** Ltd.

To avoid getting caught up in the moving parts area, do not repair, adjust or replace tools in the machine while in operation and /or main switch ON.

Stop the machine according to the procedures laid down in the use and maintenance instruction manual before carrying out other tasks.

Don’t use matches, the cigarette lighters or torches as a means of lighting during work on the machine.

Tools replacement in this manual is part of the Functional Description of this manual.

3. System Specifications

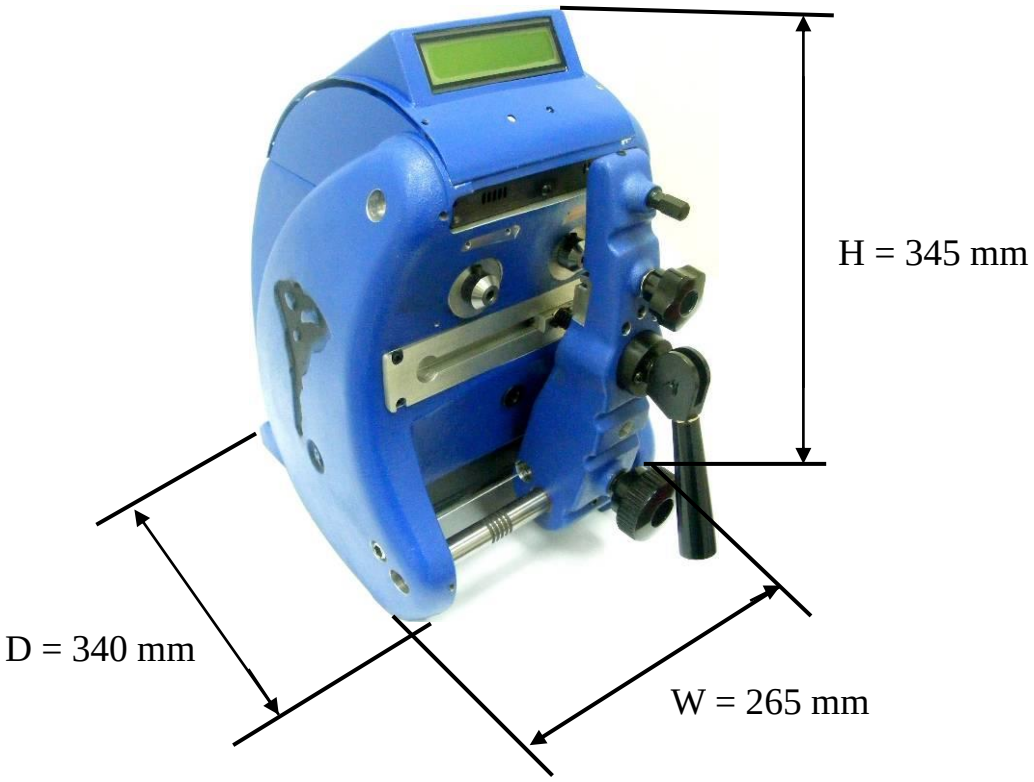
3.1. General

This manual describes the working process of the **Key Cutting Machine**. All machine components, their functional correlation, power requirements and other relevant descriptions are detailed and illustrated here to provide the operator with a thorough understanding of the system and of the correct maintenance and safety procedures, thereby minimizing machine downtime.

The machine is specially designed and manufactured by **Mul-T-Lock® Ltd.**

The machine is specially designed for the cutting of all MT5 and MT5+ key platforms of MUL-T-LOCK® Ltd.

3.2. Machine Layout and Measurements



Machine Dimensions

3.3. Weight

Machine (Net) weight: **22.5** Kg.

Packing Box (Tare) weight: **1.5** Kg.

Packed Unit weight: **24** Kg.

3.4. Service Environmental Requirements

We recommend arranging the working site in advance. Some requirements include future arrangements and we recommend the basic preparation for installation before machine arrive especially any work that generate dust.

3.4.1. Site Requirements and arrangement

The machine should be installed in a working area that provides adequate space for operation and maintenance of the machine.

3.4.2. Wall Sockets Power Supply Requirements

- The machine needs one wall electric sockets.
- Power Supply Requirements is: 1 PHASE – 220/110 Volts, 10 Ampere, 50/60 Hz.
- An electrician should check the ground in each socket.
- In case there is need for connecting an additional light, and/ or computer, another electric socket is required. Arrange minimum three-wall sockets.

3.4.3. Telephone lines:

The site should be including at least one telephone line, for telephone talking to the service personnel.

3.4.4. Internet Wall Socket:

It is highly recommended that the site shall include Internet socket for connecting to a Personal Computer (PC) for remote services purposes via the Internet. Internet could be via telephone line or TV cable. Consult your vendor.

3.4.5. Working Surface for the Machine:

The machine should be placed on a working bench. The operator can use a desk or a table; both must be rigid and stable to carry a load of approximately 150 Kg. Load the table and check its rigidity by slightly swinging. To rigid the table you can attach the table top surface to a wall. Use a table of suitable height of about 0.75 meter if you plan to use by sitting or about 1.00 meter if plan to use by standing.

Calculate the tabletop surface dimensions on the basis of the machine size Etc. Do not block ventilation shields at side of the machine.

Leave 200 mm free space for ventilation around machine and especially at right-hand side.

Also, arrange area to the power supply unit/box.

3.4.6. Vibration:

The machine vibration is low and no special arrangement is needed. If the operator fills any abnormal vibration he should stop the machine immediately.

3.4.7. Lighting:

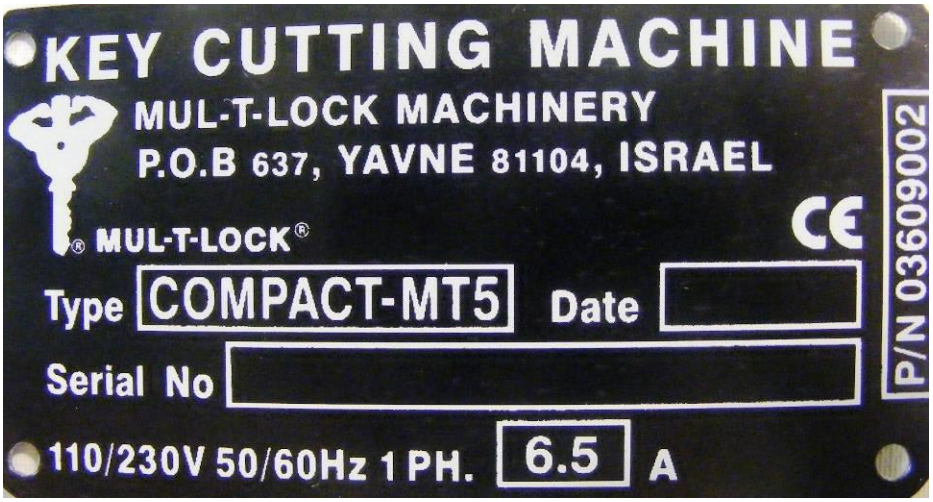
Install above the machine regular 100-Watt bulb light around 1 meter above the machine or add suitable strong light nearby. The machine has no internal lights. For tasks on the machine, such as: cleaning, or tools replacements, a stronger light is needed.

3.4.8. Seating:

Suitable seating must be arranged for the operator. Arrange the seat height according the desk or table and consider operator ergo metric parameters.

3.5. Machine Label

- Check the serial number of the machine. This number is uses for authrization upgrade.



Label

3.6. Noise level:

The machine noise level is low and normal.

The level is below 70 dbA.

The use of ear protection is not mandatory, but ear protection is recommended for prolong usage.

During running of the machine maximum 66-68 dbA found and 60-68 dbA seen. The noise level changes mainly according cutting tools condition.

Using of ears protection recommended especially for long working period.

4. Packing and Transporting

4.1. Safety notes for lifting and transport

The maker bears no responsibility for any damage to object or persons caused by non-compliance with the safety standards in force which concern lifting and movement of material within the user's premises.

Machine transfer and truck loading must only be carried out with the appropriate equipment as described in this section.

Always act with extreme care so as to prevent personal injury and damage to the machine or its individual parts.

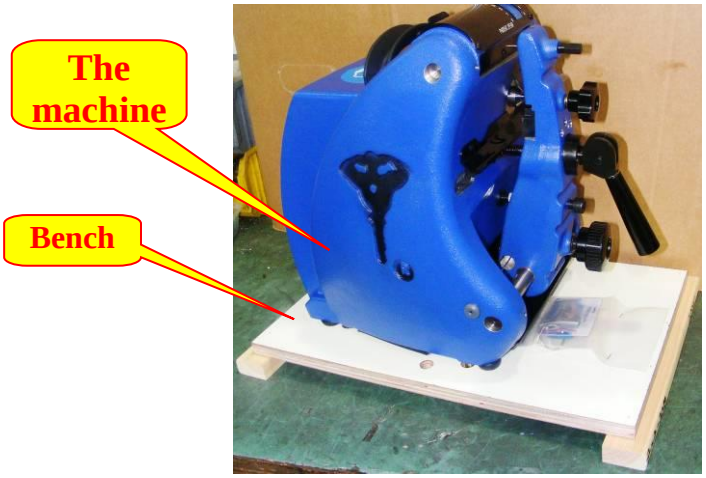
Personnel must keep clear from the suspended load and, in any case, keep out of the crane, forklift truck, (or other suitable lifting/handling equipment), work areas.

The transit lanes inside the factory where the machine is to be installed must be kept clear. The floor must kept clean and free from any obstacles which might make the forklift truck or crane "jump".

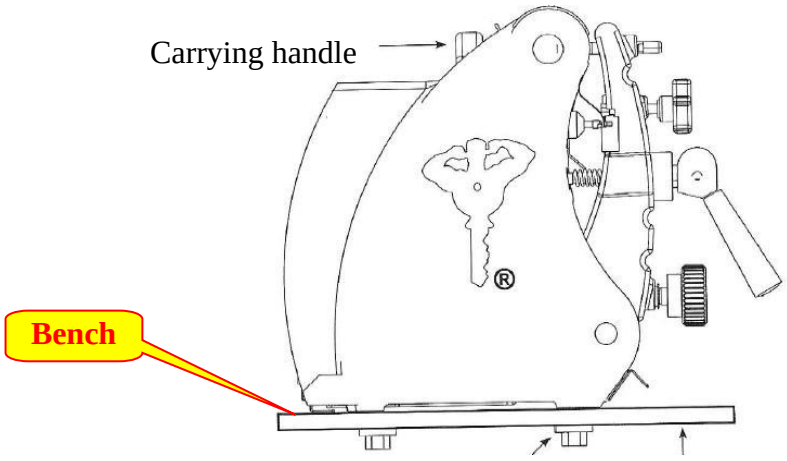
The load must always be securely fixed to a load-bearing part of the lifting and transport equipment, thus preventing any movement whatever the cause.

4.2. Packing Instructions

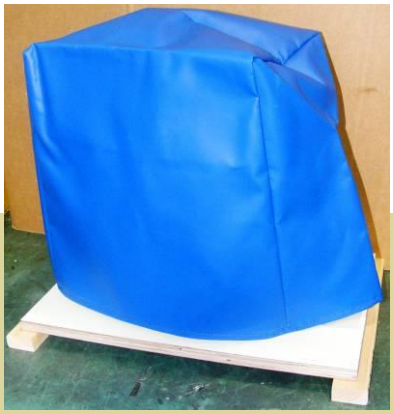
The machine is packed into wooden crate s ready-made to accommodate machine dimensions. After unpacking the machine store all packaging items for repacked the machine for shipment to the factory in the future, if necessary.



The machine stands on the bench.



Attach the machine to the bench with four screws.



Cover the machine with the blue plastic cover.

Place the cardboard cover over the machine.

MUL-T-LOCK® Ltd.

Compact MT5

Key Cutting Machine

S/N**:** _____

Mark the box with the sticker and add the serial number on it.

Components to be packed:

- Main Unit
- Power supply
- Accessories
- Documentations

Each unit shell packed as follows:

a. Wrap the packed unit with:
   - Layer of plastic sheet.
   - Layer of "Electrostatic free plastic sheet".
   - Stretch nylon sheet.

b. Add two "Desiccant Bag Insertion" between the plastic sheets.

c. Fix the wrapped unit to the crate base using: metal brackets that are attached to the base according to the wrapped machine configuration.

d. Ensure that the following are imprinted on the crate:
   - "Very Fragile", "Do not stack", "Avoid humidity".

   - Description of the crate content.
   - Full details of the crate destination.
   - "Lift from this side" - to indicate the lifting direction.

4.3. Transporting Instructions

WARNING

Please note that specialized personnel trained for this type of maneuver must conduct handling and lifting operations. Design the transportation concerning the dimensions of the package and the weight. Design and prepare the room for the machine concerning room dimensions and connecting to electricity and telephone line.

