KOUSHA FAN PARS

Engineering and Manufacturing

Central Office

Address:

Islamic republic of Iran, shahrake-e-gharb, Farahzadi Blvd., next to Atieh Hospital, Sepehr street, No. ٤٥

Telephone number: (+٩٨)٢١- ٨٨٣٦٤٩٤٠-٦

(+٩٨)٢١-٤٢٨٠٤ (Special line)

Fax number: (+٩٨)٢١-٨٨٣٦١٠٥٩

E-mail: info@kfp-dental.com

service@kfp-dental.com (After sales service unit)

Factory

Address:

Tehran-Qom (khalj-e-fars) highway, ٣٥th kilometers, Shamsabad industrial town, Phase ٣, Sarvestan Blvd., Gol-e-sorkh ٩ street, Segment ١٠٣١

Telephone number: (+٩٨)٢١- ٥٦٢٣٥١٤٥ -٨

Fax number: (+٩٨)٢١-٥٦٢٣٢٥٥١

E-mail: factory@kfp-dental.com

Website: www.kfp-dental.com

In the name of God

Dear customer

We thank you for your selectivity and trust in purchasing domestically produced products, and we are pleased that after continuous efforts, we have been able to manufacture Ducatron Induction Casting Machine in Iran and put it at your disposal.

This product has been designed by our technical and engineering team of experienced and committed people in the fields of mechanical, electronics and computer engineering, and by utilizing updated technology and building upon on ۲۵ years of experience in manufacturing dental equipment, this product has reached production of export index quality.

In designing the product, three principles of accuracy, reliability and safety performance and also being easy to use have been considered, so in order to correctly and completely utilize product features, we ask you to read the instruction manual carefully and if you have any questions or you need more information, contact the after sales unit.

Instruction manual is a comprehensive reference for efficient and safe use of the product. Following the instructions of this manual has a great role in reducing consumable costs, avoiding risks and ultimately increasing product life. Instruction manual should always be kept near the product and the user should periodically read it.

Please impart us with your constructive guidance, so that we can benefit from your comments, recommendations, and gain knowledge about your needs.

With the hope of enticing your satisfaction,

Kousha Fan Pars Engineering and Manufacturing

Contents

Section ۱: Maintenance

(۱-۱) How to use the manual

This manual presents the instructions about use, installation and maintenance of Ducatron Induction Casting Machine made by Kousha Fan Pars Co. It should be noted that:

- **The product should be used according to the instructions of this manual. Thus, all parts of it should be read carefully before starting and installing the tool. Special attention should be paid to the highlighted parts. (refer to section ۲-۱).**
- **Observing the instructions of manual assures the health and safe operation of the tool.**
- **Manual is an integral part of the product. Thus, it should always come with the product and should be used optimally as a reference for use during the operation of product. It should be available even during sale of the product, or even when it is not used.**
- **In case of losing or damaging the manual, get a replacement one from the after-sales service department of Kousha Fan Pars Co.**

The following are explained in detail in this manual:

- **Installation and start-up of the product**
- **Operation details of the product and its parts**
- **Maintenance program**
- **Primary safety and preventive details**

(١-٢) Terminology and signs

Knowledge of signs meanings is of great importance. A list of signs has been introduced in the following for initial recognition and reference to them if necessary.

Danger!

Indicates compulsory warnings.

Warning!

Indicates functional recommendations.

Forbidden!

Indicates forbidden activities.

Caution!

Refers to user instructions of the tool.

Section ۲: General information

(۲-۱) Company liabilities

Kousha Fan Co. is not liable for any problem involving the following: Failure to follow the instructions of this manual (incorrect use of product), repair by an unauthorized person and part replacement without coordination with after-sales service department, failure due to power fluctuations.

(۲-۲) Guarantee

Guarantee of this product includes repairs, supply and replacement. If used appropriately, Kousha Fan Co, guarantee covers all main parts of the device for ۱ year.

Following cases are not covered by guarantee:

- **power fluctuations**
- **incorrect transportation of device**
- **inappropriate and frequent use of device despite having obvious flaws**
- **not observing the maintenance instructions**
- **installation by unauthorized persons**
- **any repair or replacement by unauthorized persons.**

Commutation fees of company representatives to install or repair during guarantee period will be received from buyer at site.

