

**Description and Preventive**

**Maintenance Manual**

**ONA PRIMA SERIE “E”**

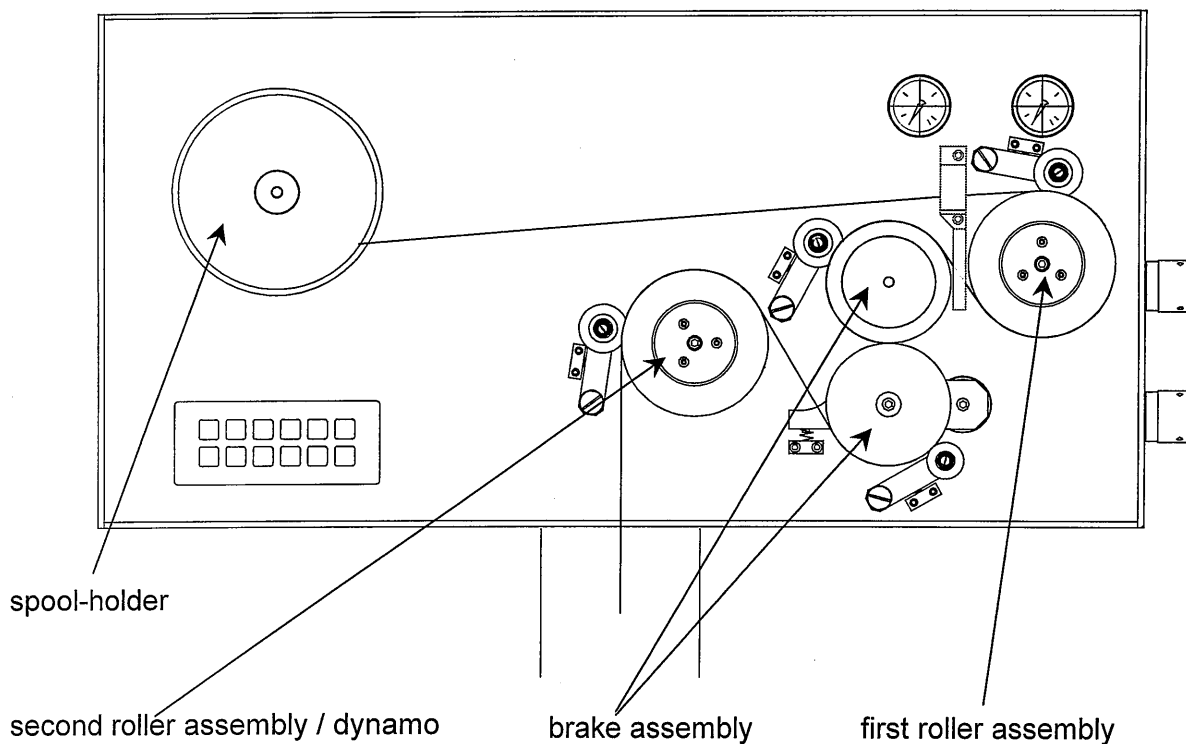
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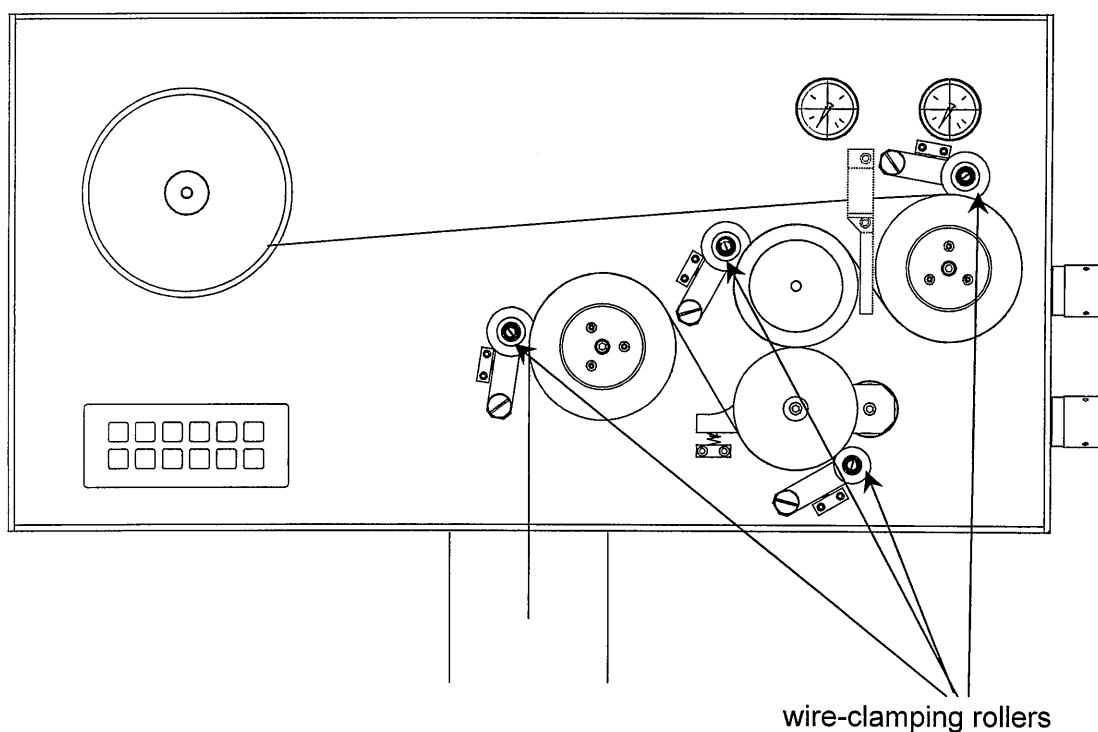
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## 1. MACHINE

### 1.1 FRONT PANEL (machine without Automatic Wire Threader. In machines with Automatic Wire Threader see its correspondent manual)



**figure 1**

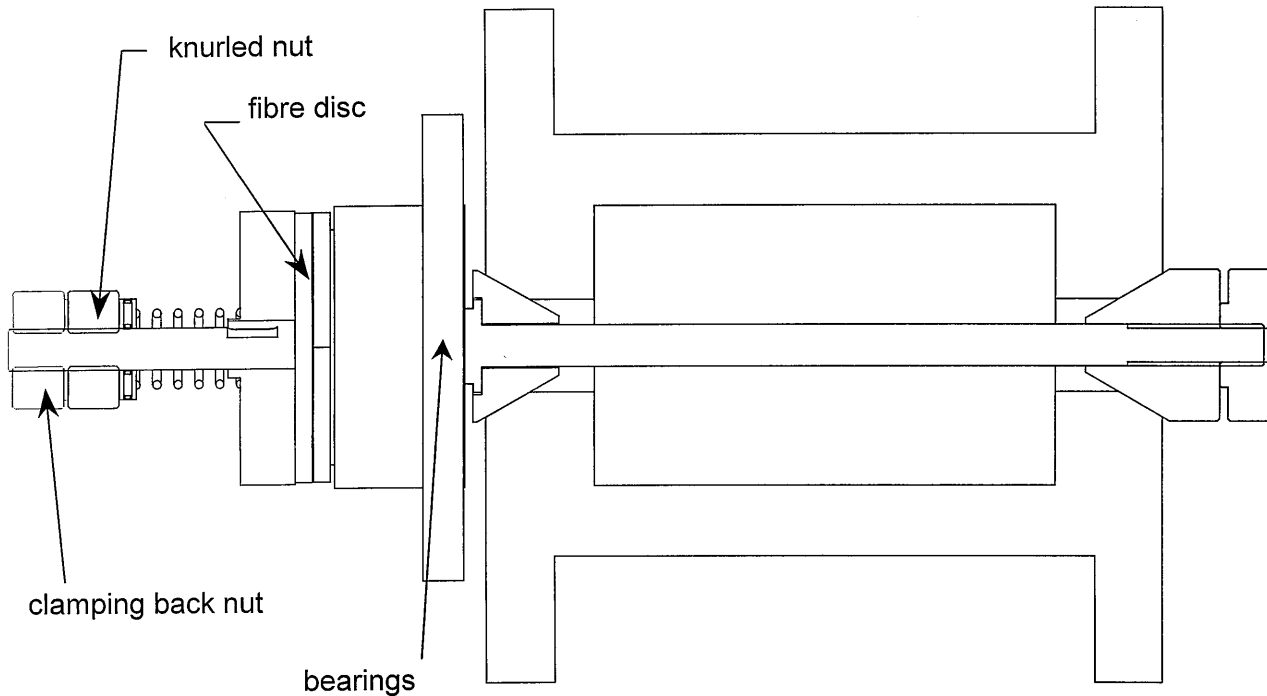


**figure 2**

### 1.1.1 SPOOL-HOLDER

There are three precepts:

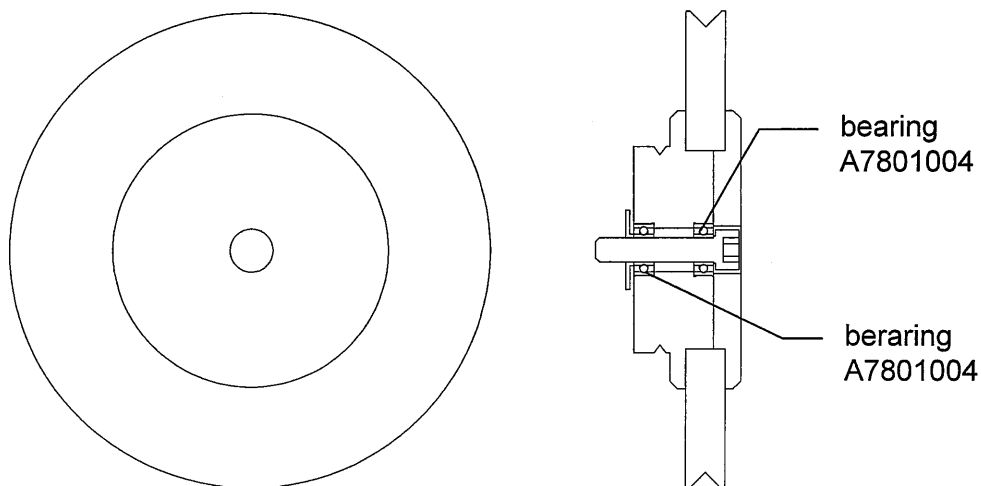
- (a) Always ensure that the bearings are thoroughly lubricated.
- (b) Always ensure that the fibre disc brake is not too dry, since if it is then the slide will be irregular and functioning will be impaired. You should spray it with CRC226, CRC556, or a similar fine oil.
- (c) Always be sure that wire tension is appropriate. Adjust it by means of the knurled nut. Tension should be 300 g. when the coil is half unwound (aprox. 4 kg of wire) (See figure 3).



**figure 3**

### 1.1.2 FIRST ROLLER ASSEMBLY

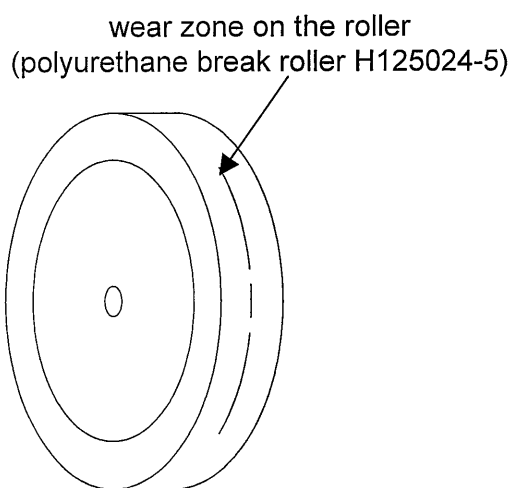
It is important to check visually that it turns freely, because it has bearings that should be regularly lubricated.



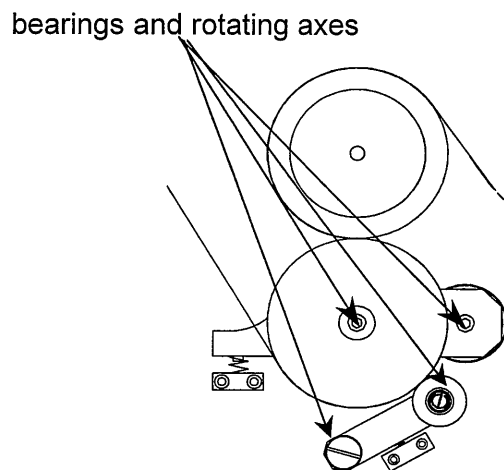
**figure 4**

### 1.1.3 BRAKE ASSEMBLY

It is important to inspect the condition of the polyurethane brake roller (see figure 5) since with time it can leave a mark. This mark is of little importance as long as it is not pronounced, but it should not exceed the thickness of the wire being worked with. Lubricate the bearings and the rotating axes in the manner described above (see figure 6).



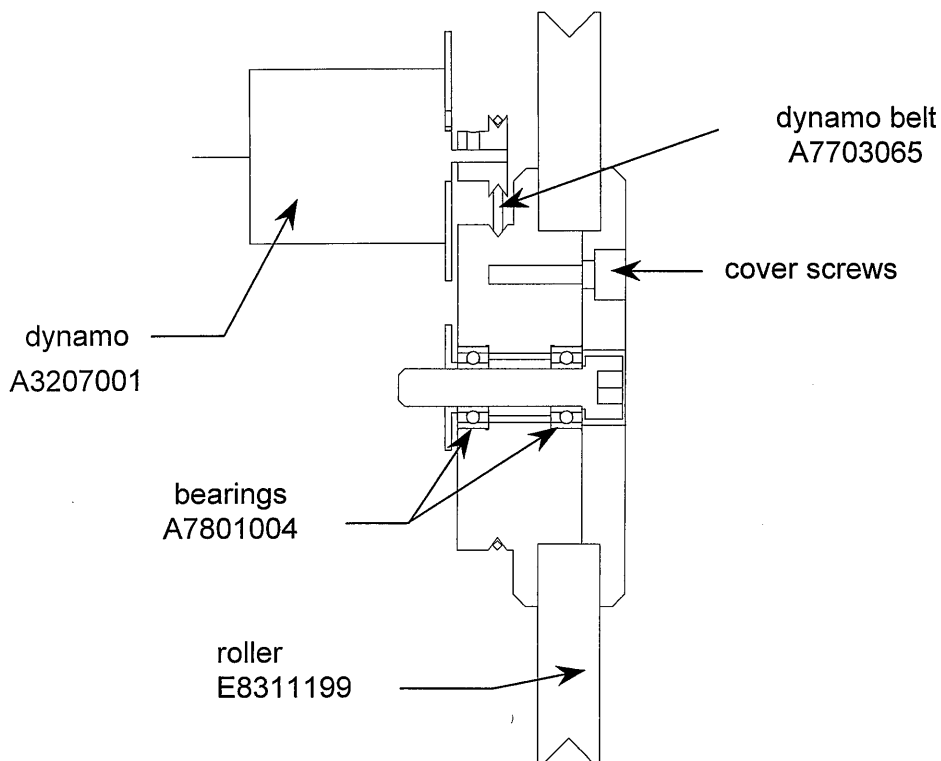
**figure 5**



**figure 6**

#### 1.1.4 2° SECOND ROLLER ASSEMBLY - DYNAMO

As in the first case, it is important to check that it rolls freely, since it has bearings that should be regularly lubricated. In addition, care should be taken with the belt and the dynamo. So that the dynamo functions well, ensure that the belt is not too tight. To facilitate easy adjustment, remove the three cover screws, disassemble the roller, and take out the roller. You can then see the belt and the dynamo (Figure 7), being now possible to tight or untight it easily, working on the dynamo fixing screws.



**figure 7**

#### 1.1.5 WIRE-GUIDING ROLLERS

It is important to check the outside condition of the four rollers making up the assembly, and in addition to lubricate their bearings (Figure 2).