The machine may be delivered:

1. By road
2. By rail
3. By sea
4. By air

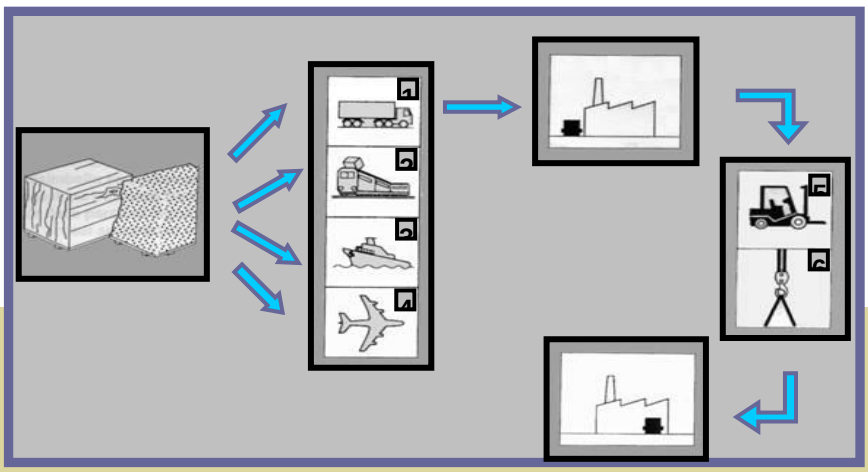
When the crate arrives at the user's site it must be handled with extreme care, outside and indoors, using suitable equipment for crate's weight.

1. Fork lift
2. Other mechanical means

These two tools are also suitable for the lifting and movement of the uncrated machine.

WARNING

Avoid hands handling, protect your back. If man work is a must, use minimum two workers together for handling.



4.4. Handling the Machine

4.4.1. When lifting and or moving the machine, it is absolutely necessary to respect the instruction in this manual of this machine, and all the safety instructions and local safety standard and regulations in force.

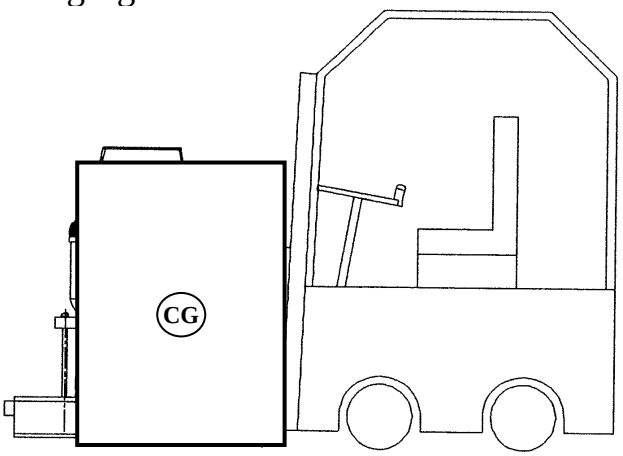
4.4.2. Only high qualified personnel allowed to lift and handling the machine.

WARNING

4.4.3. Before starting any handling procedure, check the total weight of the machine with or without packaging and then use appropriate, correctly positioned equipment to lift or moving the packed or unpacked machine as per the procedure specified below.

4.4.4. **Lifting the packed machine (s)**
(By means of fork lift truck or trans-pallet)

Insert the forks into the pallet in the position indicated in the following figure.



4.4.5. Primary equipment handling regulations:

4.4.5.1. Ensure that the lifting device is suitable for the load to be handled.

4.4.5.2. Open the lifting forks to the maximum required to correctly position them without damaging the pallet and/or the machine(s) itself.

4.4.5.3. Place the forks in the Center of Gravity position; witch does not always correspond to the center of the packed machine.

4.4.5.4. Before lifting the packed machine, ensure that the end of the forks protrude from the pallet. While moving the machine, keep it close to the ground.

4.4.5.5. Ensure that the area across which the load is moved is clear of objects, persons and animals.

4.4.5.6. Wear suitable, protective clothing.

WARNING

During the lifting procedure, the machine is in an incline position (3-5º on the heavier side towards the fork lift truck) since the centre of gravity has been shifted). However, this does not compromise the safety of the persons or of the machine itself. Avoid oscillations during this operation.

4.4.6. Moving and lifting the unpacked machine manually

WARNING

Before any manually moving or maneuvers of the machine in any way, ensure to disconnect the machine from the electric power supply by turning OFF the main switch and then disconnecting the machine main plug from its socket. The machine is heavy and it is highly recommended to move it by two persons.

4.4.7. Center of Gravity (CG) location

4.4.7.1. Hereinafter is a drawing top view of the unpacked machine with the location of the Center of Gravity (CG) of the machine.

4.4.7.2. The CG of the packed machine may vary from the unpacked machine.

4.4.8. Positioning of the machine

Carefully move the machine to its final location and lower to the bench and leveling.

4.5. Uncrating:

Proceed with extreme care when effecting the below uncrating procedure since some machine parts may be up against the wooden panels. Do not break, open the crate with sharp tools and do not perforate the crate panels.

- Remove the plastic/metal strip. Remove the cardboard cover.
- Remove the internal plastic cover and check that the content corresponds to the shipping list in the enclosed documents. Inform the carrier or the company immediately of any missing or damaged part. Use the machine handle to lift the machine. Place the machine on a suitable surface.
- Unscrew 4xM1 0 screws. Pay attention to the washers and spacers and collect them for future use.
- Store the machine container parts for future transportation. Mul-T-Lock Ltd. is not responsible for any damage to the machine, shipment for repair or replacement if shipped without the container.

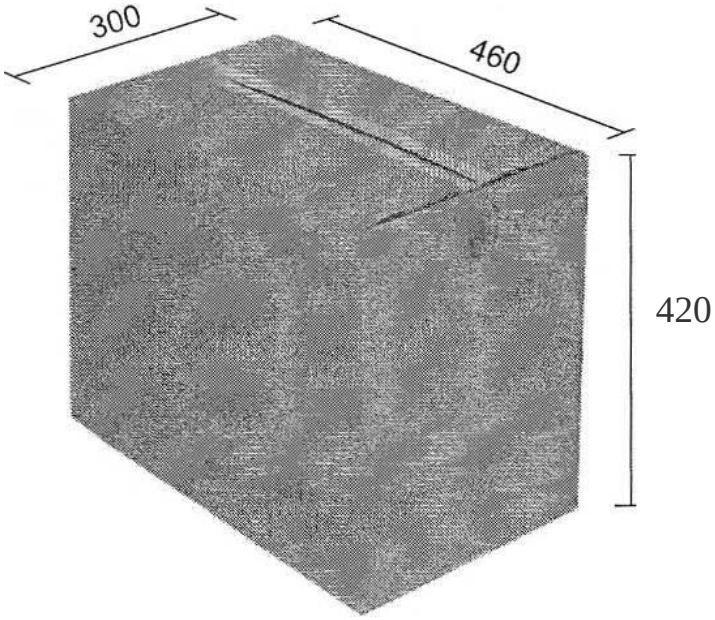
4.6. Packing dimensions:

Overall Dimensions:

Width - 300 mm

Depth - 460 mm

Height - 420 mm



4.7. Installation Zone Features

Make sure that the load-bearing capacity of the table or desk is suitable for machine overall weight.

Overall machine dimensions must be carefully considered to ensure rational installation. The machine should preferably be located in an area that gives access from all sides.

The work zone must be well lighted and equipped with telephone line, Internet connection and suitable electrical sockets. The latter should be in a protected position.

The electrical power supply cables and the telephone lines must be protected in such a way they do not get in the way of the operator.

4.8. Receiving Inspection:

The machine is fully inspected before shipments. After opening of the machine container the user must inspect the shipment as follows:

- Check that the machine is complete and intact. Make sure that no component was damaged or broken in transit.
- Check that your local electric voltage is compatible with the machine (110 Volts AC 60 Hz / 220 Volts AC 50 Hz).
- Check to package contains:

№	Description	Check
a.	Key Cutting Machine	
b.	Power Supply	
c.	Electric Cable /cord	
d.	Machine operation manual	
e.	Key for machine power switch	
f.	2.0 mm hexagonal (Allen) key	
g.	Φ 4.0 mm cutter	
h.	Engraver cutter	
i.	Fuse 6.3 Amp.	

Note:

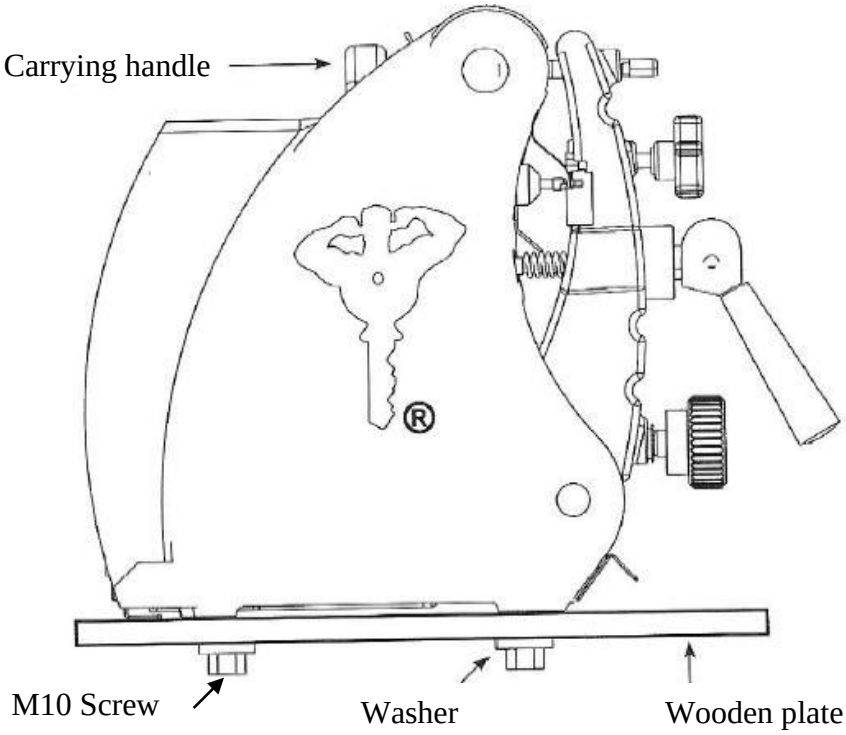
The electrical cable/cord supply but electrical outlets vary from country to country. The cable is standard 10 Ampere cable. Consult your local electrician for alternative.

4.9. Installation for mobile use:

The machine may be installed on vehicles for "on the road" locksmithing service. Anchoring and power supply should be carefully maintained in such a mobile application.

Installation:

Arrange a strong wooden surface, table or a shelf with a minimum thickness of 3/4" (19 mm). Drill 4x ½" (13 mm) holes in the surface at the best location, allowing a minimum space of 6" (150 mm) space at the back side for cooling air flow and for approaching the machine. Attach the machine with 4xM10 screw and washers (Φ10x18x2.2).



Note: Drill holes locations are according drawing at the end of this manual.

4.10. Electrical connection:

This machine is either 110 VAC or 220 VAC.

Note:

For car installation: 12VDC with suitable power inverter to 110 or 220VAC having continuous 300 watt power.

5. Functional Description

The key cutting machine is a CNC machine. The Machine includes a motor to activate the machine, a motor to activate the cutters and motor to activate the cutting depth.

The machine includes a PLC to control all movements of the machine.

To operate the machine the operator uses the MMI includes the LCD.

The Major Parts of the machine are:

- The Machine.
- Power supply

5.1. General

The machine is operated by a computerized operating system, following to the summarizing of the interface to the key cutting machine.