User is a representative from the buyer and the necessary instructions should be conveyed to him by the installation team. Generally, activities of a user consist of the following: working with the device according to user manuals, maintenance and periodic inspections, registration and recording incorrect functions and notifying the after the sales unit.

The device can't be used before installation and insurance of correct operation of protective parts.

It is highly recommended that user has a general knowledge of this manual before using this device. The cases which appear to be operation flaws in the device should be registered by user and they should be sent to the after-sale service department.

- **Authorized representatives of Kousha Fan pars Co.**

These persons are endorsed by company to work on the device under any operational circumstances. They are also authorized to do any electrical and mechanical adjustment/repair, maintenance program and authorized parts replacement.

Section ٣: Product Introduction

The Buyer shall receive a detailed Operations Manual for casting safely all precious and non-precious alloys (except Titanium).

(٣-١) Main parts

The main components of the product are:

١. Glass viewfinder

٢. Argon gas outlet valve

٣. Cylinder base position

٤. Water tank

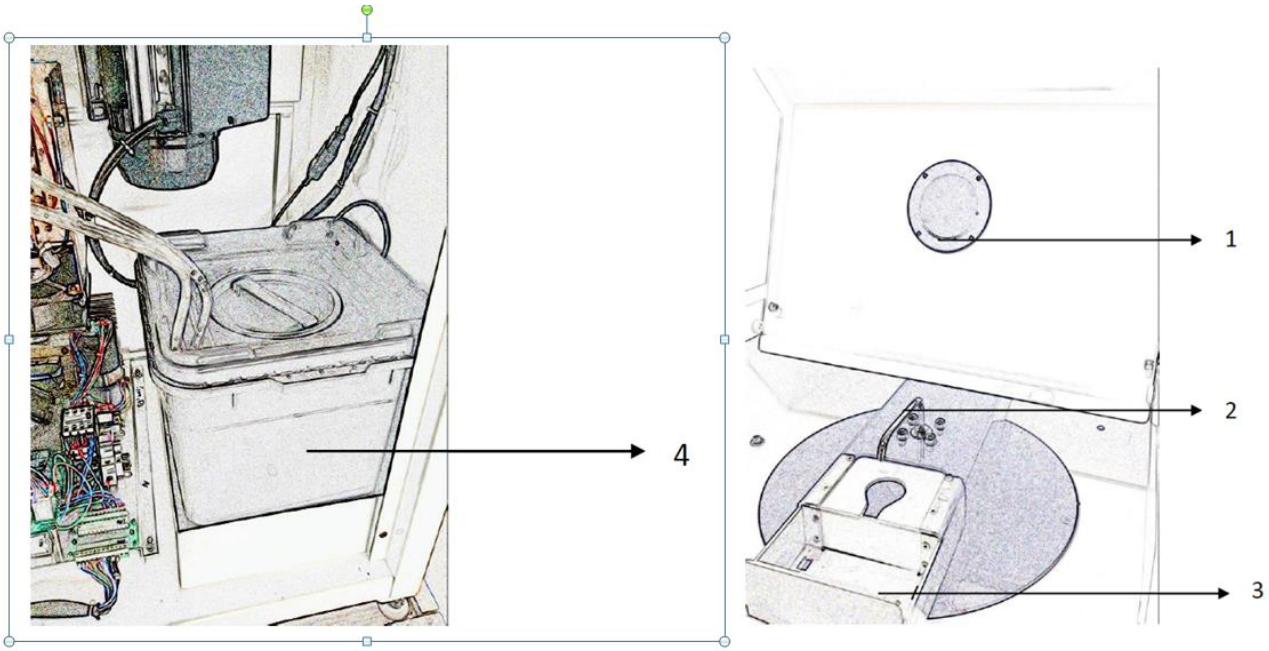


Fig. ١: Main components of the Ducatron Induction Casting System

(٣-٢) Panel description

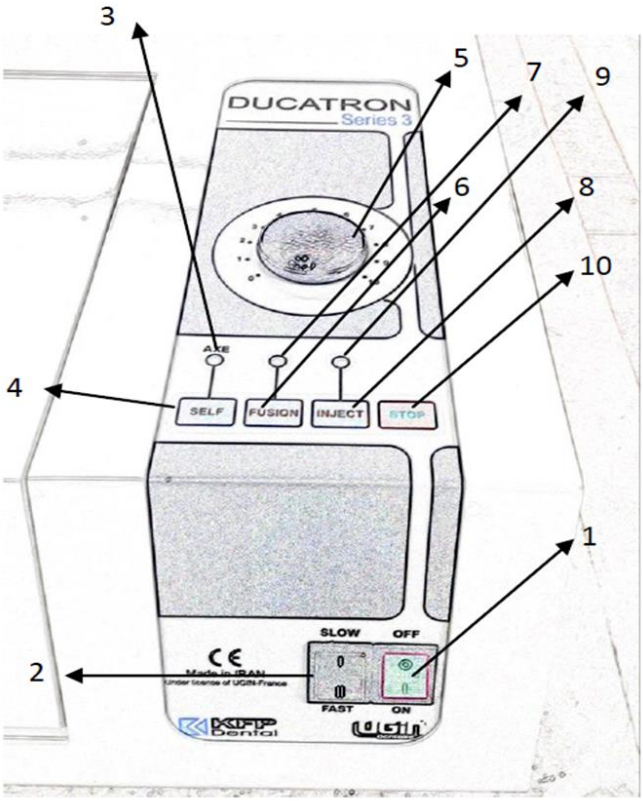


Fig. ٢: The Ducatron panel

The panel consists of the following parts:

١. on/off switch

٢. Fast/Slow switch for the speed control arm

٣. Indicator light with alarm for correct positioning of the centrifuge arm

٤. Button for lifting the heating coil

٥. Coil voltage dimmer (for adjusting the alloy melting speed)

٦. Switch for start of melting the alloy (fusion)

٧. Indicator light for start of melting operations

٨. Injection switch indicating start of alloy injection operations (operates only when the top cover is placed in the closed position)

٩. Indicator light for start of ally injection

١٠. Stop switch

Section ۴: Technical features

(۴-۱) Technical features and operation rules of device

