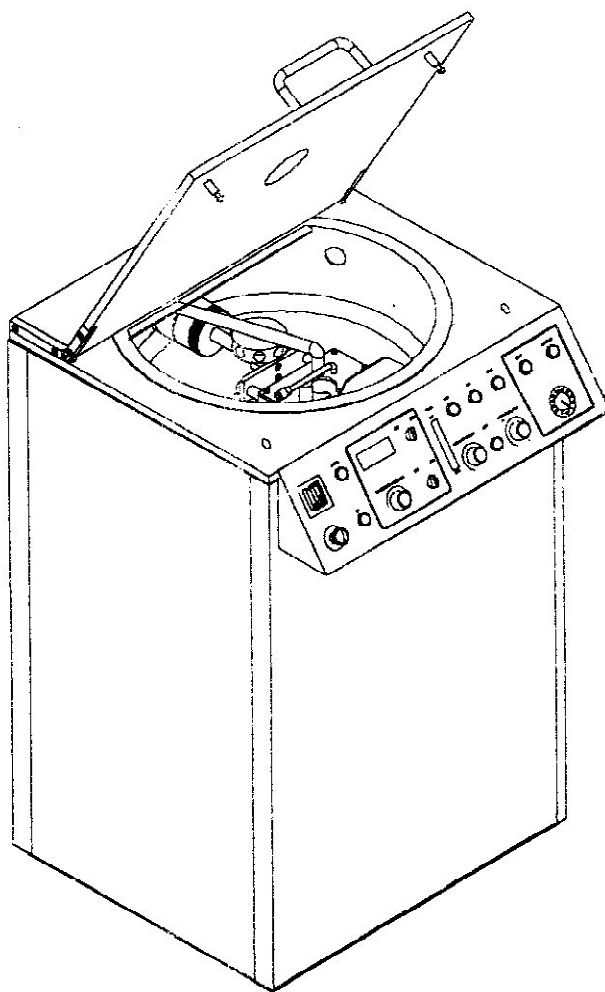




# INSTRUCTION MANUAL CENTRIFUGAL CASTING MACHINE MODEL CS-1



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# CONTENTS

1	TECHNICAL DATA .....	3
2	FOR A SAFE USE OF THE MACHINE .....	4
2.1	Safety protections.....	4
3	UNPACKING OF THE MACHINE.....	6
3.1	Supplied optional.....	7
4	INSTALLATION.....	8
4.1	Positioning of the machine .....	8
4.2	Service connection.....	8
4.3	Incorporated cooling circuit.....	9
5	GENERAL DESCRIPTION OF THE MACHINE.....	10
5.1	Description .....	10
6	INFORMATION ON THE USE.....	12
6.1	Controls .....	12
6.2	Casting and centrifugation.....	12
6.3	Casting.....	13
6.4	Vacuum casting. ....	14
6.5	Inert gas input .....	14
6.6	Centrifugation .....	15
6.7	Functioning of the version with digital temperature control pyrometer. ....	15
7	INFORMATION ON THE MAINTENANCE.....	16
8	NOISE PRODUCED BY MACHINE .....	17
9	TROUBLE SHOOTING .....	17
10	INSTRUCTIONS FOR SERVICE REQUEST.....	18

## ENCLOSURES

EXPLODED VIEW DRAWINGS

ELECTRICAL DRAWINGS

**BEFORE USING THE MACHINE READ CAREFULLY THIS MANUAL**

## 1 TECHNICAL DATA

WEIGHT	120 kg
WIDTH	600 mm
LENGTH	600 mm
HEIGHT	960 mm
HEIGHT WITH THE COVER OPEN	1430 mm
ELECTRICAL SUPPLY	220 V single-phase
MAXIMUM POWER REQUIRED	5 kW
AIR SUPPLY PRESSURE	min. 6 bar
WATER SUPPLY PRESSURE	min. 3 bar
WORKING TEMPERATURE	0 °C ÷ +40 °C
MAXIMUM CAPACITY OF THE CRUCIBLE	Au ⇒ 800 g Pt ⇒ 350 g
CYLINDER DIAMETER	min. 80 mm max. 100 mm
MAXIMUM LENGTH OF THE CYLINDER	115 mm

## 2 FOR A SAFE USE OF THE MACHINE

### ■ USE AN ELECTRIC PLUG TYPE 16 A, 380 VAC.

The use of an alternating current supply different from the recommended one can cause damages to the machine.

### ■ PLACE THE MACHINE ON A PERFECTLY HORIZONTAL SURFACE.

If the machine is inclined, it could be damaged and the centrifugal operation could result wrong because of the consequent vibrations.

### ■ NEVER TRY TO REPAIR OR TO REASSEMBLE THE MACHINE.

In case the machine is repaired, disassembled or reassembled by a non skilled person and non authorised by the manufacturing company or by the reseller, there is the danger of electric shock. This can happen also in case the inside parts are inadvertently touched.

### ■ IN CASE OF BREAK-DOWN

In case of malfunctions or improper information on the indicators during the use of the machine, immediately disconnect the machine from the electric line and contact the reseller or an authorised service centre.

### ■ EMERGENCY STOP CONTROL

This control has a mushroom shape of red colour with yellow bottom and it is placed on the control panel. It must be used : 1) to avoid, at their starting, any damages to persons; 2) to reduce, at their starting , damages to the machine or to the operation being performed at the moment. **DO NOT MISUSE.**