### 1.1.6 PERMANENT FLOW REGULATOR

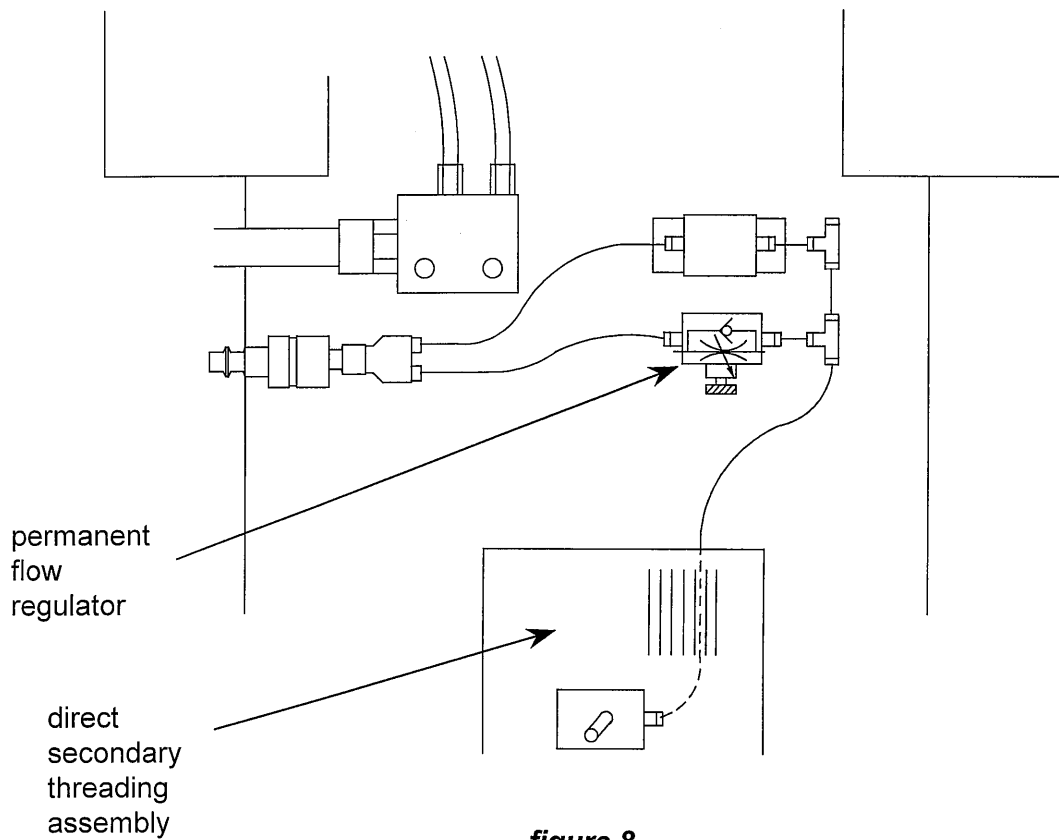
#### Function:

To provide the wire output tube with air and thus to inhibit intake of water from the lower head. To eliminate humidity from tube interior.

#### Adjustment:

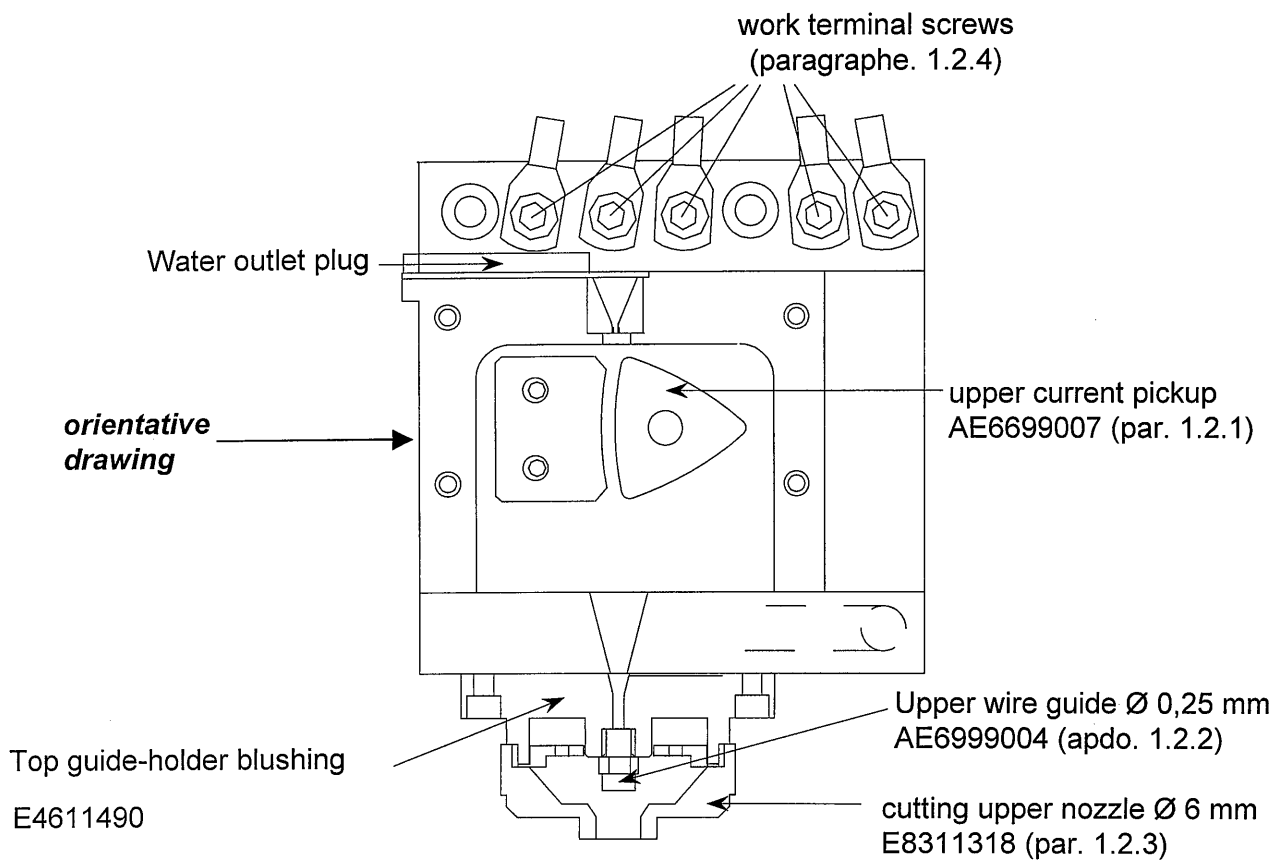
By means of its screw and locknut. To provide a rough idea, the airflow originated should not be noisy in the machine, only must be heard a slightly blast and must not drop water through the rear side (entrance to the secondary threading assembly). (It has been already adjusted in the factory).