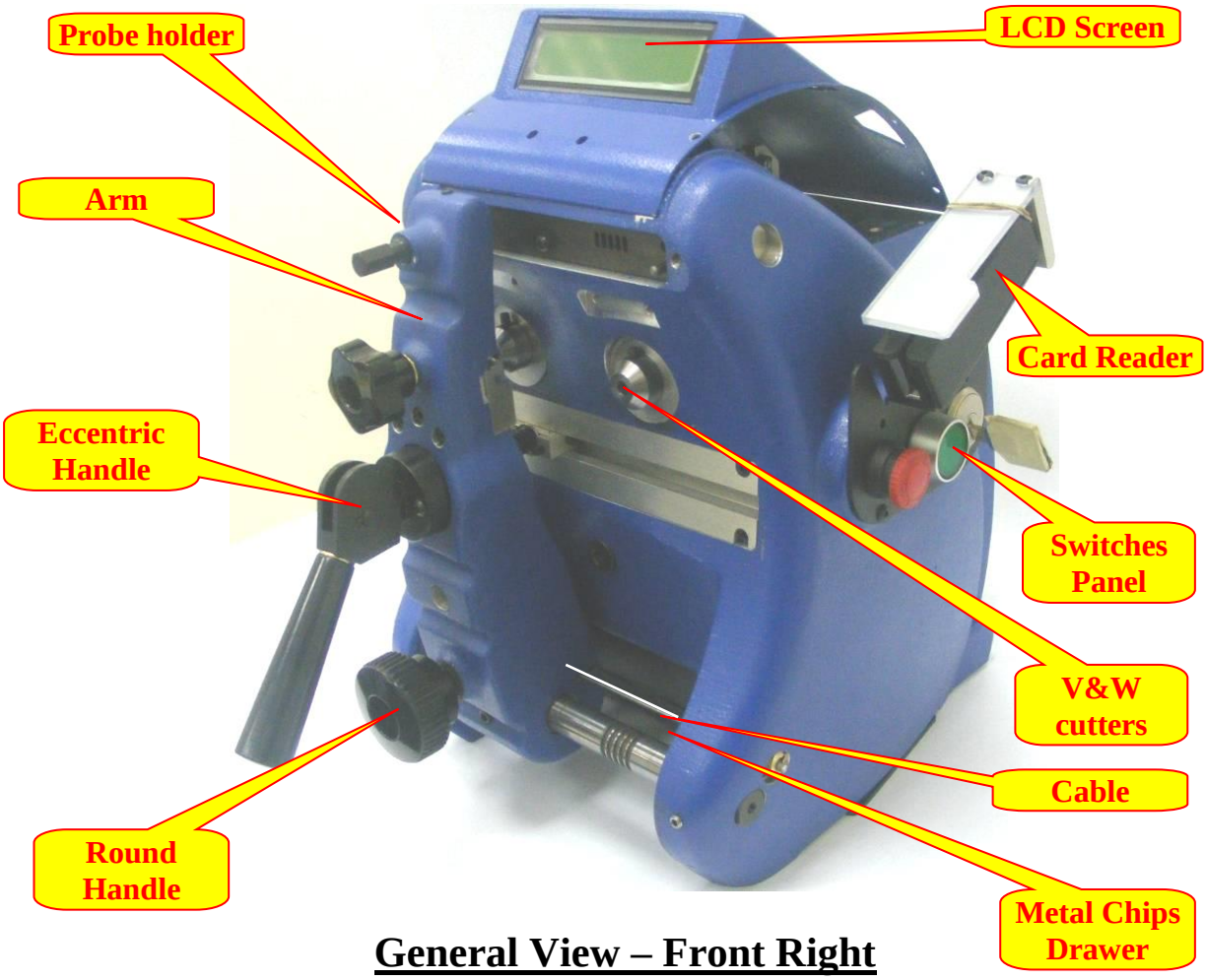
5.1.1. PLC

- The machine is operated by PLC. PLC's functions:
- To get the machine states from the sensors.
- To get commands, modes of operation from the card reader.
- To solve the logic in accordance with machine states, commands, operation modes and recipes.
- To count the information on product in the machine and to change it's position according to the manufacturing process.
- To send commands to the spindle motor, LCD display etc.

5.1.2. LCD:

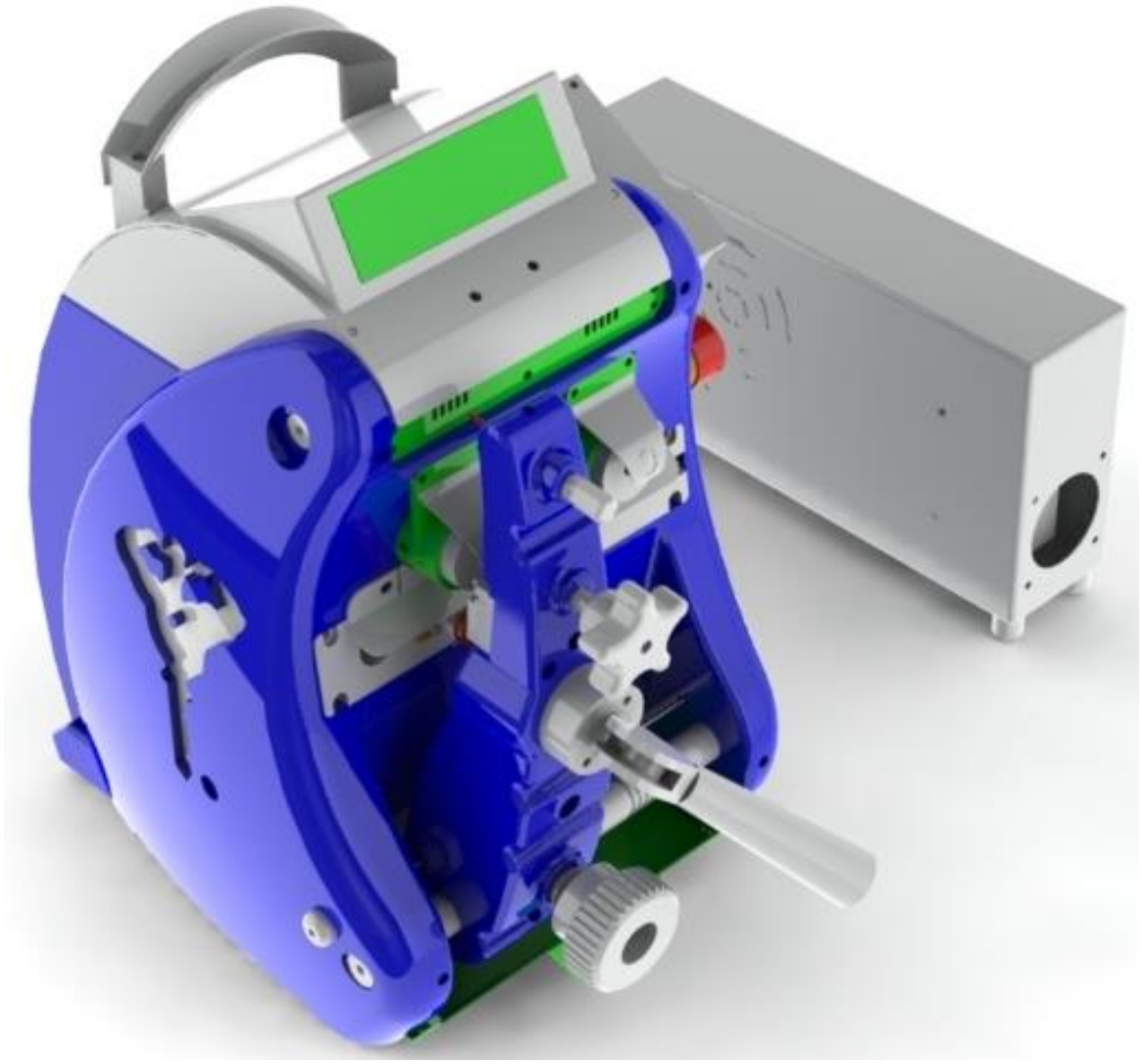
- To communicate with PLC and to get all necessary information about the machine and products states.
- To display the information on the LCD screen.