Kousha Fan Pars Co. products are manufactured based on the latest technologies and are of highest qualities. The most recent design and manufacturing methodologies are employed to increase lifetime and quality of products.

This product described in the present manual is an electric centrifuge for melting metals at high temperatures. The employed technology is providing the required electrical current via electro-magnetic induction.

The alloy to be melted is placed within a crucible and then transferred to the centrifuge for melting. Due to the centripetal force, the crucible slides towards the center of the cylinder (The Ducatron is equipped with a fully automatic rotating arm mechanical balancing system).

For increased safety, the top lid (cover) is automatically locked during the operation of the centrifuge and unlocks only at the completion of the centrifuge operation.

(۴-۲) Technical Information

Technical specifications of the Ducatron Induction Casting Machine are given in Table ۱.

Table ۱: Technical specifications of the product

Voltage Supply	**۲۲۰ V, ۵۰/۶۰ Hz**
Rated Generator Frequency	**۱۳۵ kHz**
Power	**۲۵۰۰ W**
Current	**۱۲ A**
Max. Temperature	**۱۵۰۰ deg Centigrade**
Rotational speed of the arm	**۵۰۰ rpm**
Crucible Capacity	**۵۰ gr (gold or equivalent)**

Argon Gas Injection Rate	**١٥ lit/min**
Width	**٦٩ cm**
Depth	**٥٩ cm**
Height (top lid closed)	**٩٥ cm**
Height (top lid open)	**٩٨ cm**
Net Weight	**١١٠ kg**
Water Tank Capacity	**١٨ lit**

Cooling Systems

- **For cooling the electricity generator, a ١٢٠ cm x ١٢٠ cm cooling coil has been integrated on the system.**
- **A closed water circulation system (tank capacity= ١٨ lit) is added for cooling the induction coil.**

Accessories:

Table ٢: Accessories of the product

Component/Part	**Number**
Crucible for melting alloys	**٥**
Argon gas outlet valve	**١**
Base	**٦**
Complete set of casting cylinders	**١**
Forklet under the cylinder	**١**
Fuse ٢٠	**٢**
Fuse ١٠	**١**
Cylinder tray	**٦**

Section ۵: Transportation and installation

In order to avoid accidents, it is really important to follow the following instructions during installation and fixing of equipment. All steps are explained in detail:

(۵-۱) Unboxing

Having received the device, make sure that the main box is sealed and intact. Otherwise, inform the after-sales service department of Kousha Fan Co, or its authorized representatives.