**PRIMA machine rear view without automatic wire threader**



**figure 8**

## 1.2 UPPER HEAD ASSEMBLY

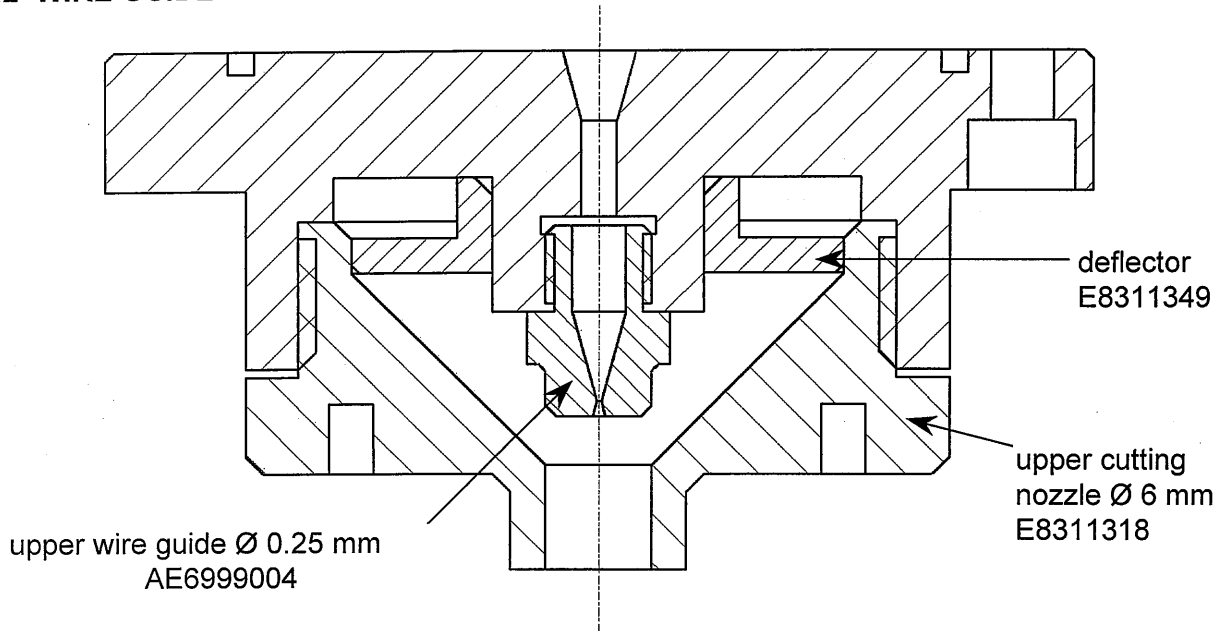


**figure 9**

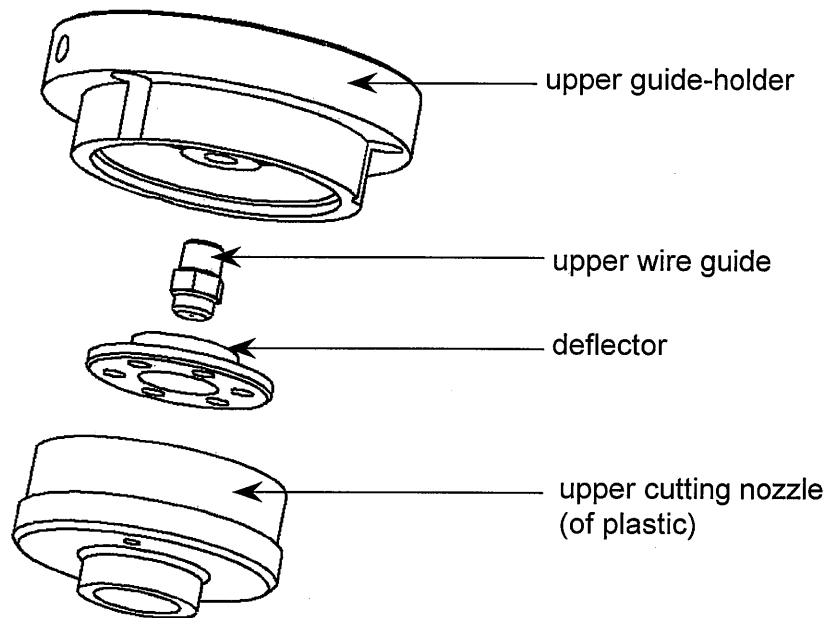
### 1.2.1 CURRENT PICKUP

Ensure that the current pickup wire contact is sound and that it is not pitted or has grooves by the small sparks produced when wire breaks, when work is done without water, etc. The same current pickup can be used up to six times, and has six positions. If these are badly worn it should be replaced.

### 1.2.2 WIRE GUIDE



*figura 10*



*figure 11*

This is a very delicate piece. Avoid over-tightening the screw, so that it is not deformed. Pass the wire through the guide to ensure that there are no differences in wire tension, or, equivalently, that there are no snags in the wire inside the guide.

If there are snags, they may be due to small fissures in the diamond guide itself. In such conditions wire ruptures will be more frequent and it may become impossible to work with the machine. It is then essential to change the guide(s). (See figures 9, 10 and 11).

### 1.2.3 PLASTIC NOZZLES

These are the pieces most likely to suffer knocks and abrasions, since they come closest to the work zone. Water pressure and machine operation in general depend on their condition, for which reason it is important to keep them under observation. (See figure 8.)

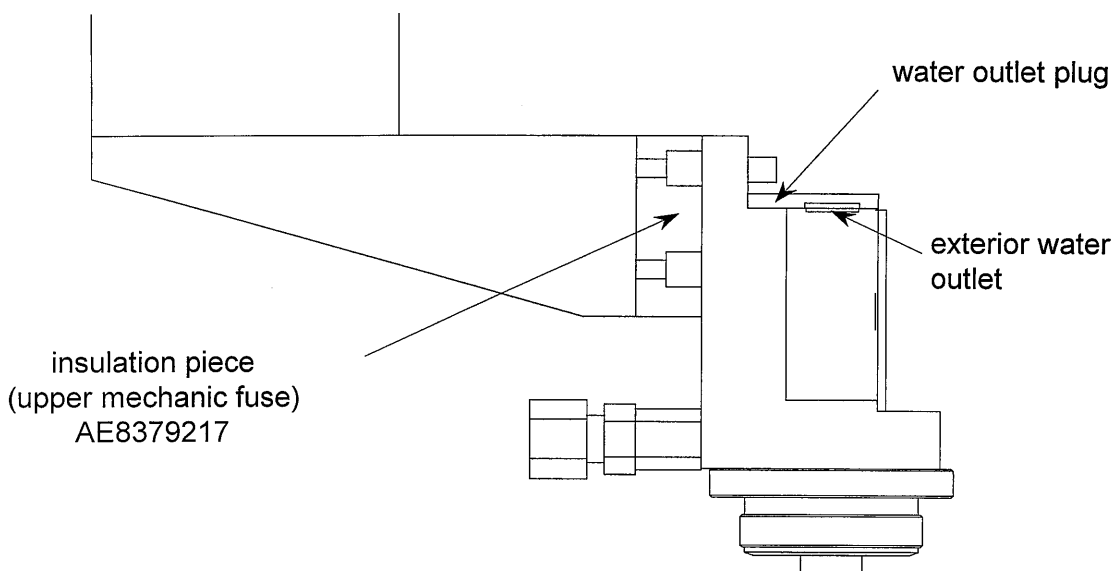
### 1.2.4 WORKING CABLE TERMINALS

Ensure that the working cables are in sound condition, and that they are properly connected to the upper head assembly. (See Figure 8.)

### 1.2.5 INSULATION PIECE FOR THE UPPER HEAD ASSEMBLY (Upper mechanic fuse)

This has several functions:

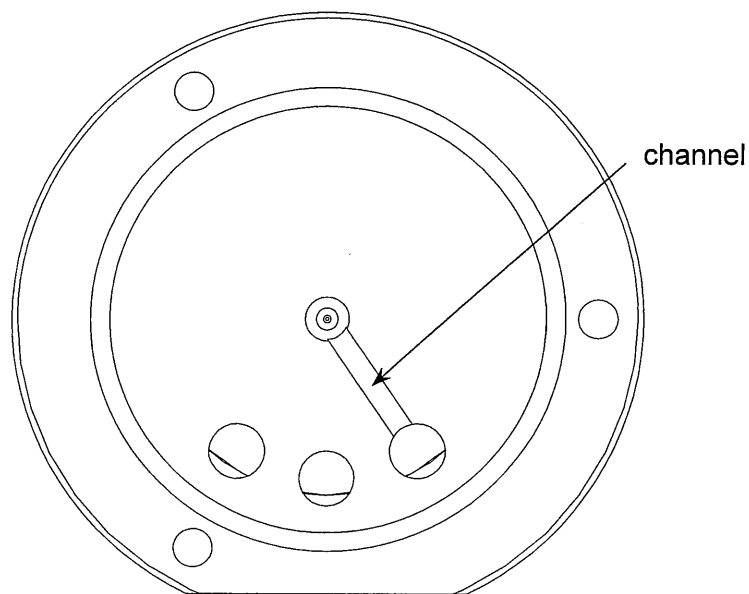
- To insulate the head, which is at erosion voltage, from the frame. The frame is at potential zero (earth connection).
- To fasten together the head and the Z-axis rod.
- To serve as a mechanical fuse. When it receives a knock, the head should be inspected, since there may be damage to the thread of the screws inside, and the upper head may have moved. In such a case it is necessary to use the dial indicator to inspect its alignment and reset it to zero.



**figure 12**

### 1.2.6 WIRE COOLING AND CURRENT PICKUP

Ensure that water is leaving from the left part of the water outlet plug (Figure 12), which is in front of the work terminals, in the upper head. If outlet flow is insufficient, the wire and the hard metal current pickup will not be able to cool to the extent necessary. This continuous supply of clean water from the filter serves also to remove dust and other impurities from the area around the guide and current pickup. The water comes via a channel in the upper guide-holder bushing. (See figures 9 and 13.).