5.2. General Machine Views:

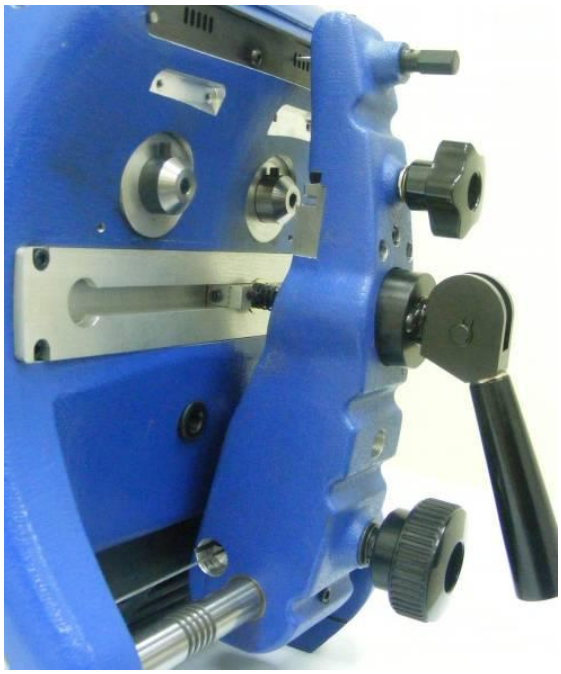


General View – Front Right

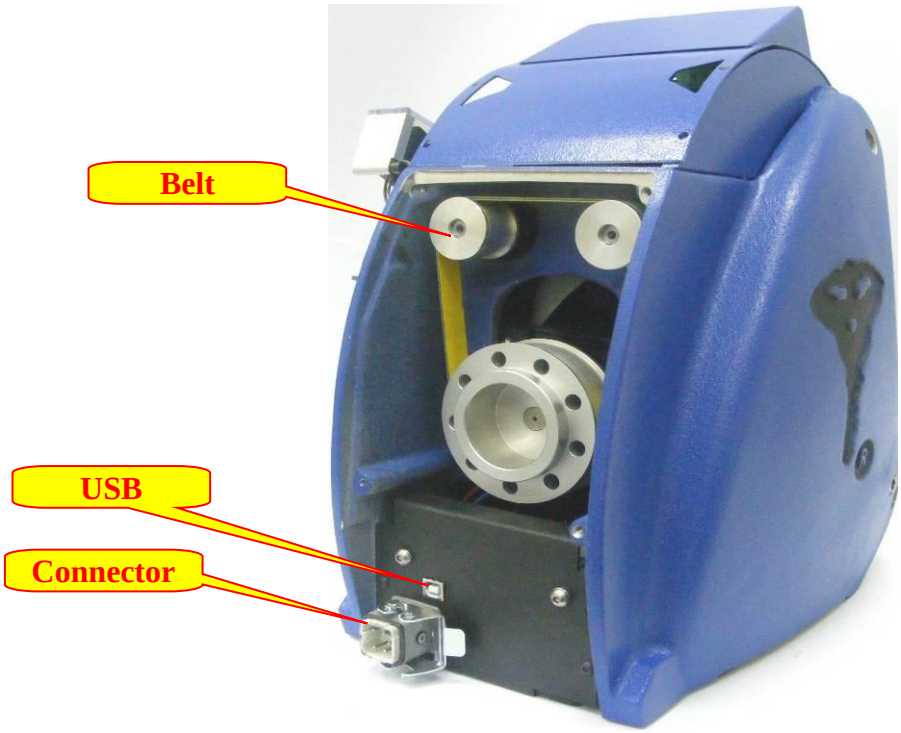
General View – Front Left



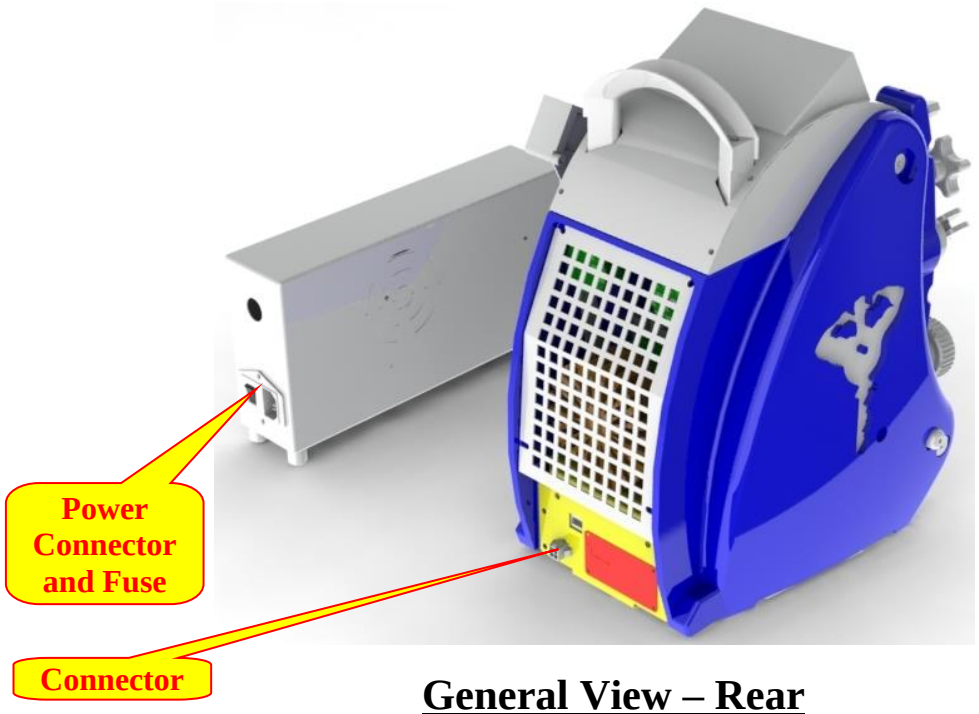
General View – Front Left



General View – Front Arm



General View – Rear

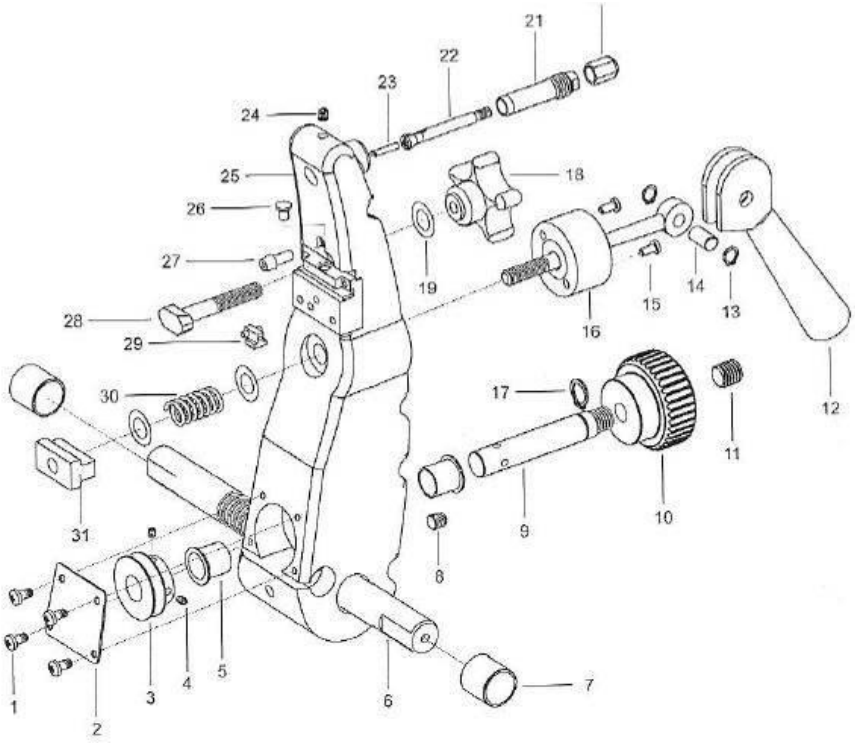


General View – Rear

5.3. Arm assembly:

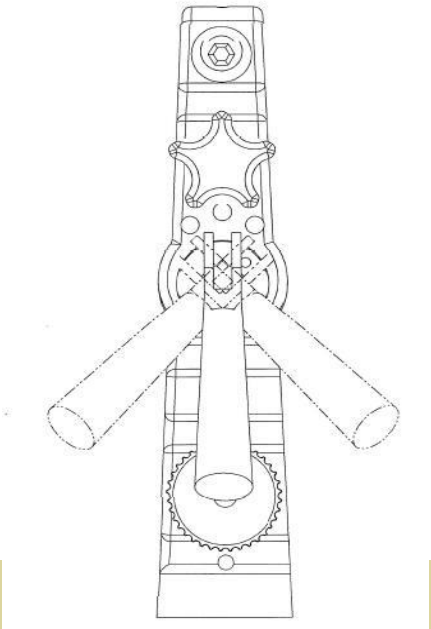
The arm is made of painted aluminum. The arm assembly slides on a shaft (6) enabling horizontal motion. The adjustable probe assembly (20, 21, 22 & 23) in the arm enables adjustment of the arm relative to the milling cutter and guides the arm to proper positions on the locating plates. The arm shaft is toothed, enabling exact location of the dimples. The arm has a vise for the key blank, an eccentric lever (12) for pushing the arm against the milling cutters, and a rotating knob (13) for sliding the arm from one dimple to the next.

For adjusting the probe, use special tool supplied with the machine.



No.	Part	No.	Part	No.	Part
1	Screw	12	Eccentric lever	23	Probe tip
2	Cover	13	Retaining ring	24	Probe locking screw
3	Cable pulley	14	Pin	25	Arm
4	Socket set screw	15	Screw	26	Pin
5	Bushing	16	Pressure coordinator	27	Special pin
6	Central shaft	17	Retaining ring	28	Holding bar
7	Bronze bushing	18	Clamping bolt	29	Stopper assembly
8	Screw	19	Handle ring	30	Spring
9	Cable wheel shaft	20	Probe nut	31	T - nut
10	Round handle	21	Probe housing		
11	Handle screw	22	Probe holder		

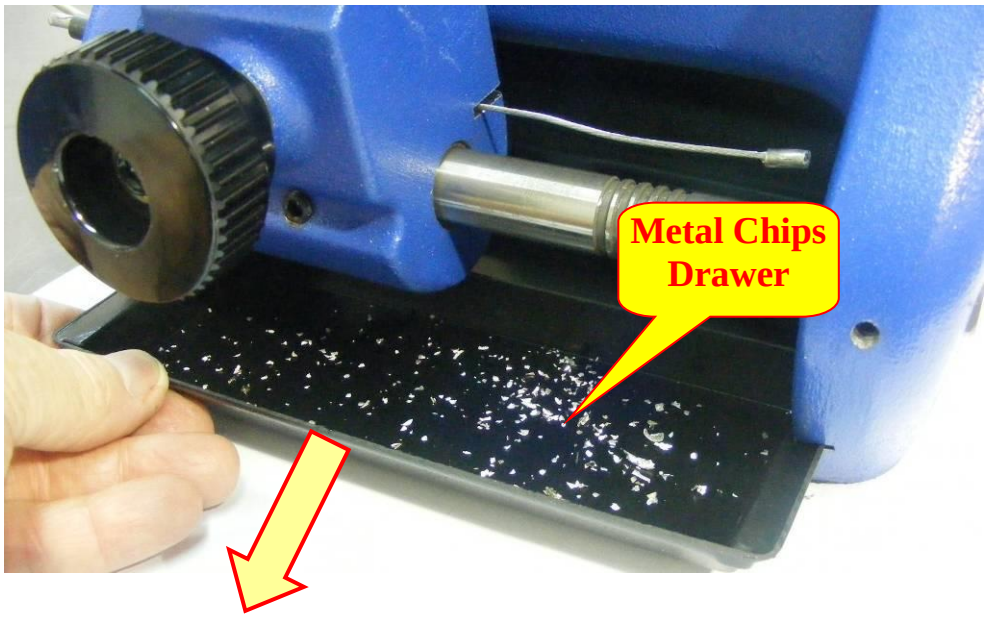
The arm handle may be placed at three different positions (Fig.5) for the operators' convenience (also for right/left handed operators). To change position, loosen the 2 screws (15) of the pressure coordinator (16) and move lever to the desired position.



Handle positions

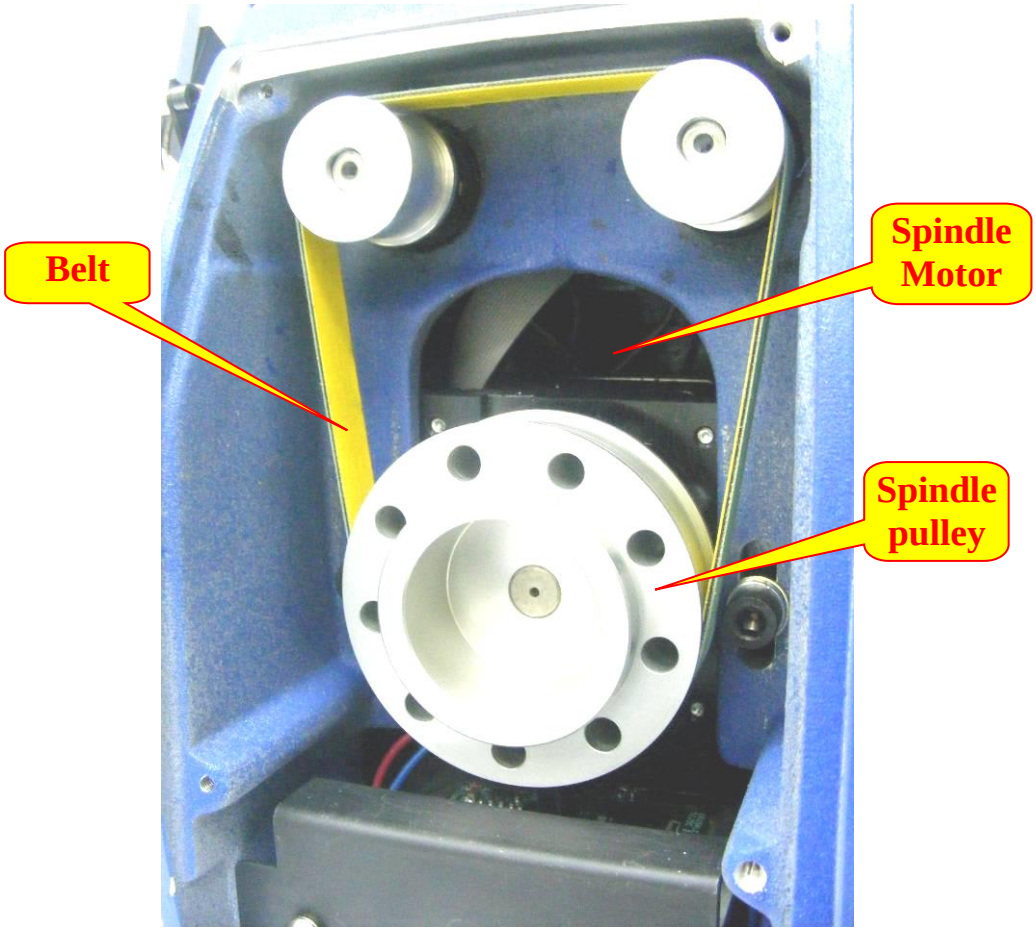
5.4. Metal Chips Drawer:

The metal chips drawer used for collecting metal chips from the cutting process.



Metal Chips Drawer

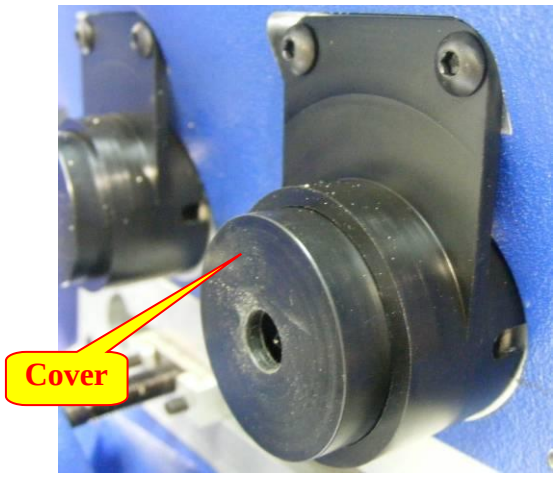
5.5. Spindle Motor:



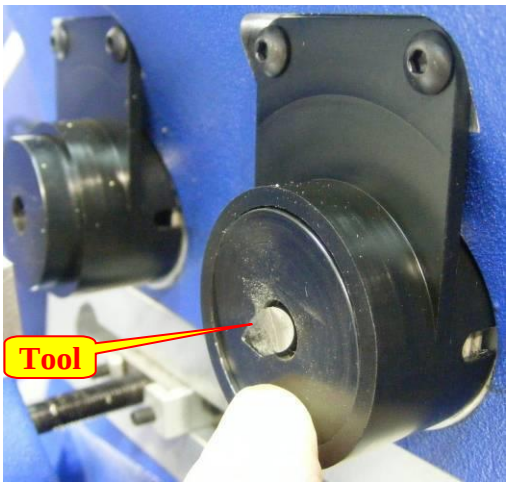
Spindle– Rear Side

5.6. Cutting tools:

The cutting tools are behind cover to protect the operator hands. The cuttings tools are come in pairs. Always keep them in pairs, and replace both at the same time.



Cutting tools - Cover



When pressed – tools shown

Cutting tools units

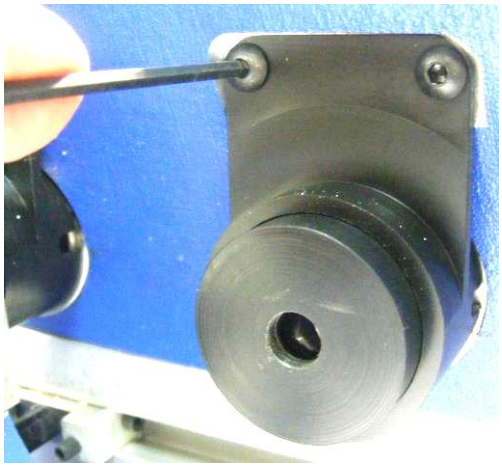
5.7. Change Cutting tools procedure:

WARNING

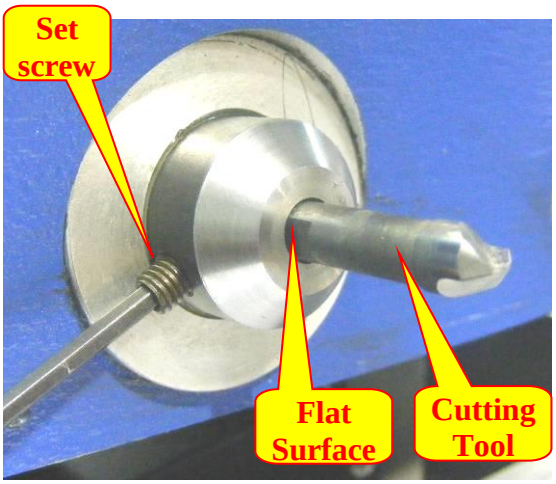
You are about to perform actions near the cutting tools. Be *sure no unauthorized personnel are near the machine. Avoid hazardous situations.*

Prior to any operation, disconnect the machine from external electric power source.

Cutters are bruise and cut –protect your hands, use protective gloves.



Remove cover to replace tools



Release screw and replace tool.