## 2.1 Safety protections

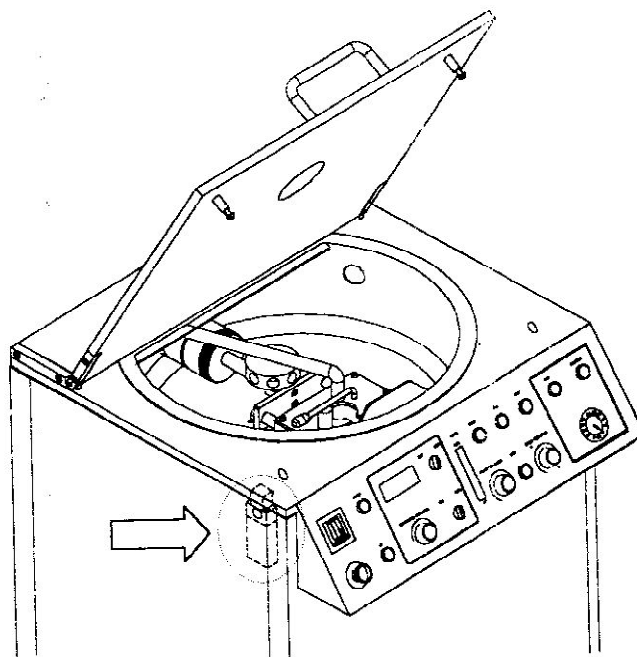
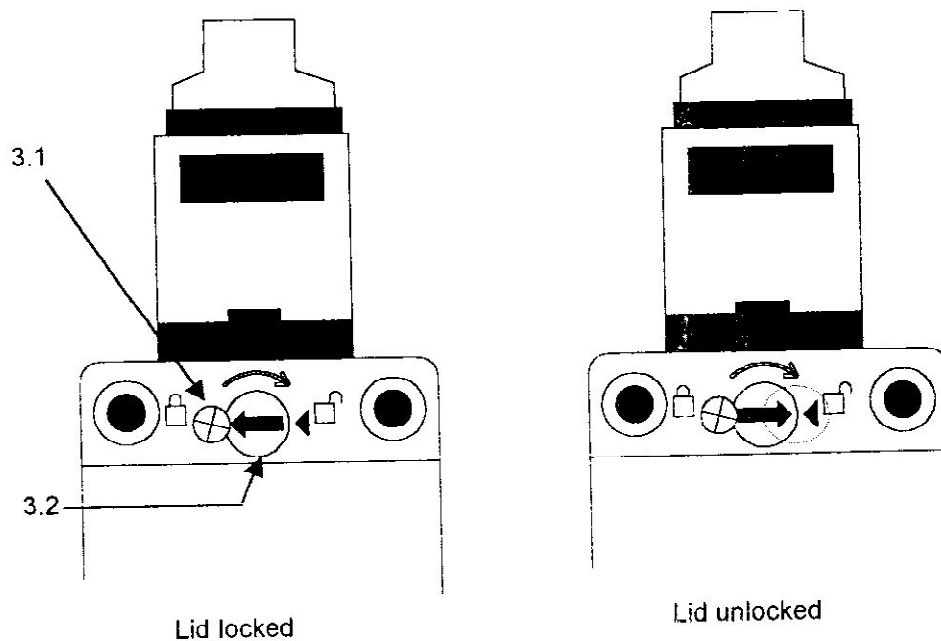
□ The operator is protected during the operations by the lid of the centrifugation chamber . The working cycle can begin only after the closure and lock of the lid. The protection device stays in the locked position until the end of the working cycle and is then electrically unlocked.

### **ATTENTION:**

**DO NOT FORCE THE LOCK OF THE PROTECTION LID DURING THE WORKING CYCLE .  
IN CASE THE LID DOES NOT AUTOMATICALLY OPEN AT THE END OF THE WORKING  
CYCLE, DO NOT FORCE TO OPEN THE LOCK.  
ONCE SHUT AND LOCKED THE PROTECTION LID CAN BE UNLOCKED ONLY IF THERE IS  
ELECTRICAL CONNECTION .**

To open the protection lid in case of lack of electric supply, perform the following operations :

1. Remove the left side panel of the machine using the special key supplied with the machine
2. Loosen the crossed screw [3.1]
3. Turn of 180° the screw [3.2] with an appropriate screw driver so that the arrows match each other and unlock the lock.
4. Open the lid
5. Turn of 180° the screw [3.2] to bring back into use the safety device and then lock it again screwing the crossed screw.
6. Re-assemble again the side panel of the machine.



**Fig.3: Safety device to lock the lid.**

■ The electrical circuits of control and power together with the rotation motor of the arm are placed below the centrifugation chamber. This place is isolated from the operator by fixed protection devices. These protection devices are kept into their seating by special screws which to be removed require the use of special keys supplied with the machine.

**ATTENTION:**

**TO PREVENT DAMAGES TO PERSONS DUE TO HIGH TEMPERATURES OR TO ELECTRICAL SHOCK, AVOID ANY DIRECT CONTACT WITH THE MELTING COIL DURING THE HEATING OPERATION.**

### 3 UNPACKING OF THE MACHINE

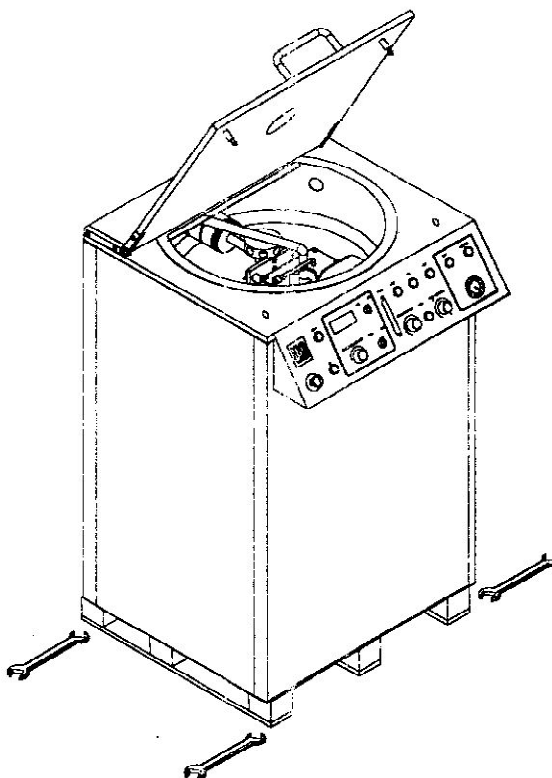
■ The machine is fixed with bolts to a wooden pallet to grant a safe transport. Use a wrench n. 17 to unscrew the bolts and free the machine from the Pallet before the installation. **ATTENTION: be careful and keep the machine in vertical position.**

■ Control that the machine has not been damaged during transport. In case of damages , contest it to carrier and give immediate written communication to the manufacturer and reseller.

■ Open the protection lid and with care free the centrifugal arm. The machine accessories can be found into the centrifugal chamber.