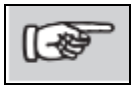
(۵-۲) How to move the device

The device should be moved as follows:

۱. **Unplug the system from the power supply**

۲. **Empty the water tank**

۳. **Keep the product in an upright position throughout the displacement. For safety and prevention of accidents resulting from non-observance of technical recommendations, see Section ٤،٢.**



Failure to follow the aforementioned instructions results in device being damaged, and Kousha Fan Pars Co, won't be held liable.

(۵-۳) Environmental circumstances

It is important to choose an appropriate environment during installation and operation for personal safety, correct operation and long lifetime. This environment not only should be big enough but also should be on enough, have proper ventilation and should be kept away from dust and direct sunlight. It should be noted that device must be placed in a way, so that the connections may be managed easily.

Workplace temperature: ۰-۴۰^{O}C

Maximum humidity: ۷۵٪

The device should not be used in a place where there is danger of explosion or firing

The light of place should be high enough so that all parts of device can be seen clearly.

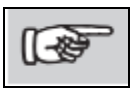
The device should never be exposed directly to sunlight or humidity of rain, etc.

Before operating the product, the following procedure must be followed:

۱. Place the product on a smooth horizontal surface. The leveling of the product upper body must necessarily be conducted through employing proper measuring tools with respect to the horizontal surface (fine adjustment is performed through the four adjustable bases of the product).

۲. Unplug the chord of the water tank pump to remove the tank from the product. Pour ۱۸ liters of distilled water into the tank and replace the tank. Plug the chord again and then close the front gate of the product.

۳. After checking the power supply (۲۲۰ V), plug the product again.



The grid single –phase electricity should match the power supply specifications of device.

(٥-٤) Installation

١. **Installation and commissioning the product must be performed by Kusha Fan Pars authorized representatives. Otherwise, the product guarantee shall be cancelled.**

` Based on its application, the Ducatron machine must be installed inside the Casting Section in the laboratory adjacent to the pre-heating (cylinder) furnaces.

Section ٦: Initial operation

٦,١. Experimental Operation (without Alloy)

Before starting the melting operations, check to see if the product is in proper functioning order by following these steps:

١. **Place the ٣٠ mm ring on the smallest ring base.**

٢. **Use the special fork to place the ring and its base on the arm of the product.**

٣. **Place the ceramic crucible in its proper place on the rotating arm.**

٤. **Use the switch to turn on the system.**

٥. **Place the arm on the machine center until the alarm sounds and the indicator light is turned on.**

٦. **Use Switch ٤ to lift the coil.**

٧. **Use Switch ٦ to start the melting process.**

٨. **Adjust the melting speed controller on ٨.**

٩. **Close the top lid of the machine.**

١٠. **Operate Switch ٨ to start the casting operation.**

١١. **Allow the machine to rotate for ١٠ to ٢٠ seconds.**

١٢. **Operate Switch ١٠ to stop the machine.**

١٣. **Wait ٣٠ seconds until the machine automatically unlocks the lid so that you can open it.**

١٤. **Open the top lid.**

Section ٧: Product application

In general, the Ducatron Machine is used in three stages, namely, selecting the proper crucible, melting the alloy, and injection.

(٧-١) Selecting the Proper Crucible

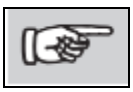
Ducatron is presented with one crucible and one glass carbon protector:

١. **China Alloy Melting Crucible**

The silicon carbide crucible is used for casting non-precious alloys. Precious metals are cast by using this crucible along with a crystal-carbon crucible. These crucibles can tolerate temperatures between ١٥٠٠ and ١٦٠٠ degrees Centigrade. The crucible prevents sticking between the exiting melt and the crucible bottom.