*figure 13 (view from above of the upper guide-holder bushing)*

### 1.2.7 CLEANING

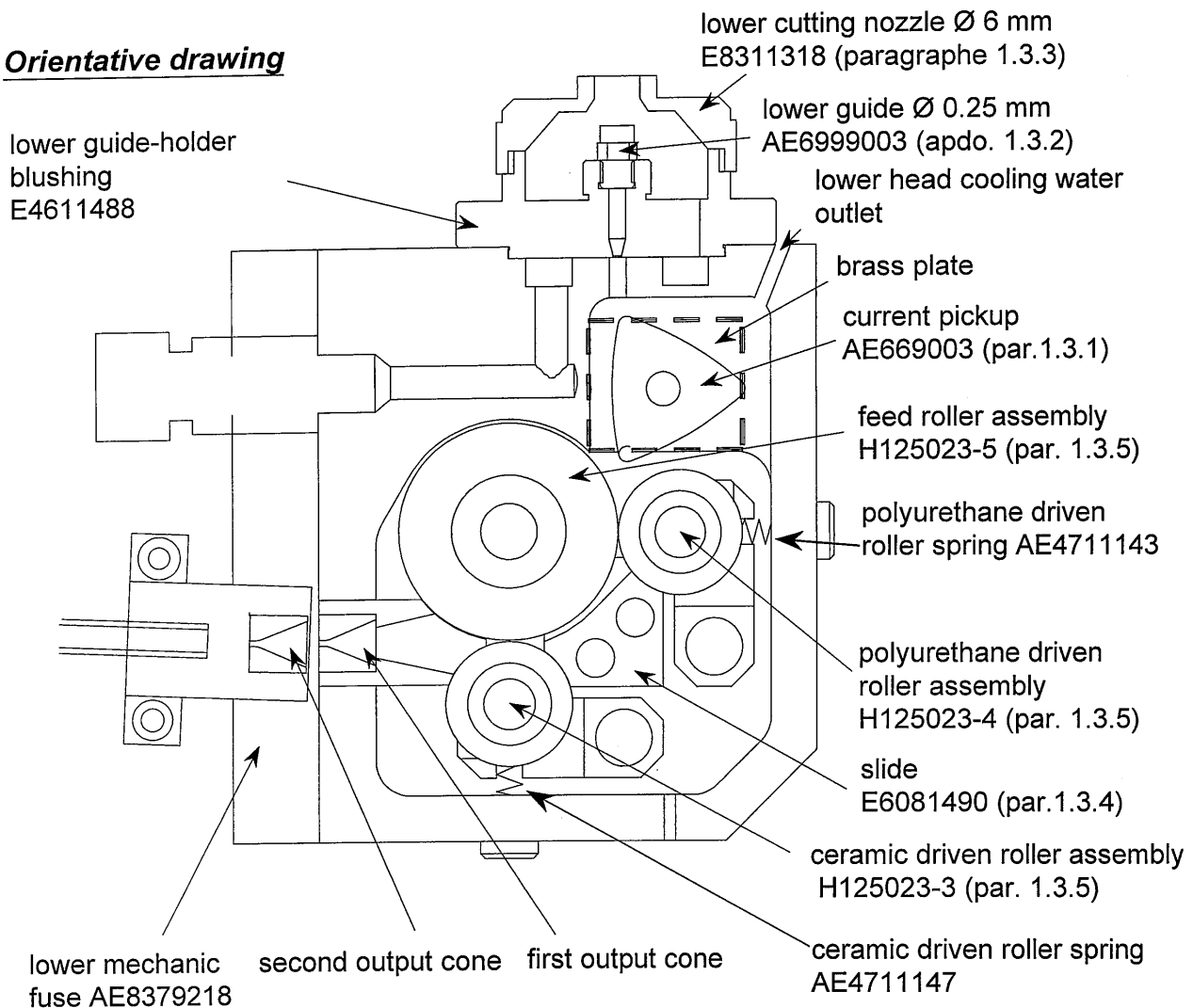
It is important to keep all these parts of the upper head clean (at least once a week) to ensure good contact between wire and current pickup, and also so that the water can circulate easily through the cavities. Cleaning must be done with HELIOXID diluted about 50% and it is necessary afterwards to rinse abundantly with water. This product and its derivatives **should be kept away from the filter**, and to this end it is possible for the drainage tube to the filter to be disconnected from the work table. Drainage can then be into a bucket.

From now onwards this operation will be called “cleaning”.

When placing the lower current pickup, ensure that the brass plate is correctly in position so that the wire will be aligned toward the feed roller.

### 1.3 LOWER HEAD ASSEMBLY

#### Orientative drawing



**figure 14**

#### 1.3.1 LOWER CURRENT PICKUP

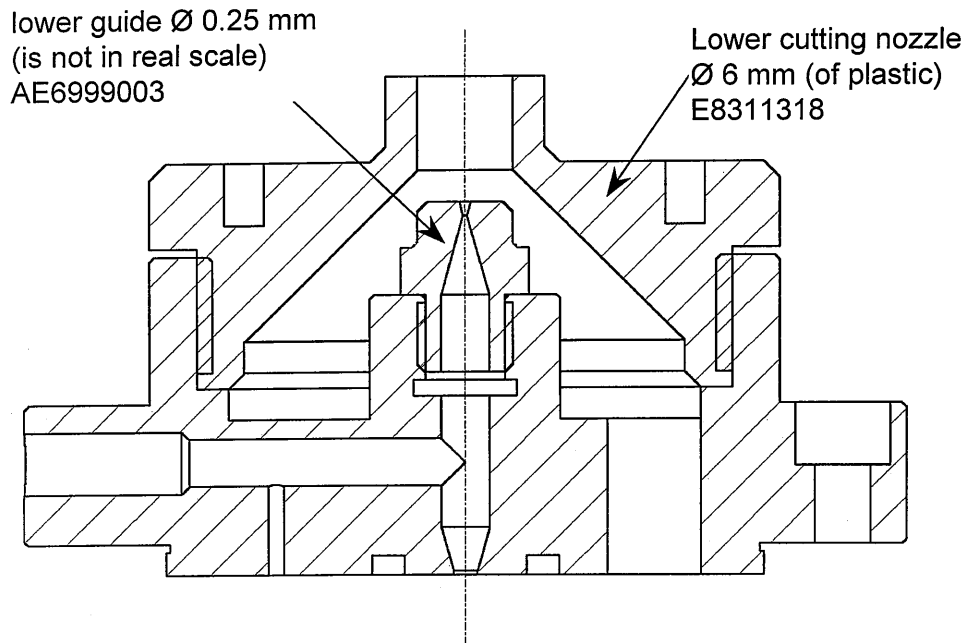
With this current pickup the same precautions should be taken as in the case of the upper (e.g. to ensure there is no pitting, grooves, etc.).

When placing the lower current pickup, ensure that the brass plate is correctly in position so that the wire will be aligned toward the feed roller.

#### **Maintenance:**

Clean once a week the current pickup, with Helioxid or similar. Rotate it 120° if it is worn away.

### 1.3.2. WIRE GUIDE



**figure 15**

Maintenance is similar to that of the upper guide (see paragraphe 1.2.2) (see figures 14 et 15).

#### **Adjustment:**

Tighten right down when it is mounted on its support (but take care not to strip the thread).

#### **Maintenance:**

Flush weekly with HELIOXID or similar agent, and rinse abundantly with water. Follow the same procedure whenever wire feed is difficult or sluggish, since the cause may be that the inner part is clogged with wire fragments or with erosion residue.

### 1.3.3 PLASTIC NOZZLE

Maintenance is similar to that of the upper nozzle (par. 1.2.3, figure 14 and 15).

#### **Adjustment:**

Normally the height is adjusted, by means of the screw, to within a few tenths of the workpiece.

### 1.3.4 SLIDE

This piece is very important when wire is being threaded, whether manually or automatically. It is the connecting piece between the polyurethane receiving roller and the feed roller properly speaking. Successful threading depends on this piece, for which reason its condition should be checked whenever the machine is given a thorough cleaning. The wire should be able to slide inside the small feed channel.

#### Adjustment:

Following dismantlement, reassembly should be carried out with main threading (feed rollers) in operation so that the rollers themselves position the slide where it will not rub against them, but being very close to the rollers, so the wire does not have space to scape. **Take care carrying out this operation because there are outside gears.**

#### Maintenance:

Flush weekly with HELIOXID or similar agent. Check during this operation that the interior surface is in good condition: there should no marks to obstruct the slide of the wire point during threading.

#### Note:

Scratches or rough edges in the wire circulation channel, or at its end, may hinder the descent and direction change of the wire point, giving rise to small jolts or stops that the dynamo will interpret as threading failure. (In this case also the result is non-resolvable threading fault, as is always the case once the wire has entered the lower guide.)

### 1.3.5 FEED ROLLERS

Three rollers make up the main feed assembly:

**a)** The first (**feed roller**) and largest, which is the feed roller properly speaking (figure 14), transmits motion from the motor to the wire. What should be checked is the condition of the ceramic material at the point of contact with the wire: ensure that a channel has not developed in which the wire could skid.

#### Maintenance:

It should be kept clean to ensure reliability and uniformity in feeding the wire, both during threading and during erosion. Flushing should be weekly with HELIOXID or similar agent, especially on the surface in contact with the wire, followed by abundant rinsing with water. Oil the bearings after rinsing.