#### **ATTENTION**

**Read the chapter "SAFETY DEVICES" for accessibility to the centrifugal chamber.**

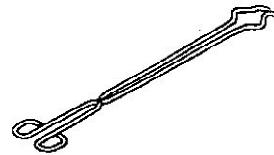


#### **ATTENTION**

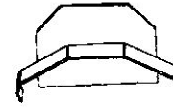
**WHEN STARTING THE MACHINE, THE TANK MUST BE COMPLETELY FREE FROM ACCESSORIES AND PACKING MATERIAL.**

### 3.1 Supplied optional

n. 1 plier for crucible and for cylinder  
cod. MA0087



n. 1 spacer for cylinder  
cod. 028D0043

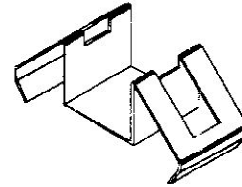


n. 3 cylinder saddles of different sizes

Ø 80 mm. cod. 017O0071

Ø 90 mm. cod. 017O0072

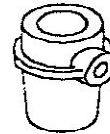
Ø 100 mm. cod. 017O0069



n° 1 refractory crucible (cod. MA0086)

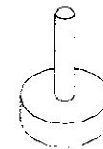
n° 1 graphite crucible (cod. MA0084)

n°1 graphite crucible lid (MA0085)



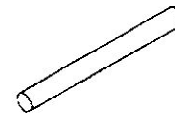
n. 4 casting machine feet

cod. 017MA032



n° 1 balancing key

(cod. 028A0044)



n. 1 screwdriver for protection panel

cod. MA0052

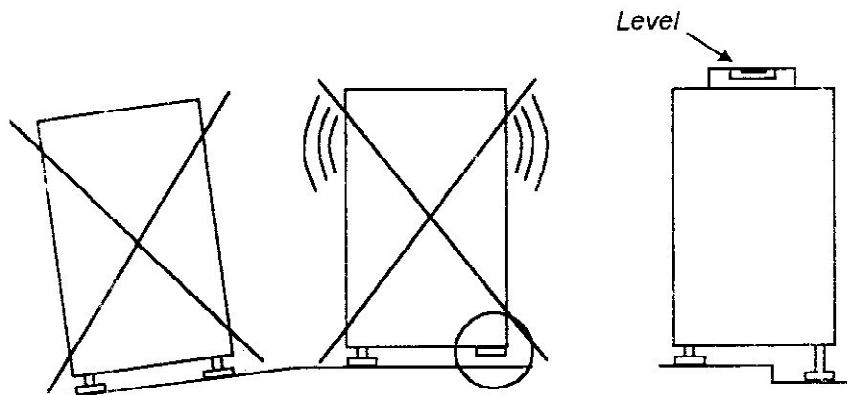


## 4 INSTALLATION

### 4.1 Positioning of the machine

■ The machine must be located in a well ventilated room for the evacuation of smokes and vapours that are formed during the melting process. To ease the casting procedure and to reduce the risks of handling hot materials it is suggested to install the casting machine next to the preheating oven and to the service sink.

■ When the machine has been positioned **CHECK THAT IT STANDS STABLE AND IN HORIZONTAL POSITION.** It is absolutely necessary to have an accurate stability during the rotation of the centrifugal arm. Regulate, if necessary, by the supplied feet the correct set-up of the machine. **DO NOT INSERT ANY SHIM BETWEEN THE FEET AND THE FLOOR.** Check with a level the perfect horizontal position of the machine.

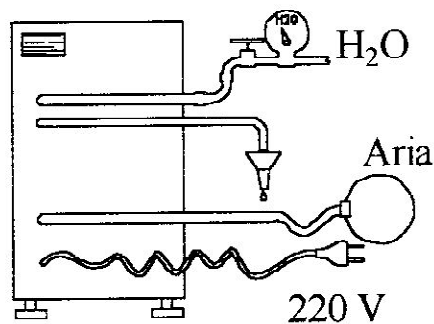


### 4.2 Service connection

■ Check that the main voltage supply corresponds to the one written on the identification plate set on the back panel of the casting machine. Check that the installed power is sufficient.

#### **ATTENTION:**

**always remember that grounding is compulsory. Check that the power supply and ground connection are made properly.**



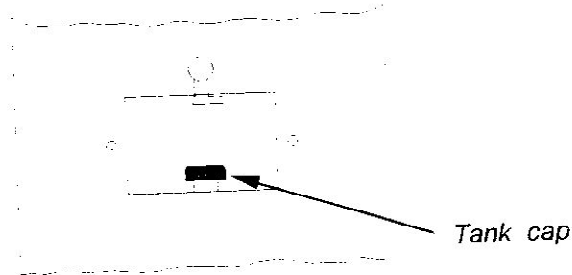


- Connect the water to the cooling circuit (if not supplied of incorporated cooling) respecting the specified direction. The minimum pressure of water supply must be 3 bar. A pressure switch checks the water flow and stops the operation of the machine if the pressure is insufficient.
- Connect the compressed air circuit through the appropriate connection. For a good operation the air pressure must be between 6 and 8 bar. In case the air pressure is lower than indicated the machine functions are stopped.

### 4.3 Incorporated cooling circuit.

To fill the cooling circuit do the following:

- 1- Remove the small panel in the back of the machine and locate the black filling cap;



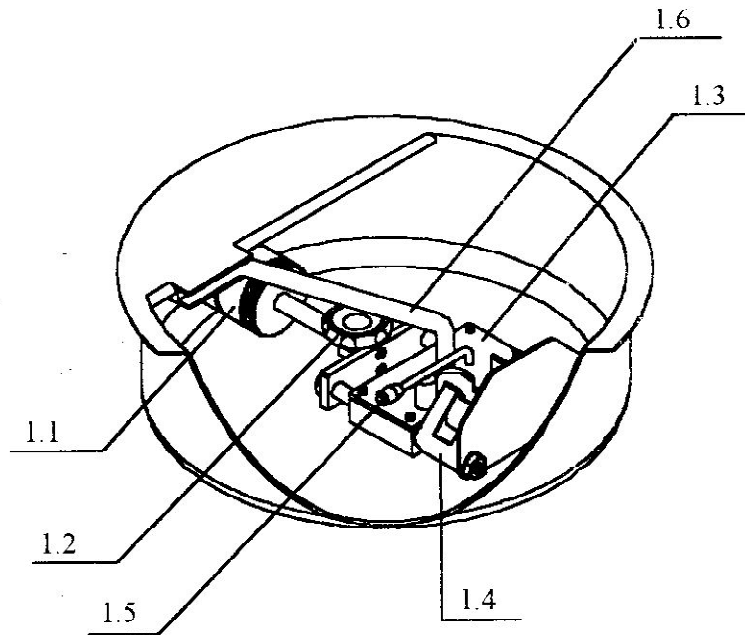
- 2- Fill in the tank approximately 24 litres of water taking care not spill on the electric circuits;
- 3- The tank must be periodically checked , about every 6 months, to refill the water evaporated during the use of the casting machine.
- 4- To empty the tank, open the internal tap over the tank cap and switch on the machine. The water pump will push out completely the water from the cooling circuit.

## 5 GENERAL DESCRIPTION OF THE MACHINE.

### 5.1 Description

The CS1 is a centrifugal casting machine with induction heating which has been projected to satisfy the demands of the jewellery laboratories , where there is the need to do lost wax casting of different shapes.