٢. **Crystal-Carbon Crucible**

This crucible is used for melting precious metals including gold. First, the precious alloy is placed inside a crystal-carbon crucible and then inside a china crucible. If the precious alloy comes in direct contact with the china crucible, it sticks to the china and causes considerable loss of the alloy. This would also increase the temperature inside the crucible (which must remain constant).



Never use the crystal-carbon crucible for non-precious alloys.

(٧-٢) Melting and Injection of Alloys

- Switch on the machine.

- Set the rotational speed of the arm: Select “Slow” for precious alloys, and “Fast” for non-precious alloys (like Cobalt),

- Calculate the required amount of ingot and place it inside the crucible. Avoid dropping them or hitting them against the crucible since shock loads lead to cracking of the crucible.

- Place the crucible in the respective position inside the machine.

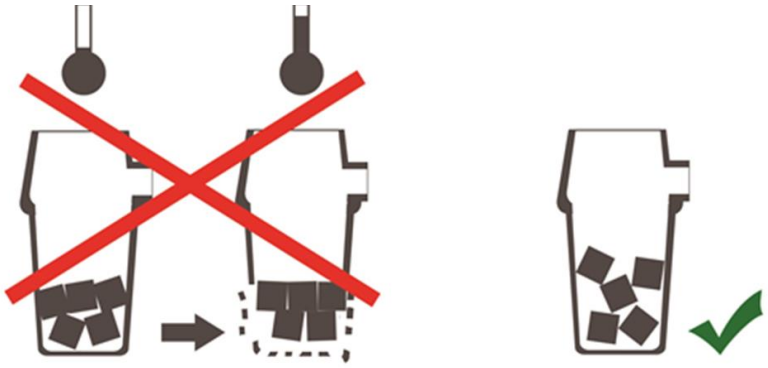


Fig. ٤: The correct method of placing alloy ingots inside the crucible

Before using the crucible, clean it thoroughly and then heat it slightly (pre-heating through the cylinder furnace) to remove any moisture. Pre-heating would prevent cracking of the crucible walls in cold temperatures and increases its useful life.

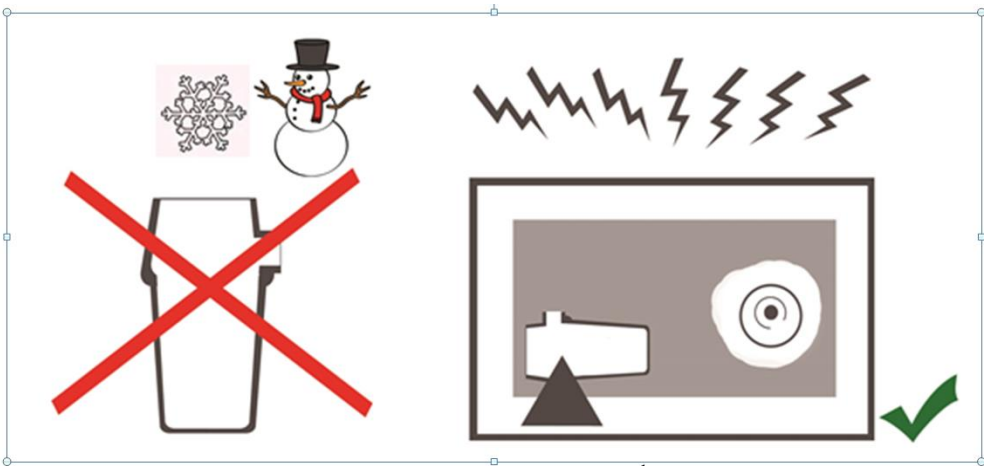


Fig. ٥: Pre-heating the crucible in cold ambient temperatures

Take Care not to damage in any way the crucible when positioning it inside the machine.