**(b)** The second (**polyurethane driven roller**) is a polyurethane driven roller, which grips the wire and, via the slide, impresses it against the feed roller. This feed roller is also subject to wear and should be watched accordingly, as should the bearings.

**Maintenance:**

The assembly should be kept clean to ensure reliability and uniformity in wire pulling, during threading and during erosion. Flushing should be weekly with HELIOXID or similar agent, especially on the surface in contact with the wire, followed by abundant rinsing with water. Oil the bearings after rinsing.

Care should be taken to ensure that the polyurethane of the pulling surface does not become hard, slippery, or rutted.

c) The third roller (**ceramic driven roller**), like the first, is of ceramic material. As in the second case, the wire-supporting point should be watched for wear or other deterioration and replaced if necessary. Its bearings should be regularly observed.

Oil the bearings after rinsing once a week.

The two springs belonging to this assembly **are of distinct types**, and should not be confused. The stronger occupies the lower position. The thinner one, which is on top, belongs to the ceramic driven roller.

The shaft of the feed roller turns on two bearings, which are of stainless steel and need to be observed once they have been operating for a few months. Their condition depends to a great extent on that of the filter, since like the other rollers they are bathed in the water that issues from it.

Flush and oil them from outside weekly (see figures 14 and 16).

**Maintenance:**

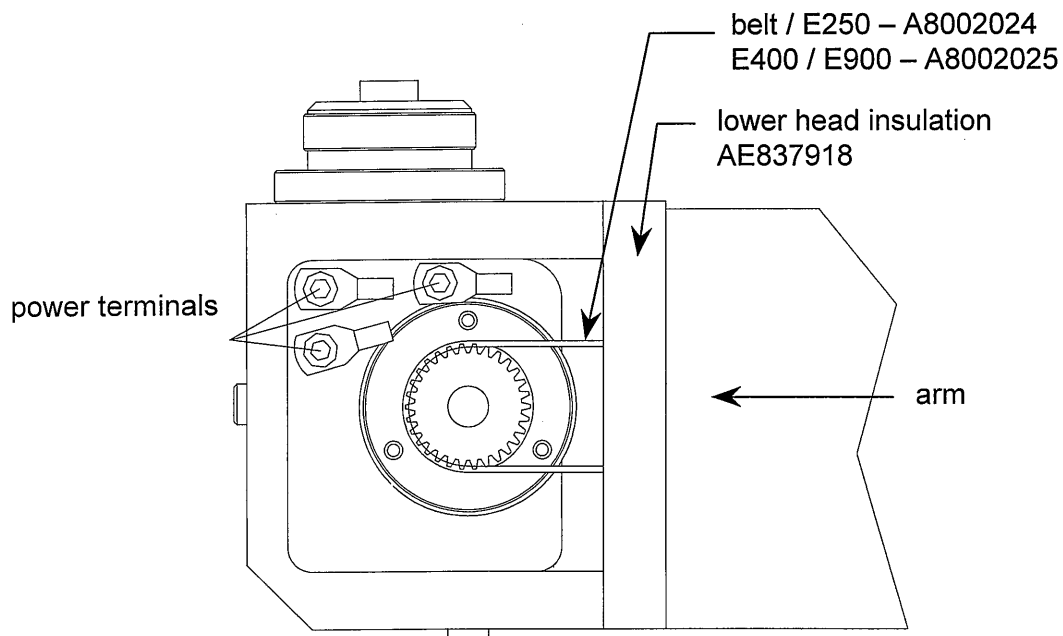
The assembly should be kept clean to ensure reliability and uniformity in wire pulling, during threading and during erosion. Flushing should be weekly with HELIOXID or similar agent, especially on the surface in contact with the wire, followed by abundant rinsing with water. Oil the bearings after rinsing.

**Note:**

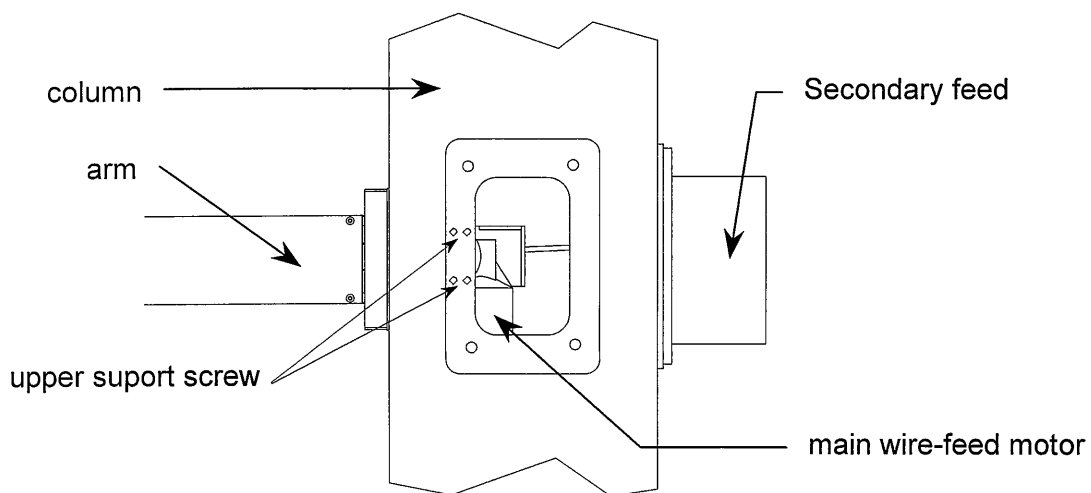
A poor surface owing to erosion dirt, brass waste, or smoothing by wire will result in intermittent slippage, added wear, and perhaps wire break during erosion (See figures 14 and 16).

### 1.3.6. BELT

This is another of those pieces that should be checked when they have been operating for a few months. To inspect it or replace it, remove the cover on the right of the lower head assembly (figure 16). (It is not necessary to remove the cover on the right of the arm.) Also remove the cover of the wire-feed motor, which is on the right of the machine column (figure 17). Loosen the motor support screws (figure 17) so that the belt can slacken and be pulled from the toothed rollers. To put it back in place, push it through the channel provided in the arm, being careful not to twist it and ensuring that the upper part goes toward the motor, always through the top part.



**figure 16**



**figure 17 wire-feed motor in the machine column**

### **1.3.7 WORK CABLE TERMINALS**

Whenever the belt is inspected, or the right-hand plug on the lower head assembly has to be removed, inspect the power terminals that go up above the toothed feed roller, since if cable or terminals for whatever reason are in poor condition then the connection will be impaired and performance will suffer (figure 16).

### **1.3.8 LOWER HEAD INSULATION**

Because it is the softest of those pieces that make up the lower head assembly and arm, a lower head's knock suffered by this element will cause the screws to yield and motion will result. It should therefore be inspected to ensure its good condition and the soundness of the electric insulation. Clean it very frequently with HELIOXID or similar agent and rinse with plenty of water. You should use the dial indicator to inspect the alignment of the lower head after a knock suffered by this head. (figure 14).

### **1.3.9 LOWER HEAD COOLING**

Be sure that the water passes through the lower head assembly and that clean water from the filter cools the current pickup sufficiently. This clean water enters through a 1-mm hole in the bushing of the lower guide-holder. It continues to the area under the guide and cools the entire wire as far as the current pickup. This state of affairs is observable, for you can see that the water leaves by the 4-mm hole tangent to the lower guide-holder bushing at the top of the lower guide assembly (figure 14).

### **1.3.10 CLEANING AND LUBRICATION**

if the machine is wanted to function properly, it is of the utmost importance to keep the recommended weekly maintenance in relation with these two basic concepts

## 1.4 WIRE OUTPUT CONES

The first of these feed cones serves not only to direct the wire but also to close the lower head assembly and keep it water-free. The second collects the wire and directs it into the feed tube. It is important that both be clean (figure 14).

### **Maintenance:**

Flush them weekly. It is important that the small output hole in the ceramic cone be clean.

### **Note:**

Dirt, wire residue, blockages and so on in the assembly, especially in the small ceramic cone, will give rise to non-resolvable threading faults (case of automatic wire threader) (owing to the wire end's stopping during threading) and curling in the assembly, which in turn, since the wire cannot go out, will cause the main feed to cease.

In this latter case one can remove the assembly by undoing two screws, then flush out the wire loops that may even be around the main feed rollers. Check that wire segments are removed from the lower head so that the machine can be restarted.