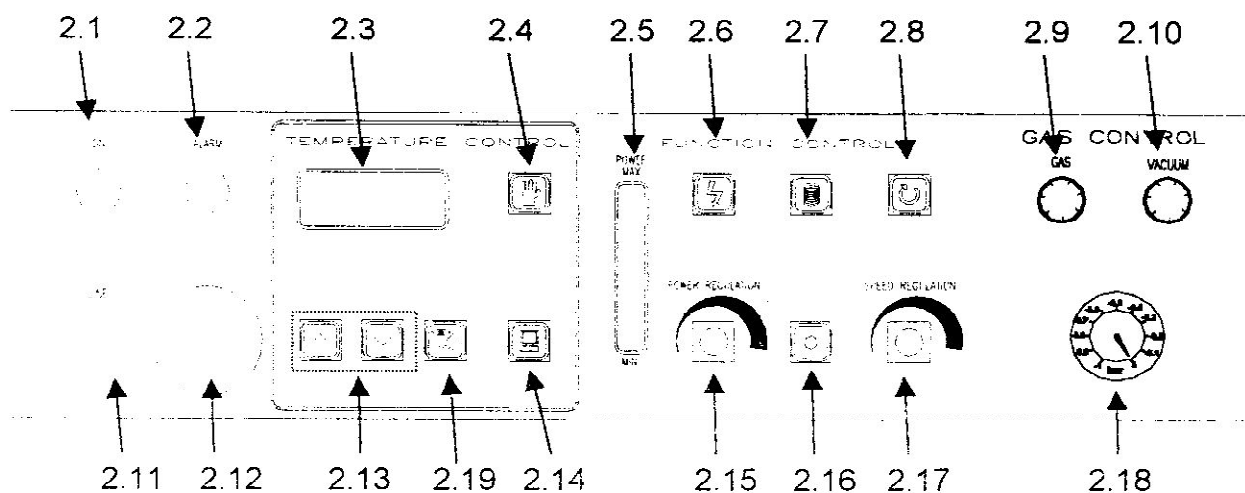
The machine is composed of a steel support which holds up the centrifugal tank and of the closing steel sheet panels. On the top panel of the machine there is an opening lid equipped with safety locking to reach the working area.



**Fig.1: Centrifugal well.**

Description of the parts:

1.1	Counterweight	1.4	Cylinder saddle
1.2	Arm balancing knob	1.5	Crucible lid stopper
1.3	Crucible support	1.6	Temperature reader



**Fig.2: Control panel .**

- |                                |  |
|--------------------------------|--|
| 2.1 Line led                   | 2.10 Vacuum Start/Stop selector                            |
| 2.2 Alarm led light            | 2.11 Main selector switch                                  |
| 2.3 Temperature display        | 2.12 Emergency push-button                                 |
| 2.4 Manual control push-button | 2.13 temperature regulation                                |
| 2.5 Absorbed power indicator   | 2.14 automatic control push-button                         |
| 2.6 Power supply start         | 2.15 Melting power regulation                              |
| 2.7 Melting coil lift          | 2.16 Power supply , centrifugation and coil lowering stop. |
| 2.8 Centrifugation start       | 2.17 Speed regulation                                      |
| 2.9 Gas Start/Stop selector    | 2.18 Vacuum manometer.                                     |
|                                | 2.19 Temperature set up.                                   |

## 6 INFORMATION ON THE USE

### 6.1 Controls

- Control that the water and air connections have been done correctly (there must not be leaks, air holes etc) and that the electric supply is connected.
- Control that the emergency mushroom push-button [2.12] is not pushed; to release the emergency rotate the button in the direction of the printed arrow.
- Adjust the acceleration of the centrifugation by the knob [2.17].

**NOTE:** *it is suggested to fix and regulate the acceleration according to the material to centrifuge. It is generally suggested low acceleration for heavy masses and higher values for lighter masses.*

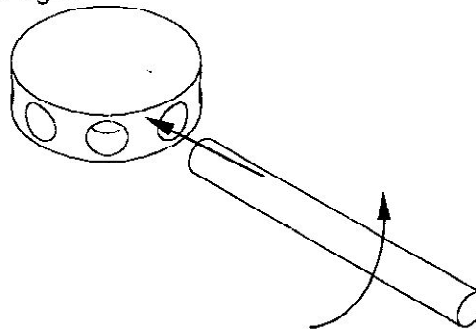
- Control that the centrifugation well is free from any material or tool.

### 6.2 Casting and centrifugation

#### **ATTENTION:**

**Use a crucible in good condition. If necessary, replace the crucible with a new one to avoid its breaking and the further damaging of the casting machine or the results of bad castings.**

- 1- Prepare the metal to melt inside the crucible.
- 2- Insert the crucible into its seat [1.3] and position it towards the outside of the well.
- 3- Position the flask, which must not be hot, on its special cylinder saddle [1.4] choosing the appropriate measure among the supplied sizes.
- 4- Use the supplied spacer in case the distance between the crucible holder and the flask is wider than 10 mm.
- 5- Balance the counterweights: first of all it is necessary to loosen the knob [1.2] placed on the rotation shaft to balance the centrifugal arm: for this operation use the supplied balancing key inserting it into one of the special seat of the knob [1.2] as shown in the thereunder drawing, and push it towards one own right.



Subsequently position the counterweights until the balance point has been reached.

#### **ATTENTION:**

**The more accurate the balancing is, the less the machine will vibrate.**

- 6- Tighten with the knob [1.2] the rotating arm of the centrifuge using the key and pushing it towards left.
- 7- Remove the flask to make the pre-heating.

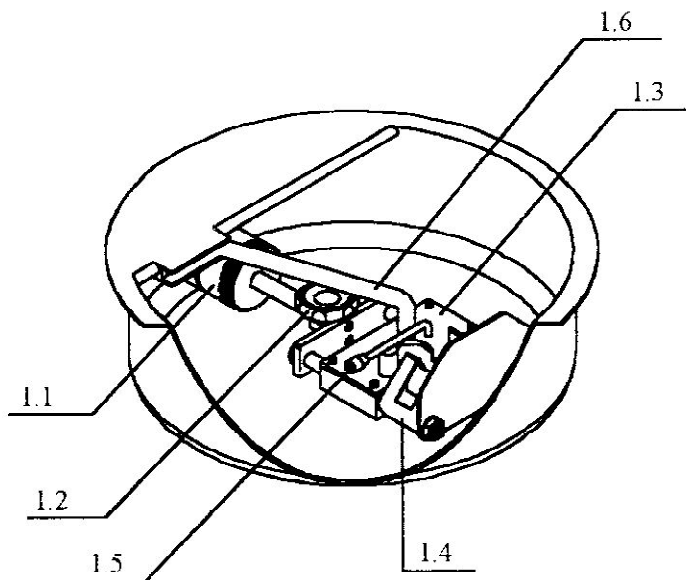
## 6.3 Casting

- 1- Switch on the machine by the main selector switch on the frontal panel [2.11] (and prepare the machine for the working operations.)