5.7.1. Cutters will replaced when a cutter has broken, when there are changes in the dimple appearance (dimple looks like have scratches), changes in cut tolerances.

5.7.2. Remove both tools covers, loosen sets screws and take used cutters out. Insert new cutters to the hole in the cutter housing. Firmly push them until stooping point. Turn the flat surface to the set screw. Tight the set screw. Replace covers to its locations.

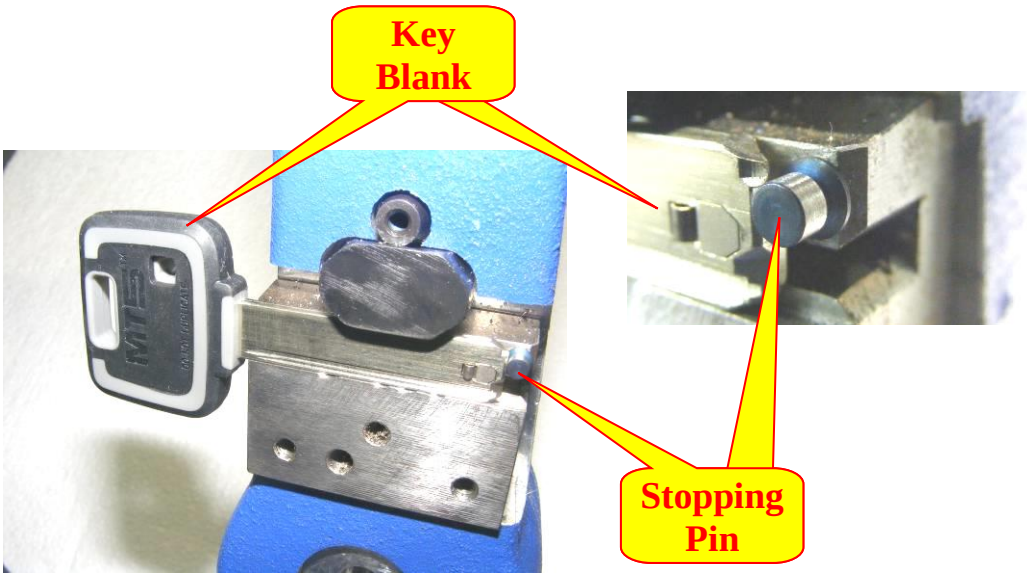
CAUTION

5.7.3. **Calibration:** After any tool replacement goes to the Calibration procedure and calibrates the machine.

5.8. Key Mounting:

The machine designed for cutting right key profiles.

Attach key blank until the tip of the key will stop on the stopping pin.



You are about to perform actions near the cutting tools. Be sure, there is no unauthorized personnel are near the machine. Avoid hazardous situations.

Push the key blank firmly all the way toward the key stopper. Use the handle to clamp the key blank.

Never cut a key when blank is not rigidly clamped.

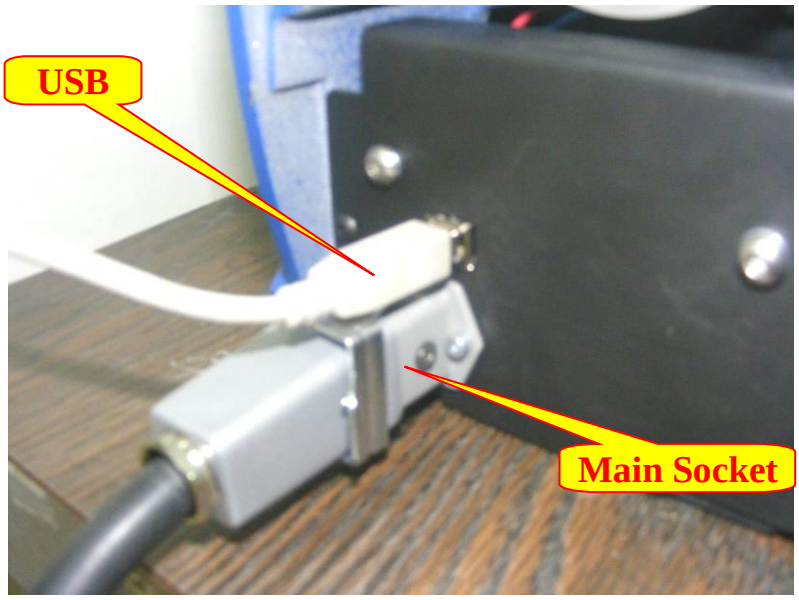
5.9. LCD Screen:

LCD Screen

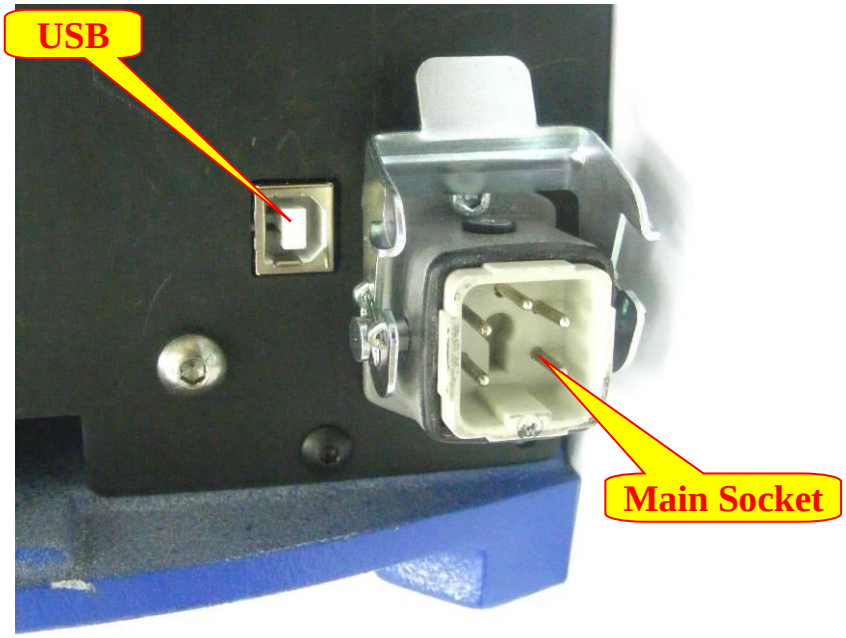
The LCD screen shows the machine status. Refer to the **Operator's Manual** paragraph.

5.10. Power Supply & Connections Sockets:

The power supply socket includes: (a) main socket for very low voltage supply (b) USB connector for maintenance purposes only.



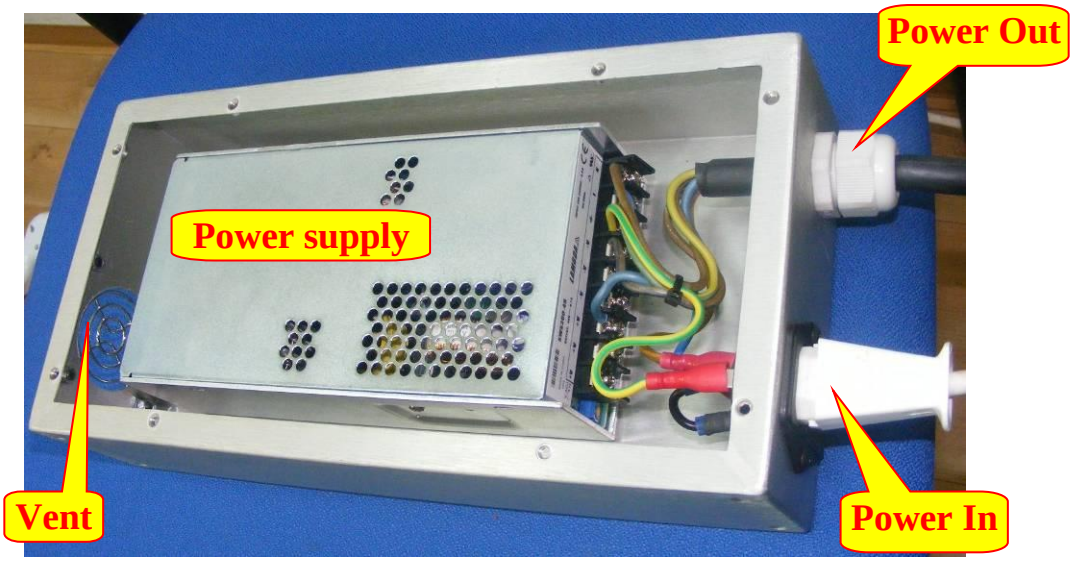
Power Connector



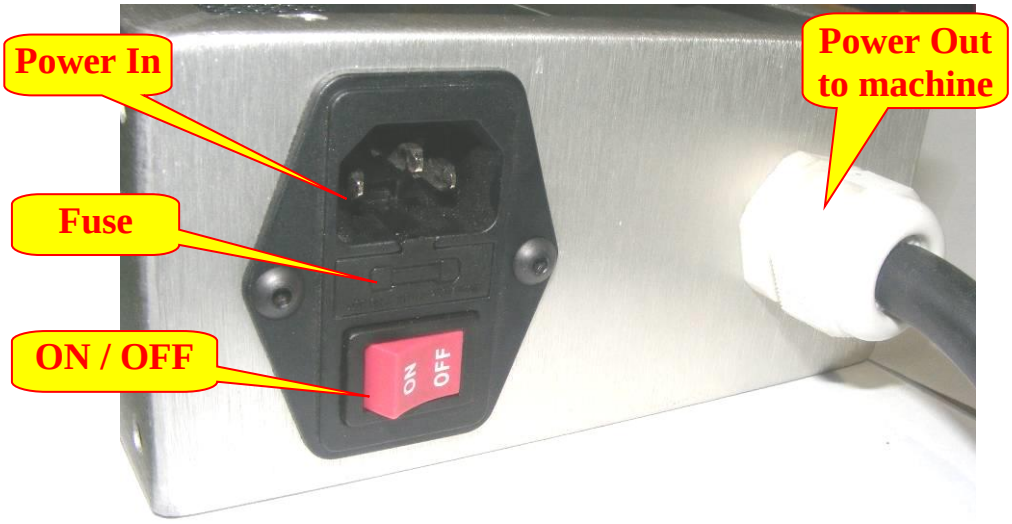
Power Connector

5.11. Power Supply:

5.11.1. The power supply unit is a power supply packed in a metal cabinet.

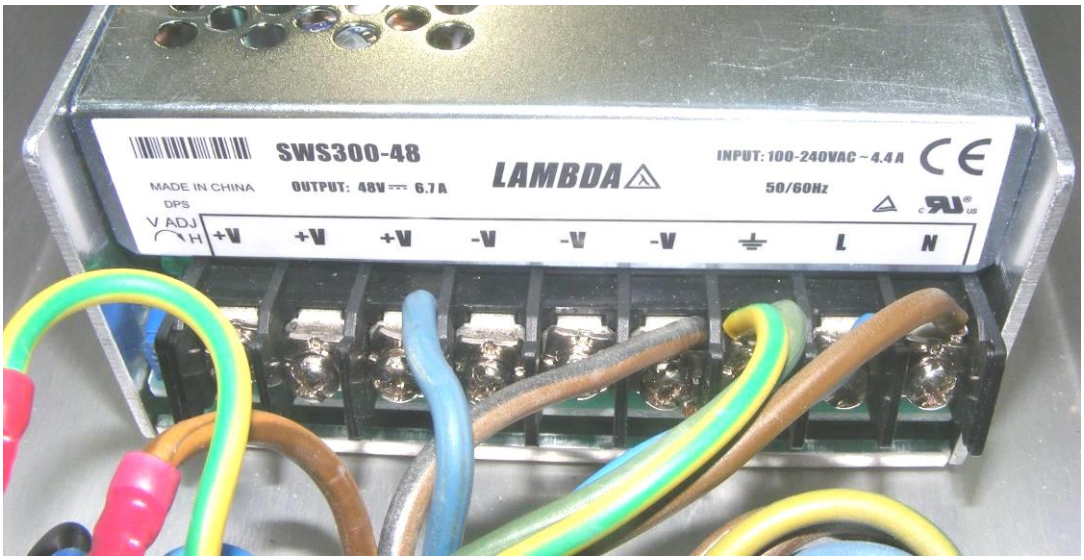


Power Supply (cover removed)