## 1.5 OUTPUT TUBE

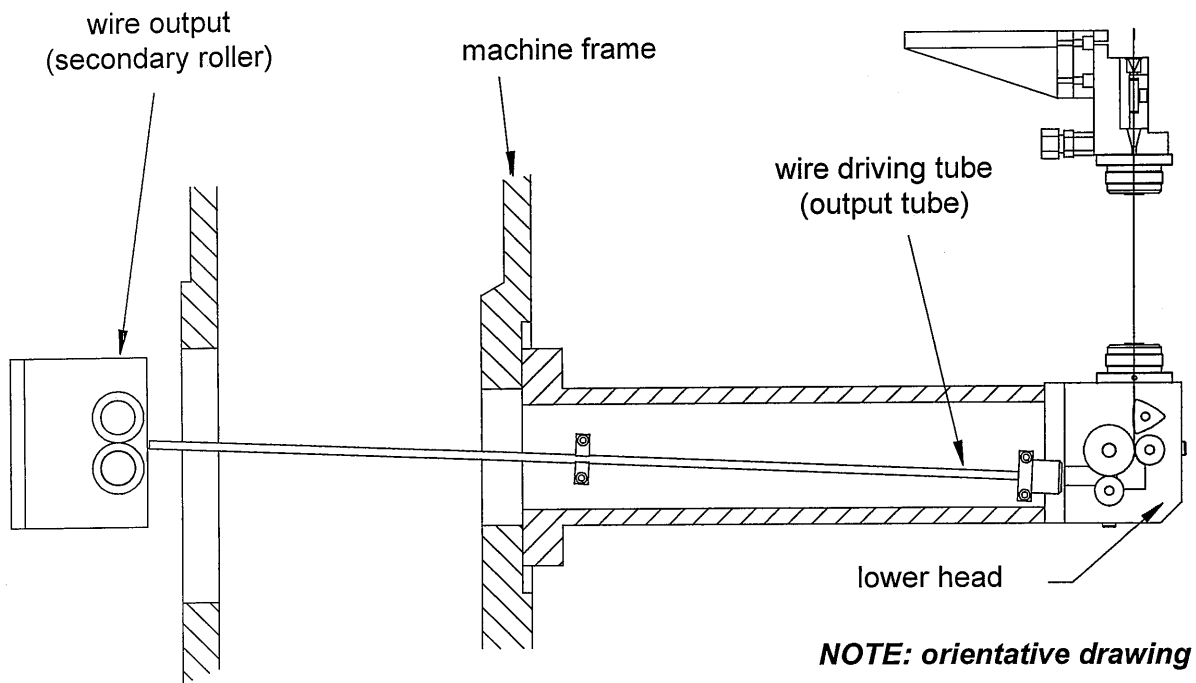


figure 18

### 1.5.1 ENTRY INTO OUTPUT TUBE

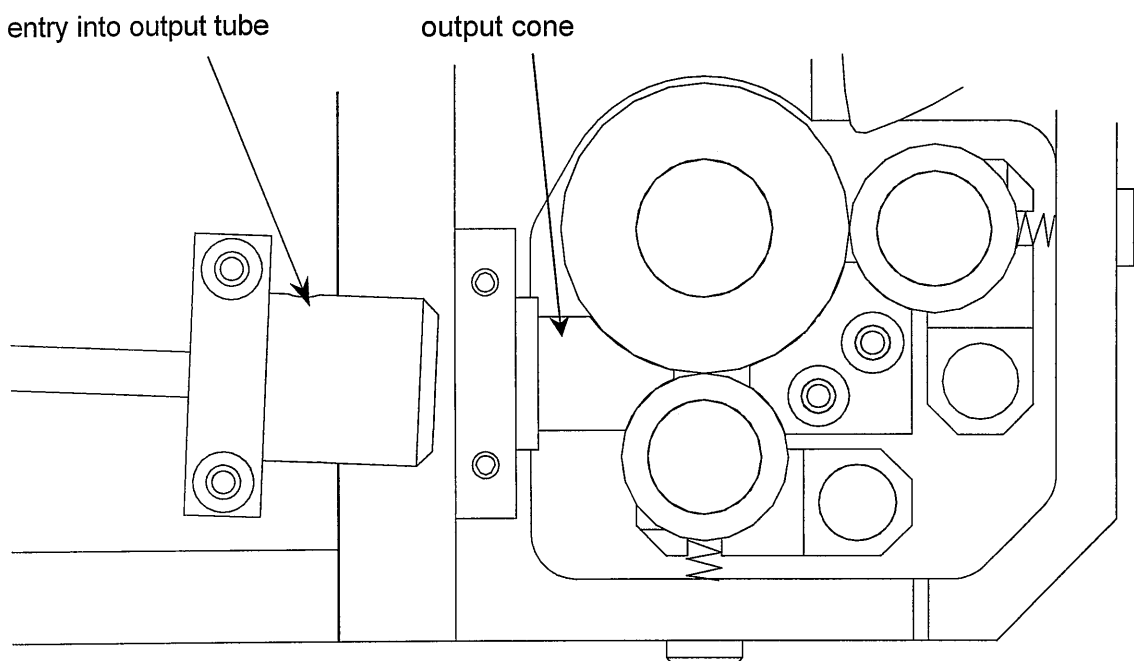


figure 19

**Function:**

To receive the wire point that has been threaded and introduce it into the steel tube, and to impel it by means of compressed air so that it may freely reach the tube output.

**Maintenance:**

Flush weekly, its accessible side (removing for it the output cone assembly explained before) weekly with HELIOXID or similar agent. Ensure that the throat of the ceramic cone is totally unobstructed.

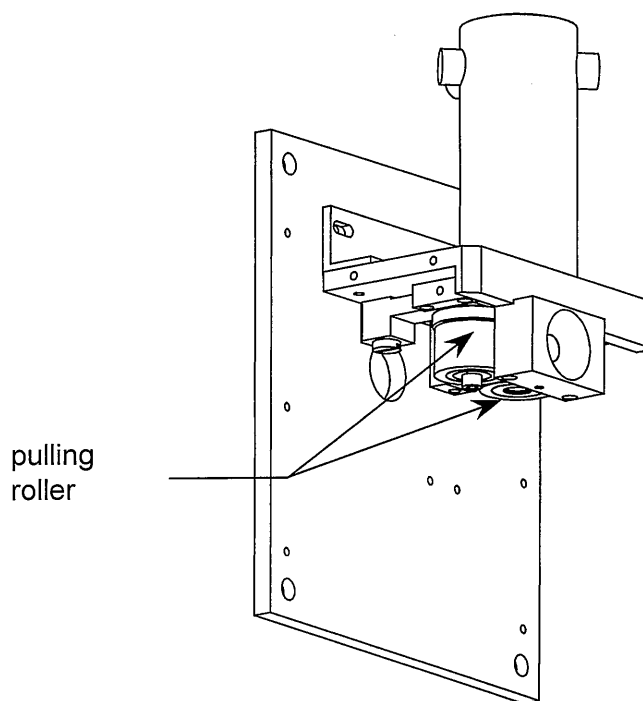
**Notes:**

The same as in 1.4 (output cone assembly).

## 1.6 SECONDARY THREADING ASSEMBLY

### Function:

To keep the wire moderately tight inside the tube during erosion so that no loops are formed, since they could cause jamming.



**figure 20**

### Maintenance:

Prevent the dust and lubricant from accumulating in this area. First take out the four screws that support the outside cover of the secondary threading assembly. Ensure that the pulling rollers are turning as they should. (Figure 20).