### ATTENTION:

The white light [2.4] and the digital temperature indicator [2.3] must turn on.

- 3- Position the centrifugal arm aligning the axis of the crucible with the axis of the heating coil.
- 4- Press the lift button [2.7] to position the coil. When the correct position has been reached, the white light turns on and the coil stops in casting position.



### ATTENTION:

- a) If the arm position is not correct (as mentioned at point 3) the coil does not lift.
- b) in case the right casting position is not reached, control the air pressure or whether there is some blockage in the inside of the well obstructing the lifting of the heating coil.
- c) with the heating coil up, the centrifugal motor is blocked.

- 5- Position the crucible holding plate [1.3] toward the centre of the rotation.
- 6- Insert the crucible into its seat [1.3]
- 7- Insert the material to be melted inside the crucible.
- 8- Close the crucible with its lid and stop it with the lever [1.5] placed in its side.
- 9- For the castings with automatic control of the temperature, see the chapter "Functioning of the digital pyrometer".
- 10- Close the lid.

**NOTE:** During the fusion from the metallic mass a small gaseous formation exhales, this could be dangerous only when the operator voluntarily and wilfully performs the fusion with the lid open and breathes directly above the crucible.

- 11- Press the power button [2.6]. The white light will switch on and after 4 or 5 seconds the led bar [2.5] will show a certain absorption ; It is necessary to regulate it according to the type and quantity of metal, turning the knob [2.15] toward right to increase the casting power (and consequently also the casting speed).

### ATTENTION:

To look at the casting process, use an anti UV ray protective screen placed on the lid.

When the casting of the metal has been made, it is possible to proceed with centrifugation.

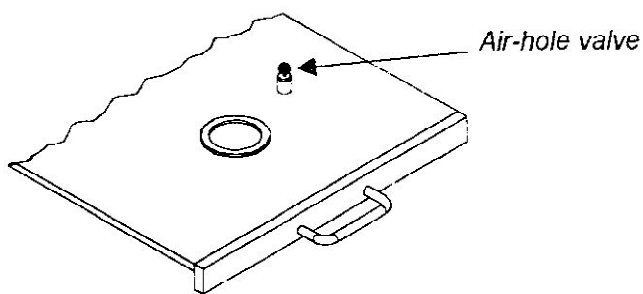
**ATTENTION:**

The lack of electric energy after the closure of the cover of the centrifuge causes the blockage of the protection device.

See the chapter "SAFETY PROTECTION DEVICES".

#### 6.4 Vacuum casting.

- 1- Prepare the crucible on its seat [1.3] with the metal to cast in . Insert the pre-heated flask and close the protection lid. It is recommended to heat the flask 5-10 degree more than usual to avoid an excessive cooling while the air is sucked in from the centrifuge well.
- 2- Press the button [2.10] to start the suction of the air from the centrifuge well, when a negative pressure of -0.8 bar has been reached , the pump can be turned off pressing the button [2.10] again.
- 3- When the casting and the further centrifugation have been finished, press the air-hole valve on the lid to fill in again the centrifugal well with air in order to make easier the opening of the lid.



#### 6.5 Inert gas input

**NOTE:** control that the gas cylinder is connected and that the valve is open.

When the protection cover has been closed, press the button "VACUUM" [2.10] so that the air into the centrifugal well is sucked up. When the pressure vacuum indicator shows a negative pressure of -0.8 bar the pump can be switched off. Press the button [2.9] to start the gas input, controlling the pressure inside the centrifugal well. When the pressure vacuum indicator shows a pressure of 0, the well is full of gas. Stop the gas input pressing the button [2.9] and start the heating of the metal pressing the button [2.6] .

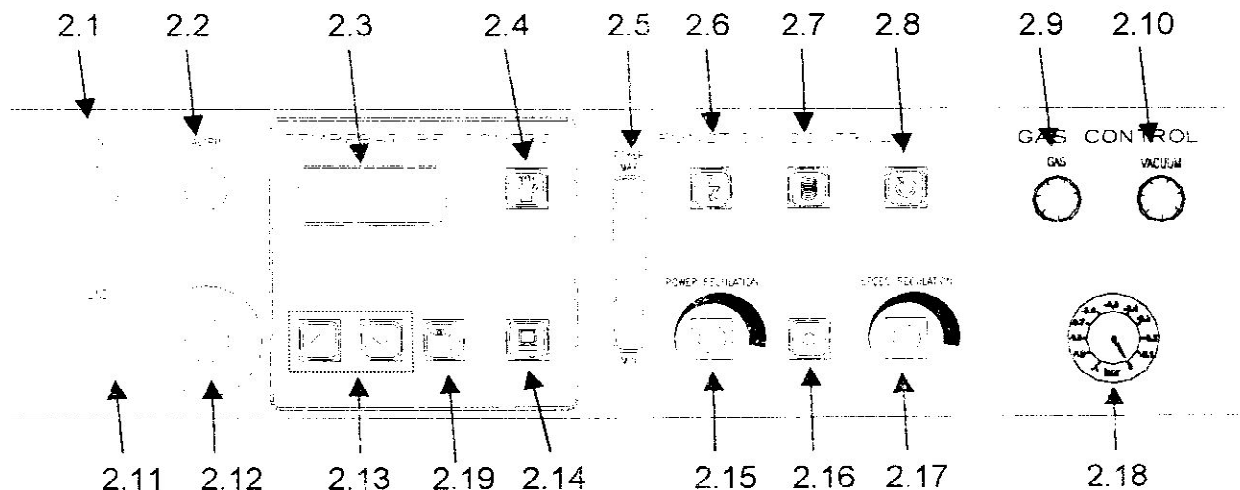
## 6.6 Centrifugation

- 1- While the metal is being heated, open the protection cover and insert the flask (which has been heated separately).
- 2- Close the protection cover locking it with the closing lever and wait that the metal is completely melt.
- 3- Press the key [2.8] to start centrifugation.
- 4- When the centrifugation has been automatically finished, or it has been stopped by the button [2.16], open the cover and remove the flask with the special plier.

### ATTENTION:

The centrifuge keeps the set speed for about 40 seconds and then it stops. The cover is locked for 5-10 sec. after the stopping of the arm.

## 6.7 Functioning of the version with digital temperature control pyrometer.



With the casting machine equipped with pyrometer, it is possible to do the casting in manual or automatic mode as thereunder described.

**Manual :** the power supply is controlled by the operator who can regulate it by the special handle [2.15]. Move the pyrometer support [1.6] from over the crucible and press the button [2.4] to select the manual mode.

The display does not show any temperature and the temperature must be visually controlled.