Power In / Out

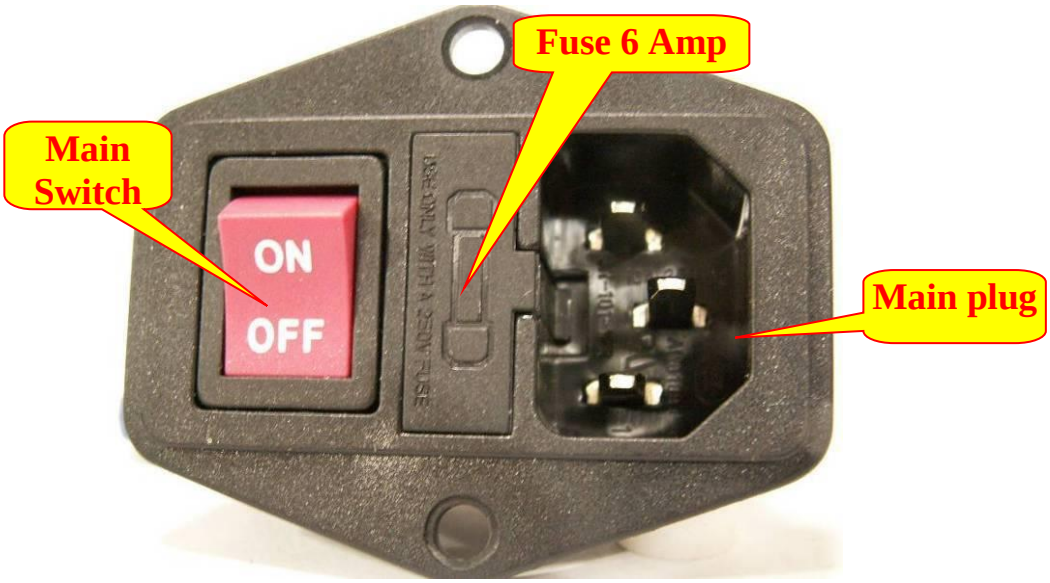
Vent shield



Power supply internal connections

5.12. Main Fuse and Fuse Replacement:

5.12.1. Main Unit:

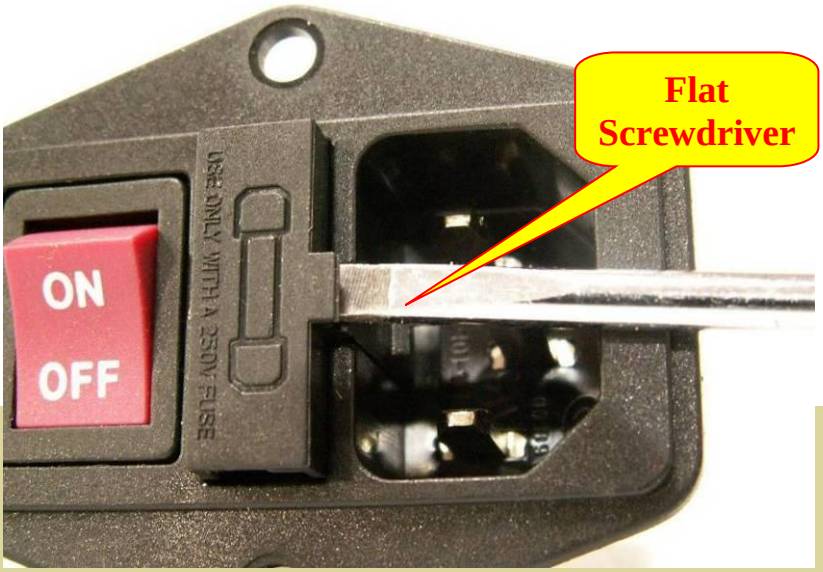


Power In Unit

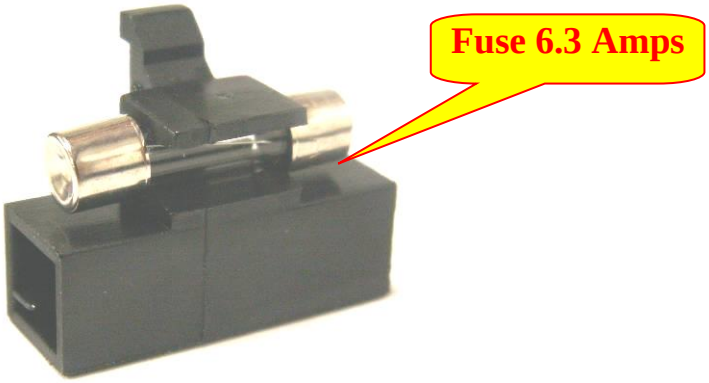
The power supply socket includes: (a) main fuse (b) Main Switch (c) Main power Socket with Fuse of 6A.

5.12.2. Fuse Replacement:

- The power supply socket includes the main fuse of 6 Ampere.
- To replace the fuse, use a flat screwdriver to pullout the fuse house.



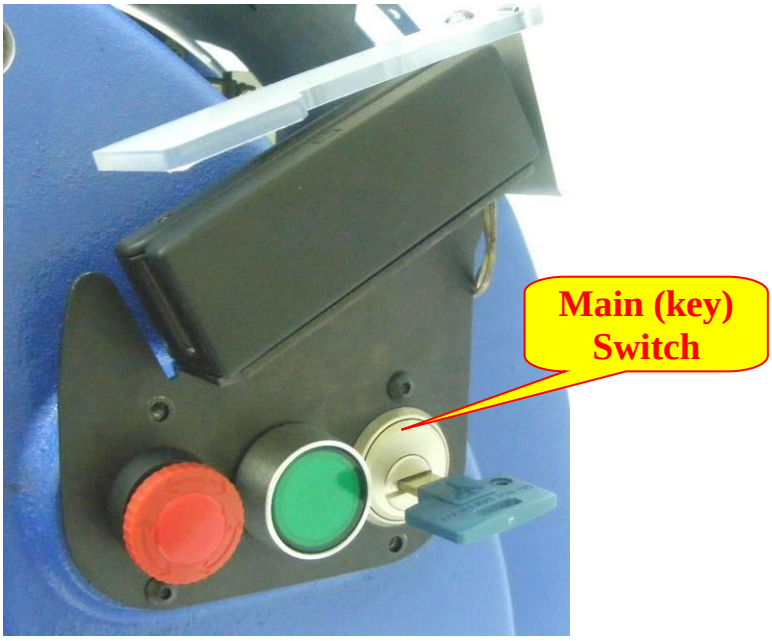
Fuse pullout and replacement



Fuse House

5.13. Main (key) Switch (on machine):

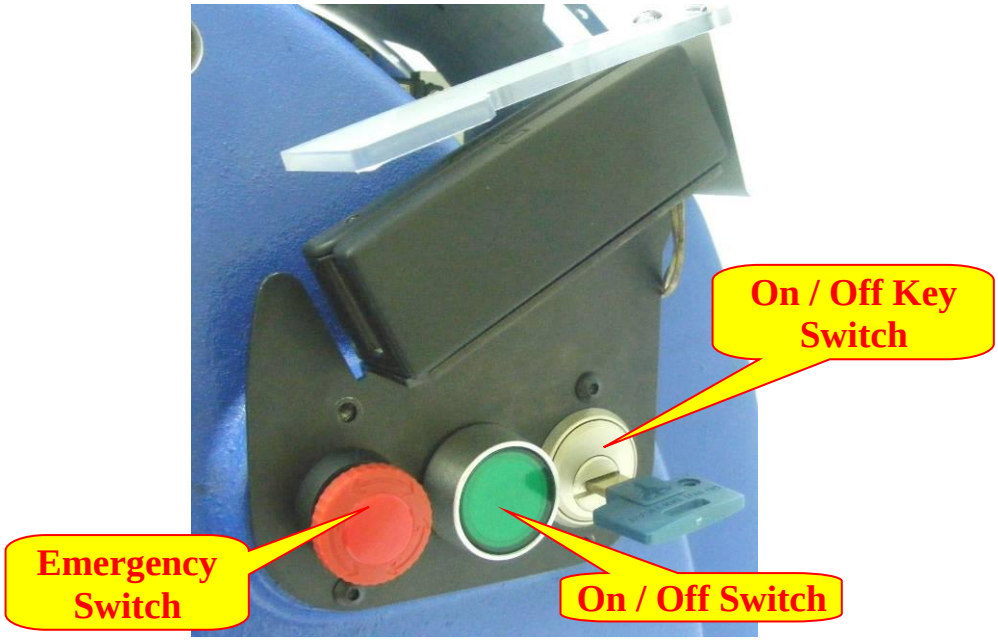
- This is a key operated ON and OFF switch.
- The switch connected serial to the main switch.
- Use the key to avoid unauthorized personnel to operate the machine.



Machine Main (key) Switch

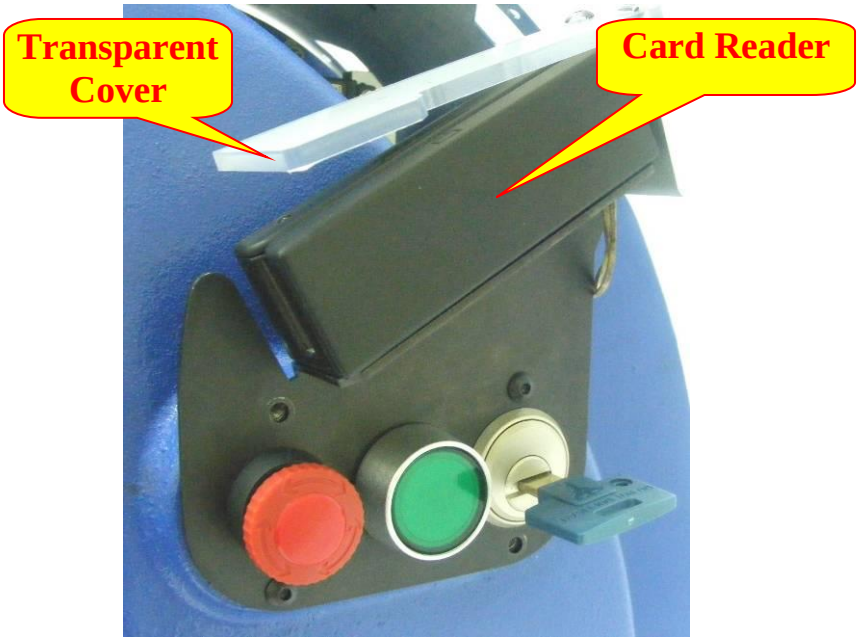
5.14. Main Switches (ON/OFF & Emergency):

- The Emergency Switch stops all machine movements.
- The ON / OFF switch is a two positions switch. First press to ON second press to OFF.



Machine Main (key) Switch

5.15. Magnetic Card Reader:



Card Reader

The card reader uses for read the duplication card.

5.16. Machine Ventilation:

The machine and the power supply generate heat and has ventilation shield. The purpose of the ventilation is to keep the temperature of internal parts, such as, motors and PLC. See also Power supply paragraph.

Machine ventilation

CAUTION

Avoid blocking venting
Keep 100 mm clear at machine rear and at bottom

5.17. Measuring procedure & key gauge:

5.17.1. key gauge

A dial gauge indicator, for measuring the depth of the dimples after cutting of a key, or for dimple cut depth adjustment?

Key gauge

5.17.2. Measuring procedure

The depth of a key dimple is determined by measuring the leftover material, left after cutting the combination dimples in the key blank (see key cross section). Wipe clean the cut key and the gauge bracket, pull up the gauge button, and locate the key. Check the zero, and then measure the dimples depth.

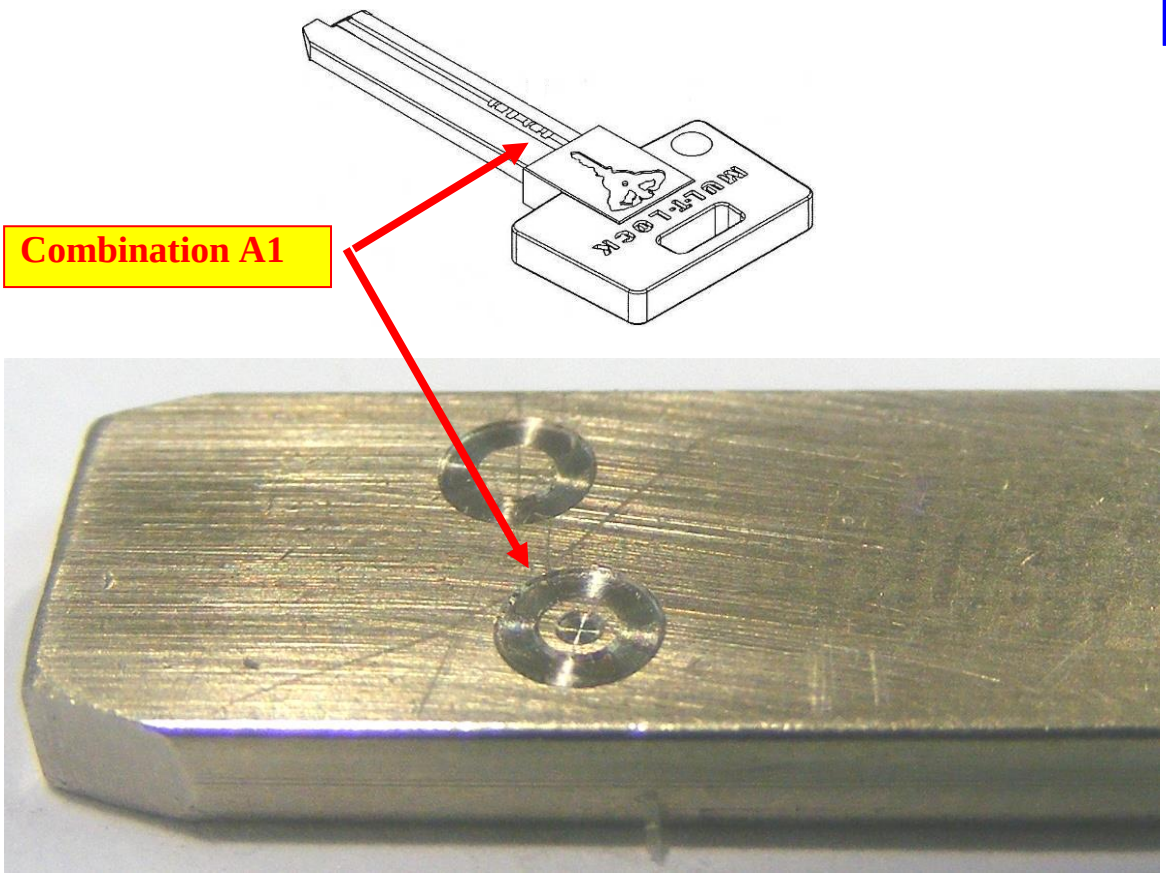
5.18. Machine Calibration:

5.18.1. Checking Machine calibration:

Machine calibration should be check regularly. This procedure is also performed when receiving the machine, and after replacement of milling cutters or probe.