- **Place the ring base on the arm.**

- **Rotate the arm till it is in the correct position (the alarm sounds and the indicator light turns on).**

- **Lift the induction coil until it has surrounded the crucible. The crucible must be positioned such that it does not touch the coil at all.**

- **Close the top lid.**

- **Operate the "Fusion" switch to start the melting process.**

One minute would suffice for melting ٢٥ gr of non-precious alloys (except when they contain Beryllium). Upon exerting of pressure on the metal via the electro-magnetic field, the metals in the alloy start pulverizing quickly and combine to form a flowing molten ball. This is the most suitable time for starting the injection operation. Injection must be done at the right time; otherwise, the alloy shall burn due to overheating.

- **Press the "Inject" button.**

- **Press the "Stop" button after ١٥ seconds to stop the arm from rotating.**

- **Wait about ٣٠ seconds for the machine to automatically unlock the top lid.**

- **Open the top lid.**

- **Bring the cylinder out of the machine carefully by using the special tool and put the cylinder in a proper place.**

(٧-٤) Argon Gas

Function: Argon is injected inside the crucible and the fusion chamber as a neutral agent for preventing oxidation of alloys (Argon injection is optional). Argon provides up to ٣٠٪ protection against oxidation. Argon capsules are available in various volumes.

The following procedure must be adhered to when using the capsule/cylinder containing Argon:

- **Attach the pressure gauge onto the back valve and adjust it at ٣-٥ bars. Argon is injected onto the alloy immediately after the fusion has started. Close the cylinder valve upon completion of casting.**

Section ۸: Safety

(۸-۱) General safety

Users are required to read and always follow the listed suggestions and warnings here; following these instructions will assure a long-term, flawless operation for product.

- **Only those who are trained about the device operation are authorized to use the device.**

Make sure that all parts of the device are installed correctly before using the device.

Make sure that all the components are properly installed before using the device.

Never use a defected device.

You should never use the device if its accessories are defected, otherwise, the device operation will be affected, and it will no longer be covered by guarantee. Thus, make sure all parts are flawless before operation.

- **The place should be clean and well-lit and free of obstacles.**
- **If you see any flaws in the device operation, stop operating the device immediately, unplug it, and call the after-sales service department of Kousha Fan Pars Co and inform them about that.**
- **Never dissemble the electrical or pneumatic parts.**

- **Never replace the power supply or parts which are directly related to the plug.**
- **Operation of this device for applications other than those mentioned is forbidden.**
- **Don’t use petrol or other combustible solvents as cleaning substance. Use only non-combustible, non-corrosive and non-toxic substances.**

(۸-۲) Device safety measures

Kousha Fan Pars Co. make use of high-quality raw materials for advanced production processes to promote the safety level.

Quality control is performed in three stages of input, middle control, and final control through several control stations, a procedure which minimizes error and defect chances.

As mentioned before, the safety modules of the product include the protective lid on top of the machine and the arm, as well as the automatic lock for the opening accompanied by several electronic controllers.

Section ۹: Maintenance

(۹-۱) Cleaning

Keep the device body clean using dry fabric. Wet the cloth with little water or a non-greasy solution, if needed (only do this for body cleaning).

Users should make sure the device is kept clean and free of dust water and other unexpected solutions.

At the end of each operation and when the device is on OFF mode and stable, cleaning should be done.

If the user decides that the internal parts needs cleaning, he/she should contact the after-sales service department.

Put the main button on the off position before cleaning external parts of the device. It is forbidden to clean the device while it is plugged.

Never use combustible, corrosive, base or toxic solutions for cleaning the device.

(۹-۲) Periodic maintenance

Inspection and periodic cleaning of the device depends on operation level. It is suggested for user to inform the company experts about the workflow through consultation after installation and learn the appropriate time for inspection and periodic cleaning from them. If user detects any damage or exhaustion during periodic inspections, he/she should contact the after-sales department, so that measures are taken for maintenance and compulsory service.

Periodic service should be determined by user and is performed by the after-sales service department. It is suggested that the maximum time interval for periodic repairs be ۱۲ months.

If user detects any defects or problems on the device, he/she should place a warning sign on the device to indicate that it is being maintained and it should not be used (EC warning signs can be purchased at the associated stores).

Cleaning, periodic maintenance and appropriate use of the device are important factors in lifetime and safety of it.

It is forbidden to use the device before solving the defect which has occurred.