**Automatic:** the power supply when the pre-set temperature has been reached is controlled by a special electronic circuit.

To work in automatic mode, follow thereunder instructions:

1. Position the pyrometer support [1.6] over the crucible.
2. Press the button [2.14] to select the automatic mode.
3. Press the button [2.19] to show set temperature on display and then regulate the temperature [2.13] until on display [2.3] it is shown the desired temperature.
4. Wait about 6 sec. (in case the temperature data do not change for about 6 sec. the automatic mode is automatically selected) before confirming the set up data and the reading of material temperature in the crucible during the fusion.

When the temperature has been set, start the casting as previously described.

**ATTENTION:**

The pyrometer is an infrared optical reader and its automatic functioning can result wrong due to the presence of oxidation on the metal surface that changes its colour.

For a correct use of the casting machine the casting of the metal must always be visually controlled.

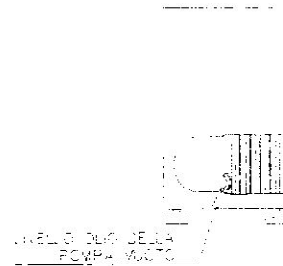
The manufacturing company declines any responsibilities in case the alloy is burnt as it is not possible to know the real melting temperature of every alloy.

## 7 INFORMATION ON THE MAINTENANCE

**ATTENTION:**

**BEFORE MAKING ANY MAINTENANCE OPERATION, DISCONNECT THE MACHINE FROM THE ELECTRIC SUPPLY.**

- Clean carefully inside the centrifugal chamber removing any investment, fragment or metal splinter. Clean particularly the Teflon coil support by means of the compressed air gun.
- To preserve the machine life, it is a good rule to provide a good cleaning inside the machine blowing compressed dry air, particularly in the power section set in the back part of the machine.
- Check every 6 months that water level in the cooling tank and refill the water evaporated during the use of the casting machine through the appropriate cap, accessible removing the back side panel.
- At the end of the daily operation, unscrew la glass holder bush placed at the end of the binocular which holds the pyrometer [1.6]; remove the small glass and clean it very carefully with a micro fibre cloth ; then place it again as before.
- Check the oil level in the vacuum pump at least once a year.





## 8 NOISE PRODUCED BY MACHINE

Measurement has been made during centrifugation cycle as this is the noisiest operation performed by machine.

- Phonometrical measurement according to UNI 9432 standards
- Phonometre: Bruel & Kjaer type 2218 with filter in octavo 1613 N. 895445
- Ponderation filter : curve A
- Measurement system : the measures have been calculated according to the acoustic pressure data and the time duration of the measures.
- Continuous sonorous equivalent pondered A level in the working place :

$$L_{Aeq,T_p} = 68.7 \text{ dB}$$

## 9 TROUBLE SHOOTING

### ■ *Switching ON the main switch, the stop indicator and the pyrometer display do not light*

Check the line fuses placed inside the centrifuge;

If only the white line button lights, check the compressed air feeding (6 bar pressure) and check that the red emergency button is released;

### ■ **There is no power**

Check that there is enough water pressure ;

The heating coil has not been raised;

The water temperature is over the safety level (only for the version with incorporated cooling circuit).

Check that the protection lid of the centrifugation chamber is perfectly closed

### ■ **When power is ON, there is no heating**

Check that the power is not regulated at the minimum;

Check the fuses inside the machine electric board;

### ■ **The centrifugation is not working**

The protection lid is not perfectly closed;

The coil is not completely lowered;

Not enough compressed air pressure ;

### ■ **The temperature reached is not the same than the set one**

The temperature reader is not positioned exactly above the centre of the crucible;

The reader glass is dirty or steamed up (clean periodically the reader glass).

## **10 INSTRUCTIONS FOR SERVICE REQUEST**

Technical service can be requested on working days at the following times:

08:00 - 12.00 e 13.30 - 18.00

Service requests must forwarded to :

SEIT Elettronica S.r.l.