5.18.2. Machine (ZERO) Calibration procedure

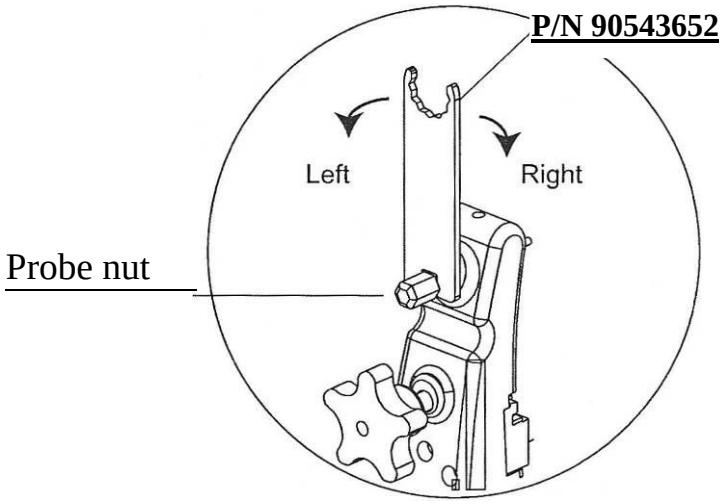
Cut a key blank to a combination of **A1** in 2 chambers. Using the key depth dial gauge to measure the depth of the internal (1) dimple and external dimple (A). Both dimples should meet the required measurements and tolerances see Table ahead.



5.18.3. Adjustment of the Probe:

Adjustment is performed by releasing the adjuster probe screw, rotating the probe with special open key, left or right as necessary. When procedure is completed, lock probe screw.

Repeat machine calibration process as described until no further adjustment needed.



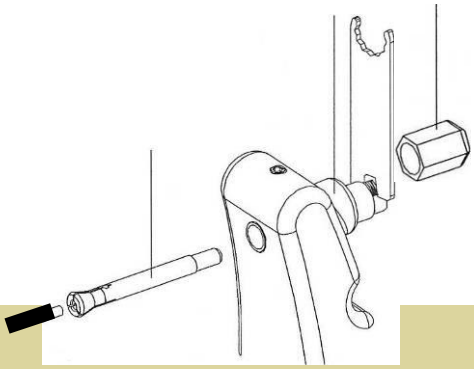
Note:

The milling cutters supplied in pairs of equal length. It is recommended, to replace both cutters at the same time.

5.18.4. Replacing probe tip:

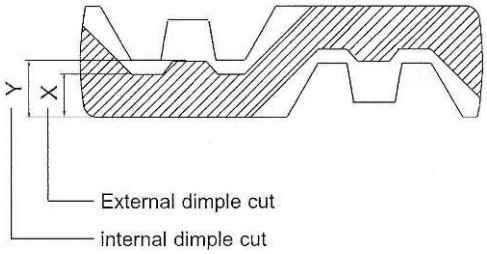
Position the cutting arm in front one of the aperture on the locating plate. Now you can push the cutting arm with your hand. Rotate the eccentric lever and screw it out, and lower the Arm a little while. Open the Probe Nut while holding the probe housing with special open key. Remove probe holder, probe tip and replace the probe tip.

Perform **machine calibration** procedure when finished.



5.18.5. Dimples Tolerances specifications

Dimples may be cut to a tolerance of 0.00 mm to -0.06 mm from the basic size, and still be considered good combination dimples (Table 1)



Mul-T-Lock key - cross section

key dimples		Tolerance		
External	Internal	min	basic	max
A	1	2.36	2.40	2.42
B	2	1.91	1.95	1.97
C	3	1.46	1.50	1.52
D	4	1.01	1.05	1.07
-	5	0.56	0.60	0.62
Key blank thickness – 2.47				

Table 1

5.19. Arm Cable Replacement & Assembly:

Prior to any operation, disconnect the machine from external electric power source!

5.19.1. General

The assembly process includes positioning of the cable and relevant parts, and tightening the cable. (Page 44)

General notes:

- Locking washer (2) and cable (7) are one part and cannot be separated.
- To remove plastic cover (1) screw M4 screw into threaded hole and pull it out.
- To start disassembling cable mechanism you must remove the eccentric lever (part 12 page 26). Position the moving arm in front of aperture on locating plate. Push upper part of moving arm with your hand, until the probe touches the tumbler disk. Rotate the eccentric lever and screw it out.
- Pay attention to the spring and two washers located on the other side.

5.19.2. Assembly process

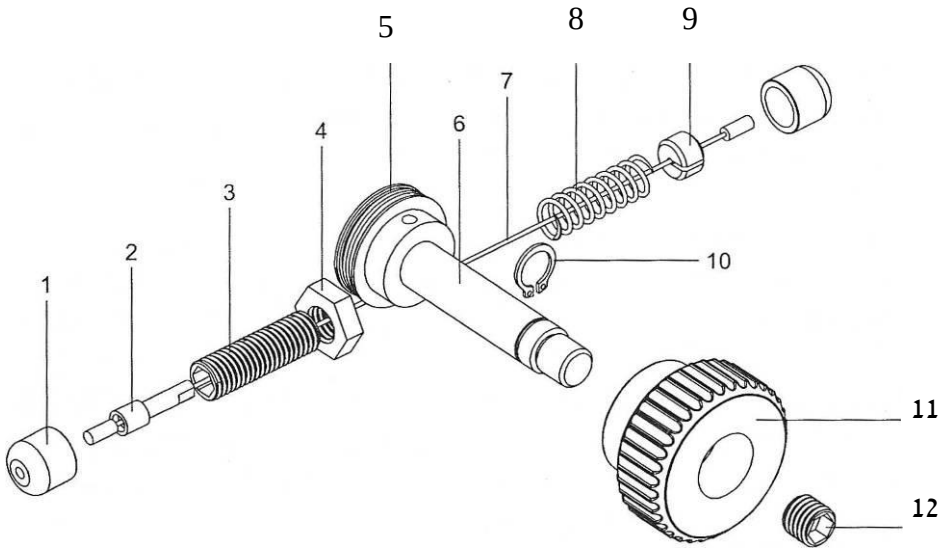
1. Assemble tension screw (3). Place hexagonal hole in the direction of locking washer (2) and nut (4) on the cable. Refer to description described on page 44.
2. Mount nut (4) at the end of tension screw.
3. Pass cable through right hand hole in machine body from inside out, and mount spring (8) and locking washer (9) on outer part of the cable. Refer to parts description in page 44.
4. Insert pulley (5) half drawn out into the machine arm. Wrap cable (7) three tires over the pulley (5) counter clockwise. Make sure there is no overlapping between tires.

5. Insert pulley all the way into the machine arm and fix it with retaining ring (10).
6. Screw handle (11).
7. Use a 6 mm hex key to secure the hex screw (12)
8. Use a 2.5 mm hex key to secure pulley cover to moving arm with 4 screws. Mount eccentric lever into place. Screw in until the probe will touches the locating plate, and then screw it CCW one turn.
9. Hold the locking washer (2) with open special key (PIN 90543652) and fix it in place (To prevent cable twisting). Screw tension screw (3) into left threaded hole in machines body, until left face of the nut has reaches the machine body and right face aligned with right end of tension screw. Use an 8 mm hex key.
10. If there is still slack in the cable, tighten it by using the tension screw.
11. Tighten the nut (4) to lock screw in place.
12. Check that the mechanism works properly.
13. Mount plastic cover (1) over cable.

CAUTION

Check calibration. If the tolerance is not correct, turn eccentric lever one turn in or out. Repeat machine calibration procedure when finished.

5.19.3. Arm Cable Assembly Drawing



No.	Part	No.	Part	No.	Part
1	Plastic cover	5	Cable wheel	9	Right cable locking washer
2	Cable locking washer	6	Cable wheel shaft	10	Retaining ring
3	Tension screw	7	Cable	11	Round handle
4	Nut	8	Spring	12	Handle screw

6. Operator's Manual

6.1. Operator training and certification:

Before operating the machine the operator must be trained by official personnel from their company and certificate to work on this machine. Recommended training should include minimum of the following procedures:

6.1.1. Learn, know and understand the machine movements and hazards areas.

6.1.2. Learn know and understand the machine electrical system, high voltage and low voltage and especially hazards areas. Opening of the machine covers only by authorized personnel and certified electrician.

6.1.3. Learn, know and understand the machine computerized system and especially operation of the machine and stopping the machine and risk situations.

6.1.4. Learn, know and understand the locations of the emergency stop of the machine in case of emergency.

6.1.5. Learning all possible risk in the machine

6.1.6. Learn never to operate the machine without another trained operator near the machine.

6.1.7. Visually check that door and panel are in close position before any operation on the machine.

6.1.8. Special note to the safety door that is close and protects with a micro switch but not lock during operation and the risk of opening the door when machine in process.

6.1.9. Visually check that inside and around the machine is clean from any debris, parts, tools Etc.

6.1.10. According to the kind of work, wear personal protection devices such as: eyes protection glasses, protection shoes, ears noise protection Etc. all according state law and regulation and/ or according management orders

6.1.11. Learn, know and understand the machine operation stand and viewing all around the machine. In case of unauthorized personnel approaches to the machine – warning and remove him from the machine.

6.1.12. Read learn and understand this manual as a whole.

6.1.13. Periodically refresh your knowledge by reading this manual.

6.2. Machine Emergency Stop

Emergency Stop button – Machine general view

Emergency Stop Button

WARNING

The machine has an emergency stop push button, mushroom shape, color **red** on **yellow**, and the operator must be familiar with the location of it before operating the machine. After use of the emergency stop, release mushroom button by quarter turn. Never get near the machine without knowledge of the machine **EMERGANCY STOP**.

EMERGANCY STOP

At emergency pressed the LCD shows.

6.3. Operator manual

6.3.1. General

The machine is cuts **MUL-T-LOCK® MT5** and **MT5+** key blanks. There is only automatically key cut from swiping magnetic cards.

The owner of the machine can also control the options that the operator can use by using a special authorization. The most common one is giving the ability to cut more keys profiles.

Maintenance of the machine is highly important and essential. Refer to maintenance paragraph of this manual and sub systems manuals.

It is recommended to make key inspection periodically. If the operator fined out that the cut key is not accurate he can or must recalibrate the machine by using the machine calibration procedure.

6.3.2. Preliminary steps

Just before starting to operate the machine take a look and examine around the machine and on the machine and recheck that the machine is ready:

- The machine is clean and the metal chips drawer is out of chips.
- No key blank in the key clamp.
- Electric cable connects to wall and to machine.
- Switch on the power supply is ON.
- Main switch on the machine is ON.
- Cutters are assembled in the machine.
- No unauthorized personnel are near the machine, especially watch the client and other persons and children with him.
- The machine is calibrated.
- Cover Card Reader when ever not in use.
- Cover the whole machine with the supplied cover when not in use.

6.3.3. Automatic Disable:

Machine automatically goes to disable mode for safety reasons:

a. When swipe the card, and the operator do not start to work, after a while (about one minute) the LCD shows Swipe Magnetic Card. This to unable to use the machine by unauthorized user.

b. When after swipe the card and press ON, after a while (about one minute) the motor stop. This for safety reason.

6.3.4. Key cutting process:

You are about to perform actions near the cutting tools. Be sure, there is no unauthorized personnel are near the machine. Avoid hazardous situations.

6.3.5. Customer identification:

- Cut keys **only** according to code on the key card.
- After presentation of the card to the receiver of the order/ locksmith, the locksmith will verify that the customer signature is identical to the signature on the back of the card.
- The locksmith will identify the type of key blank and code, by swipe the card in the machine, and cut the key accordingly.
- Read the identification code on the card from left to right.
    - Type of key blank
    - External combination dimples
    - Internal combination dimples

6.3.6. Key mounting:

The machine designed for cutting either left or right key profiles.