(٩-٣) Maintenance technical instructions

١. **Check the water inside the tank at least every three months.**

٢. **Check the cooling water connections and hoses for signs of breakage or tear.**

٣. **Make sure the water pump functions properly.**

٤. **Do not apply any mechanical pressure or damage the spring copper coil. Avoid changing the spacing of the coil (coil pitch).**

٥. **Discharge the tank water before transporting the machine.**

٦. **Do not allow unauthorized personnel to repair or operate the product.**

For changing fuses, follow this procedure:

- **Open the gate on the body of the machine. At the front part, there are two ٢٠ A fuses. Change them as shown in Fig. ٦. There is another ١٠ A fuse at the lower part of the machine where electronic boards are fitted. You can change these fuses as shown in Fig. ٧.**

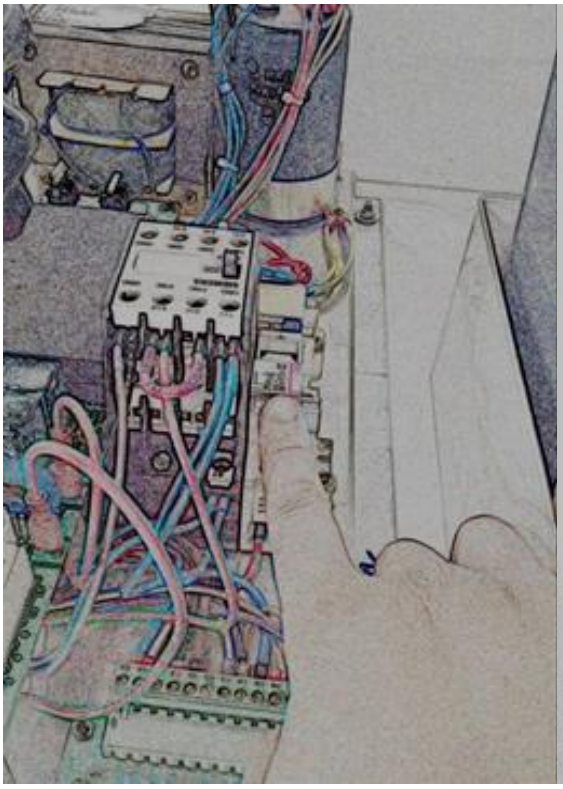


Fig. ٦: Changing ٢٠ A fuses

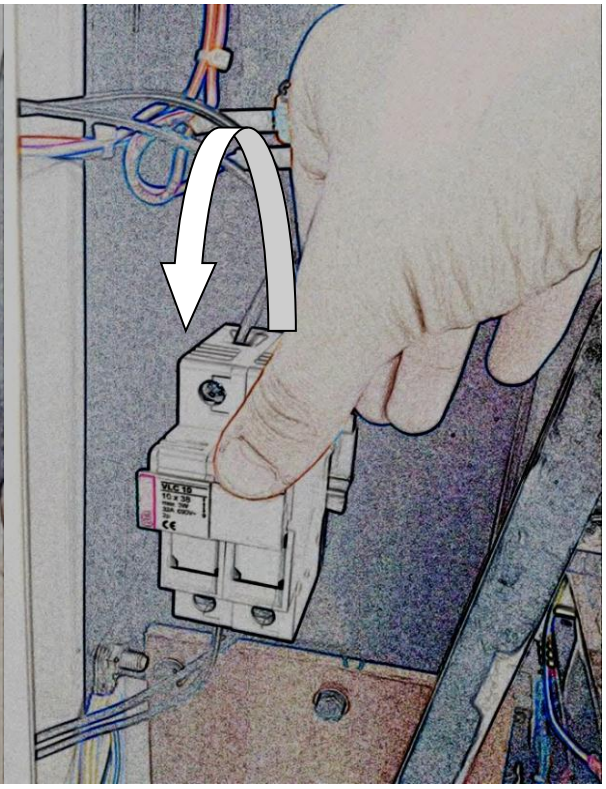


Fig. ٧: Changing ١٠ A fuses

Thanks for your selectivity

Kousha Fan Pars Engineering and Manufacturing