Zona industriale Loc. Zecchei

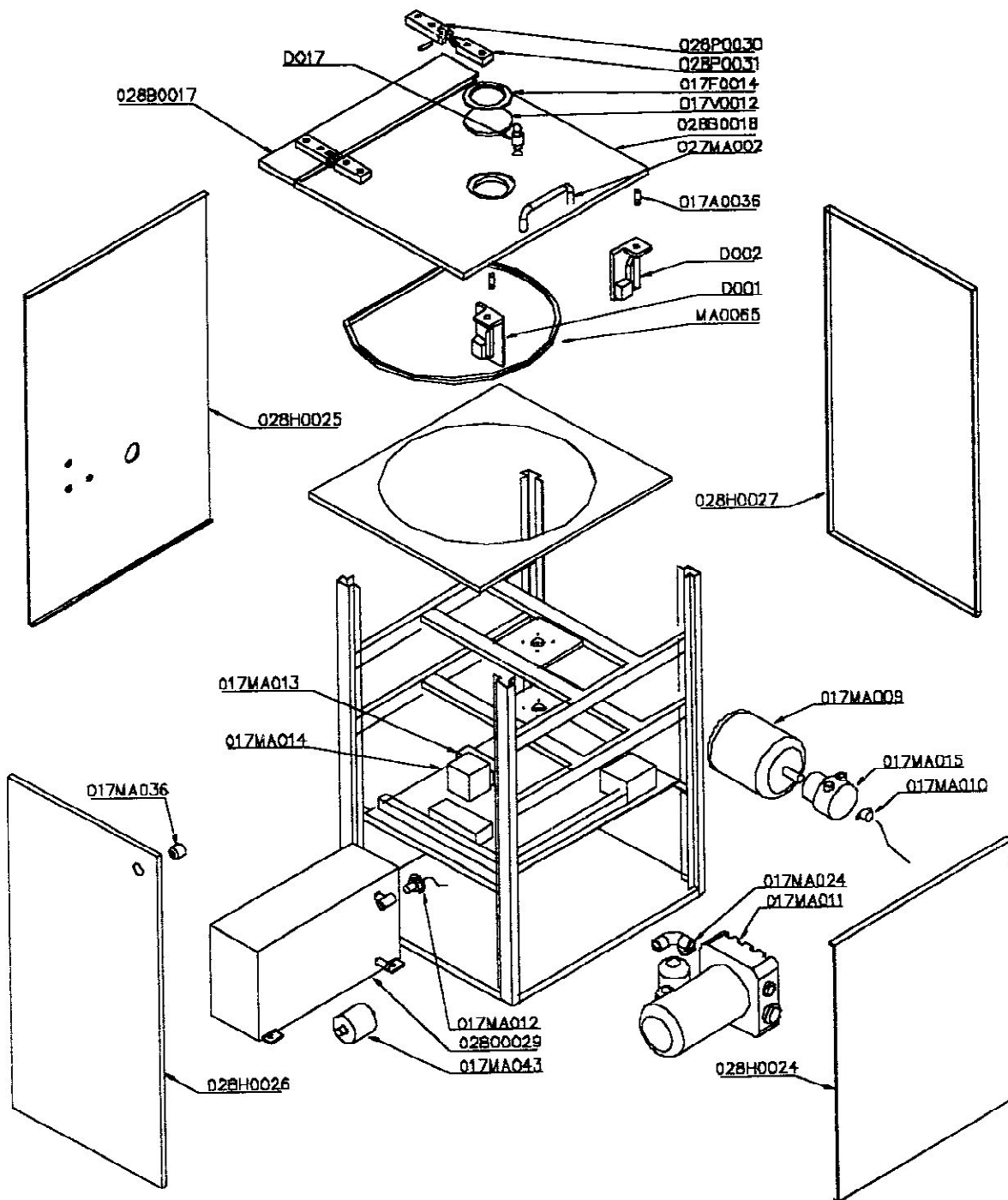
31049 Valdobbiadene (TV) Italia


Tel. 0423/975767

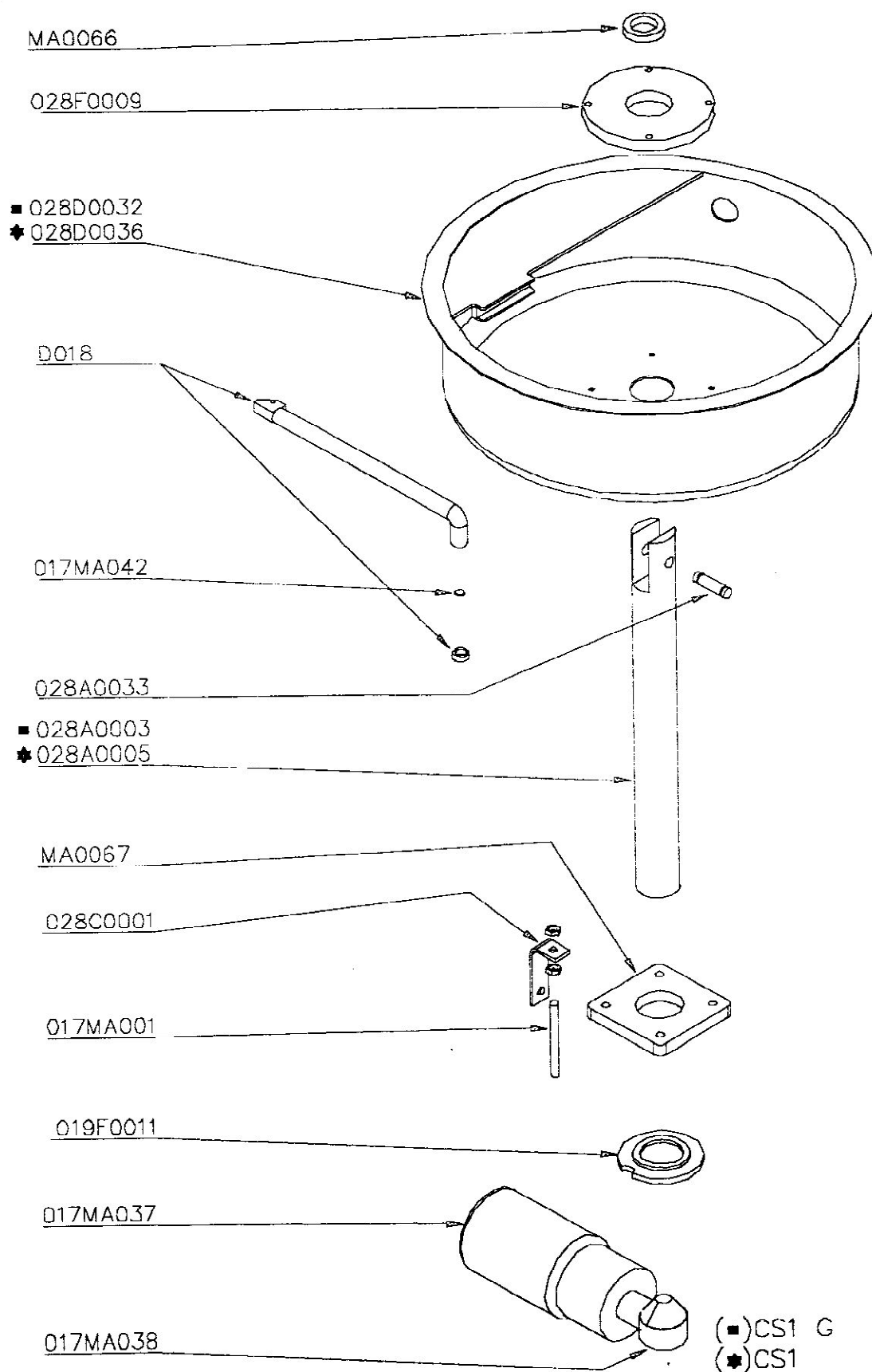
Fax 0423/975785

**The SEIT ELETTRONICA S.r.l. declines all responsibilities for any mistakes contained in this manual if due to print or transcription mistakes and we reserve for ourselves the right to introduce any modification, at any time without any prior communication, on the technical characteristics of the machine herein described..**

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Tel. 0423 975767 - Telefax 0423 975785 - Telex 420563 SEIT I**