The stopper pin assembly enables cutting telescopic dimples, side pin and back pin dimples.

Side pins dimples created by locating the key blank inside the horizontal groove in the key clamp.

Push the key blank against the key stopper and tighten the clamping bolt.

When cutting back pin dimples release screw located at the back of the key clamp, press stopper in into the hole in the key clamp.

When cutting back pin dimples release screw located at the back of the key clamp, press stopper pin into the hole in the key clamp.

⚠ CAUTION

Back/side pin dimples, are created by internal cutter only. Dimple depths are identical in all positions.

⚠ WARNING

You are about to perform actions near the cutting tools. Be sure, there is no unauthorized personnel are near the machine. Avoid hazardous situations.

6.3.7. Cutting process:

Verify that you are making an authorized duplication.

Connect the machine to a proper voltage source and unlock main switch. The switch cylinder on the operating panel prevents use by unauthorized people.

This switch cylinder has to be unlocked before starting the work process.

6.3.8. Key cutting:

- Setup the key clamp according the key (left/ right Etc.).
- Clamp the right key blank in machine clamp.
- Visually check cutters condition.
- Check emergency switch is released (or release)
- Turn machine key switch to ON.
- Watch the LCD until it shows as follows:

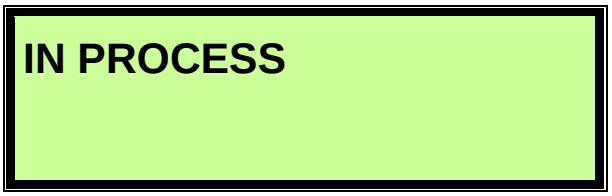
SWIPE
MAGNETIC CARD

- This screen shows machine is OK and the operator can continue.

- This screen shows the card is OK and the operator can continue. This screen appears for short time.

- If the reading is **not OK** or the card is not OK the above warning appears. Swipe again.

- This screen shows the machine is ready and the operator can now clamp the right blank and after tight press the START push button and start the key making.



- This screen shows machine is in process.
- Cut the key (First side) until ends, and press the STOP (green).

- This screen shows machine finish one side. The operator must release the clamp, and rotate the key.

IN PROCESS

- Cut the key (Second side) until ends, and press the STOP (green).

SWIPE MAGNETIC CARD

- This screen shows machine end key and ready to repeat to the other key.

- After key cutting is completed, verify that the two sides of the newly cut key are identical and fit to the cylinder.

6.4. Turn the machine to OFF:

- To turn the machine to **OFF,** during a pause in the work cycle just turns the key-switch to **OFF**.
- Never leave turned ON machine unattended.
- Close the Card Reader cover.
- During prolonged pause, turn also the main switch at the Power Supply to OFF and remove the machine key from the switch and take it with you. Advice with your supervisor where to keep the key.
- Cover the whole machine with the supplied cover.

6.5. Blockage:

In case the machine enters into a BLOCKAGE situation, the machine may stops. At this situation an abnormal noise heard. The operator must stop the machine (using **Emergency Stop**), and restart the machine.

Release the eccentric lever, and when the machine is restart and solve the blockage problem.

Never try any thing else, do not open covers.

6.6. Error in fitting:

While selecting the right key blank, and during setup key clamp, for left/right or side pins, the operator must test the clamping and the key position in the clamp. If not, recheck that the right clamp setup selected.

Never cut a key if the blank not in right position in the clamp.

7. Maintenance

7.1. General:

Prior to any maintenance operation, disconnect the machine from external electric power source!

⚠ WARNING

a. Thorough periodic cleaning of the machine, its accessories and the work zone is highly recommended since it is a factor in operator safety.

b. Periodic clean and maintenance are indispensable for correct machine operation and long machine life.

c. To clean those difficult-to-reach areas use a vacuum cleaner. Remove grease, oil and sludge with clean cloth, only if necessary use paintbrush dipped in oil, or cleaning material.

⚠ CAUTION

Do not use diesel or gasoline fuel.

d. Clean carefully and dry with a clean cloth.

e. Do not use gasoline or solvents, which might damage the paintwork, transparent parts, cable insulation etc.

f. Dust off the transparent surfaces with a light blast of compressed air: clean Plexiglas surfaces with soft soapy sponge (natural soap) or use special window-cleaning sprays and dry thoroughly.

⚠ CAUTION

Never use air blow!!!

g. When the machine is idle for long period, disconnect it from the power supply.

h. Cover the whole machine with supplied cover to avoid a build-up of dust (Any protective cover must have ventilation holes and not be completely closed at its base. This is to stop humidity as a result of insufficient ventilation. Condensation will cause rusting or corrosion of the metal parts and damages the electrical apparatus).

7.2. Daily check

a. **Cleaning**: Daily cleans the internal of the machine and the surrounding.

b. Remove unused key blanks and any unused materials.

Remove metal chips from the machine interior, and empty the metal chips drawer.

7.3. Troubleshooting

Malfunction	Troubleshooting
Newly cut keys do not function properly.	Check the milling cutters for wear or abrasion. Replace if required (replace a pair of milling cutters even if only one worn out). Re-calibrate the machine.
Dimples on key are not round and present shivering marks.	Check the milling cutters for wear or abrasion. Replace if required (replace a pair of milling cutters). Re-calibrate the machine.
Motor work but cutters do not turn.	Remove rear cover and checks the belt. Replace if required.
Motor does not work.	Visually check electric connection to the machine. Notify Mul-T-Lock Technical Support.
Arm do not move left or right when Round Handle turned.	Check cable. Replace if required (refer to **Arm Cable Replacing & Assembly** Paragraph).

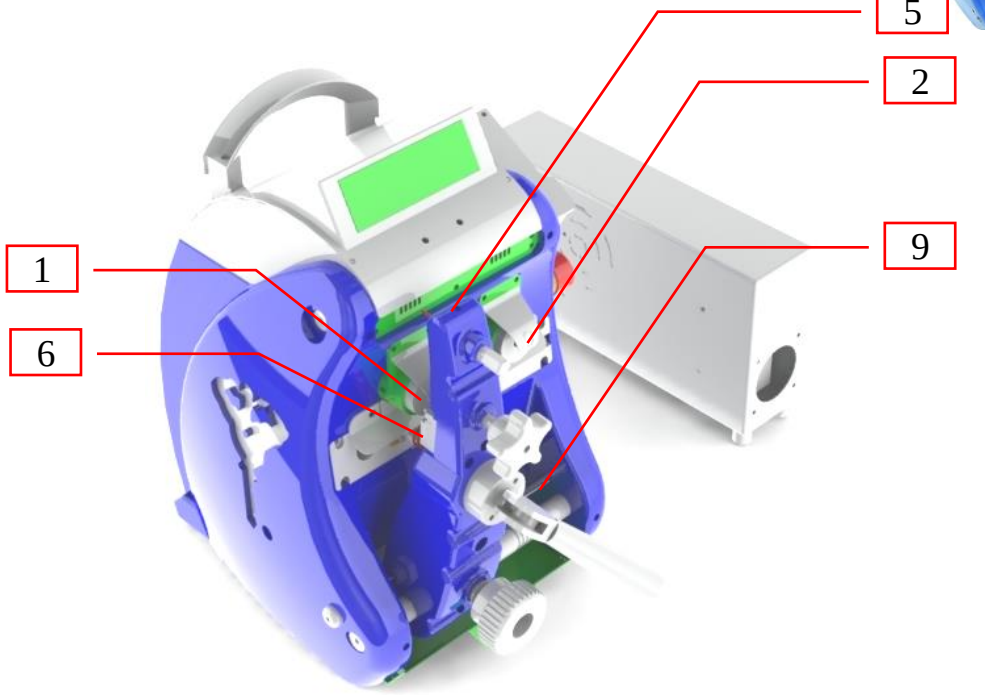
Contact the manufacture/distributor in case of any malfunction you cannot handle. Repair of electric parts must performed only by a Mul-T-Lock authorized service personnel.

Whenever consulting the manufacturer about troubleshooting, refer to machine description in paragraph 5

8. Appendixes

8.1. Spare parts list:

№	Catalogue Number	Part Name	Note
1.	W- milling cutter	90079161	
2.	V – milling cutter	90079151	
3.	Belt	91535035	
4.	Fuse 6.3 Amp.	91707405	
5.	Probe tip	36000001	
6.	Stopper pin	95047499	
7.	Key gauge	90543513	
8.	Open key	90543652	
9.	Moving arm cable	91535156	
10.	Electrical cable (European)	91707452	
11.	Machine calibration card		No Charge
12.	Machine manual		No Charge



Spare parts locations

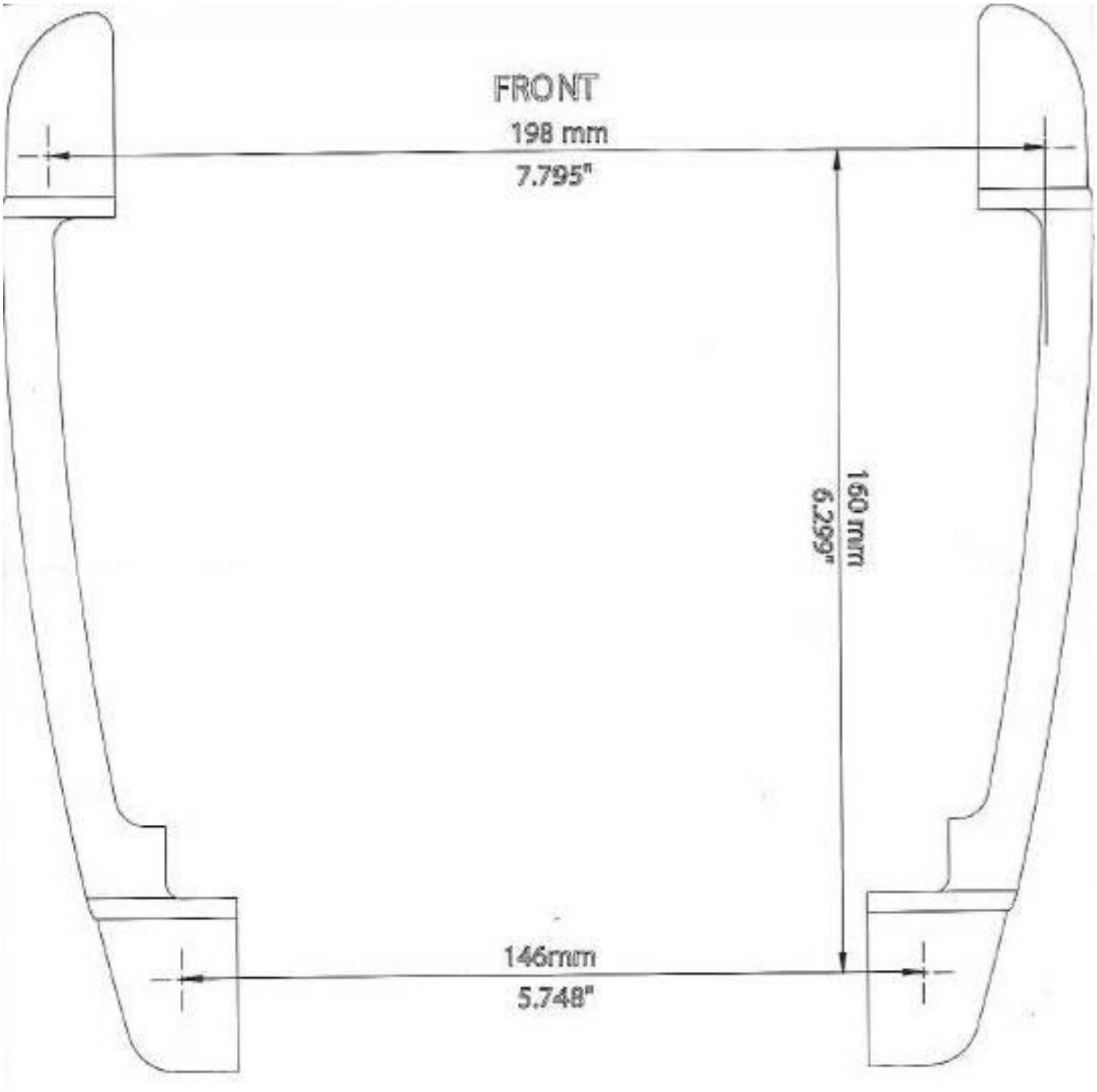
8.2. Electric schema

Missing

Electric schema for 220/110V model

Prior to any maintenance operation, disconnect the machine from external electric power source!

Only Mul-T-Lock authorized electrician may perform any electric actions in the machine.


FRONT
198 mm
7.795"
160 mm
6.299"
146mm
5.748"

With its readiness to rapidly respond to any challenge, Mul-T-Lock provides peace of mind through offering comprehensive, customized, top security cylinders and locking solutions and service worldwide.

ASSA ABLOY is the global leader in door opening solutions, dedicated to satisfying end-user needs for security, safety and convenience.

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