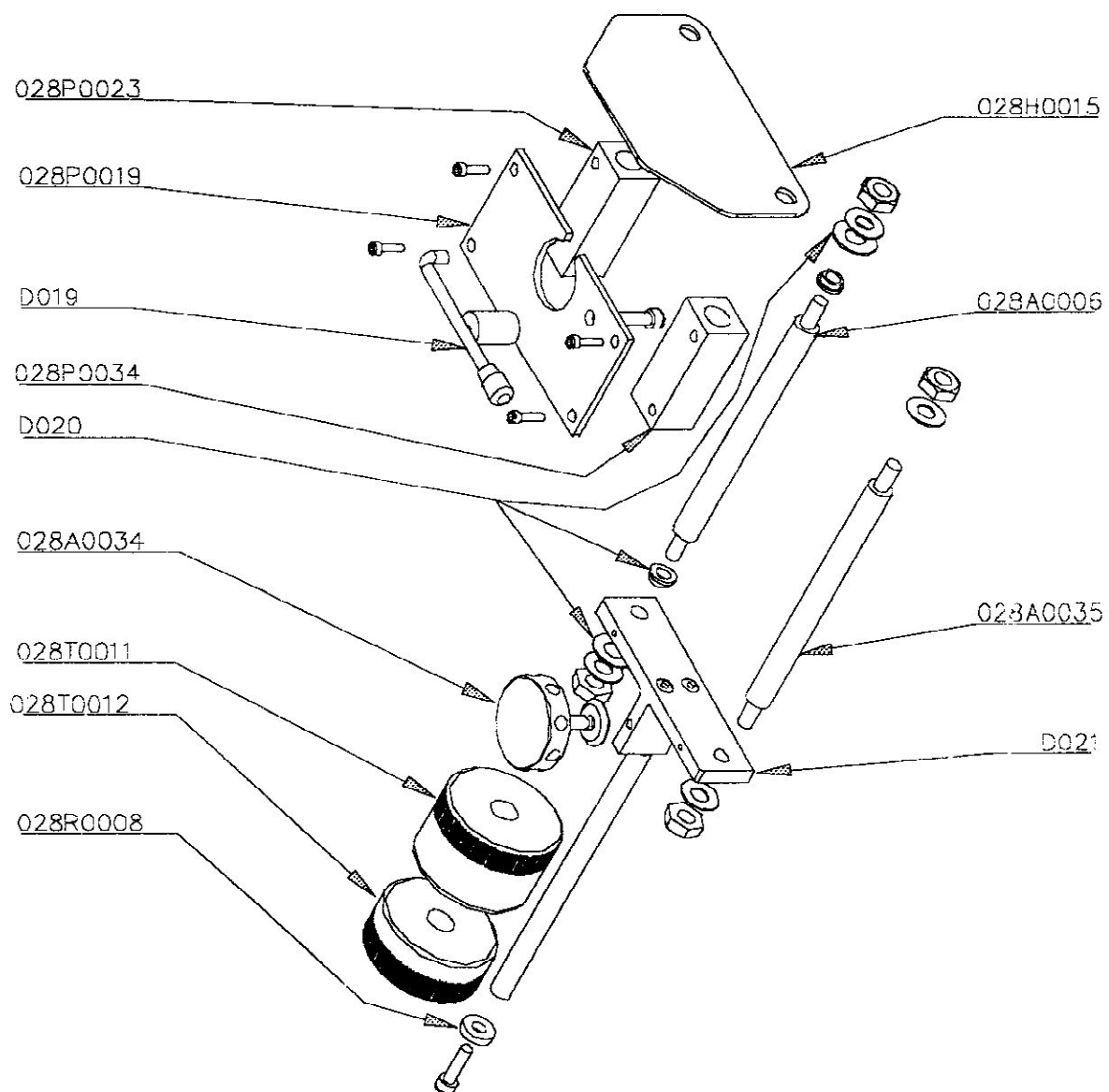



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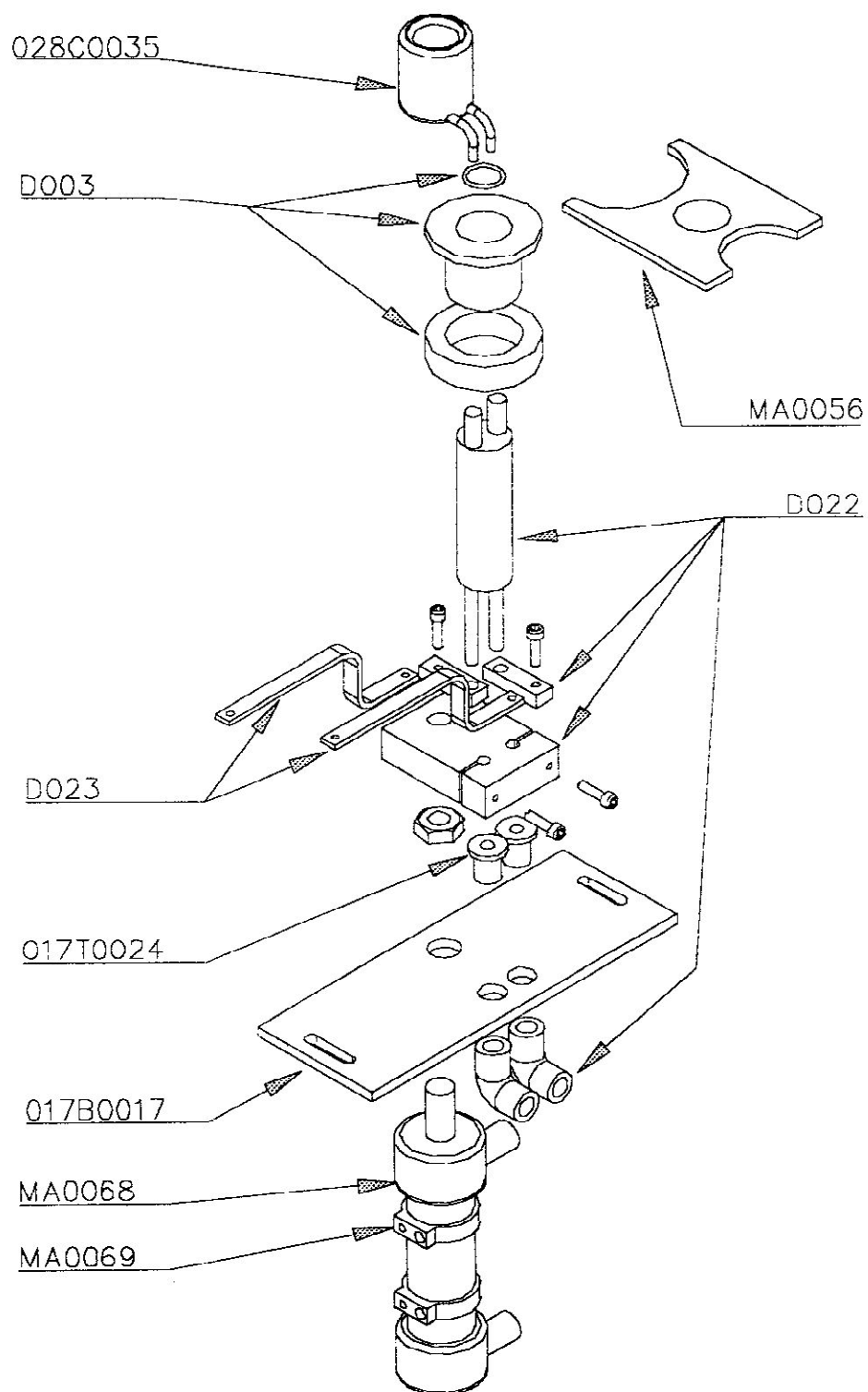



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ROTATION SYSTEM



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	DATA :	02/05/96	



	DIS. N°	028-W-0104	COIL MOVEMENT SYSTEM
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