### Note:

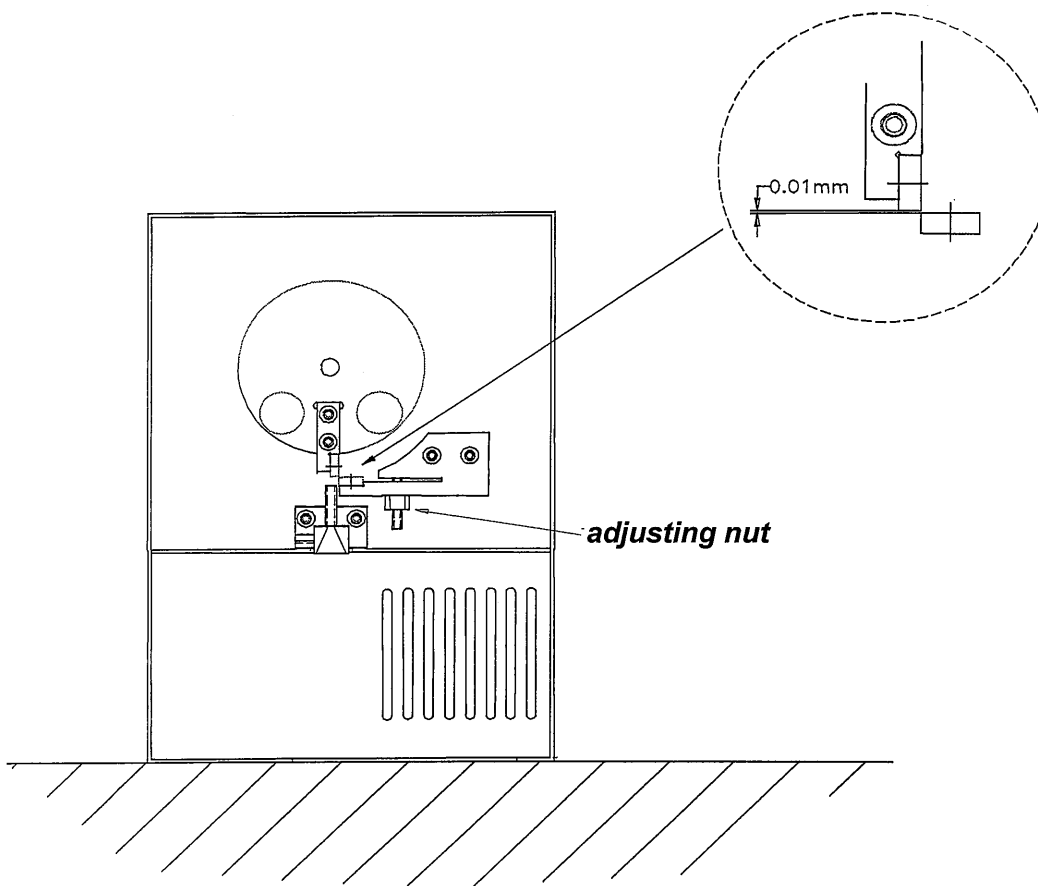
**The wire tracking rollers must not touch the wire driving tube** or others elements, on the contrary as the pair of rotation of the rollers is limited, they would stop. Rotating elements of these rollers (bearings, etc.) must be lubricated weekly as well as the rest of the mechanic elements mentioned before.

Bearings of both rollers must be cleaned weekly, on the contrary wire remains could stop the secondary roller and produce a wire jam in the lower head.

## 1.7 WIRE CUTTER (optional)

### Maintenance:

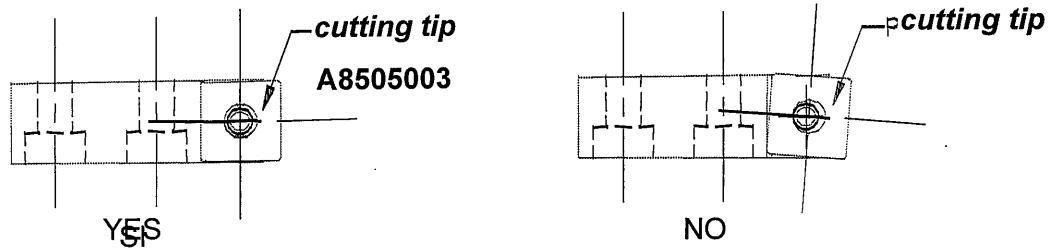
- For optimal cutting, the distance between the two blades when they are closest together should be about 0.01mm. Adjust by means of the self-locking nut that controls the position of the fixed blade.
- In the course of this operation, be careful not to turn the flywheel of the mobile blade if there is any chance that the two blades will come in contact. The cutting edges might sustain sufficient damage to impair their functioning.



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**figure 21**

- For purposes of adjustment it is advisable to place the body of the cutter on a table. Heeding the figure, tighten the adjusting nut until separation, measured by gauge, is 0.01mm.
- Tighten the blades in such manner that each reference face is securely tight against the reference corner of the respective supporting piece, so that the blade is not inclined or twisted. In either case it will cut less efficiently.



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**figure 22**

- Whenever you observe wear on a cutting edge, alter the position of the blade in question. Each blade is so shaped that it has eight cutting positions.

## 1.8 WORK TABLE

Insofar as concerns the work table, there are three points to be borne in mind.

### 1.8.1 INSPECTION OF WORK TABLE

Inspect the cables leading to the work table, since the performance of the unit depends on their condition.

### 1.8.2 CLEANING

The table and the workpiece support should be kept clean since the performance of the machine depends on their condition. If the table is not clean it will be impossible to assess the state of the cables, terminals, etc. Moreover, these parts must be clean if correct zero reset is to be ensured.

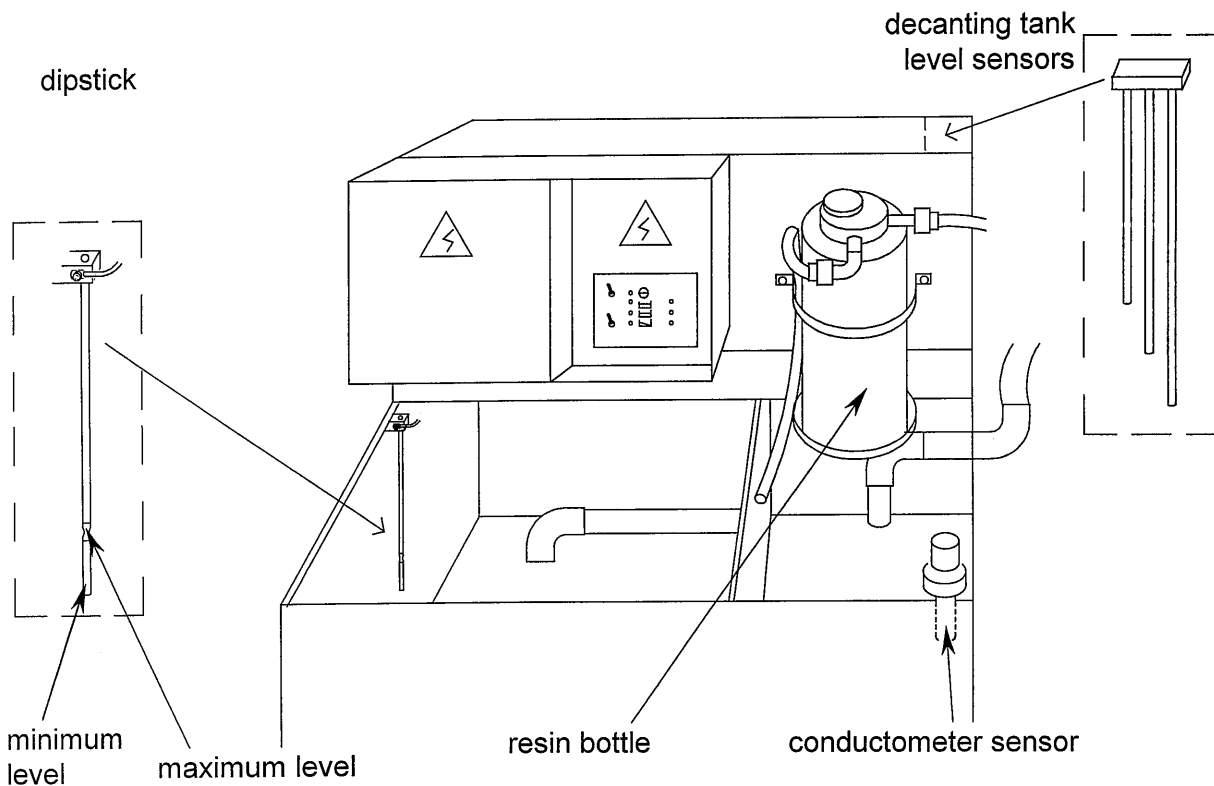
### 1.8.3 DRAINAGE TUBE

Check that the point at which water enters or leaves, and the tube itself, are free of residues so that water can pass through unhindered and that the water level on the table does not rise.

## 1.9 PNEUMATIC

The air supplying the machine, especially if it has an automatic wire threader, should be filtered and very low in oil content.

## 2 FILTER



**figure 25**

### 2.1 RESINS

Deionizing resins serve to keep deionization at a certain level. If this level begins to falter, the resins are depleted and should be replaced (supposing there is not any problem in the hydraulic system).

Prior to replacing them, undo the two tubes leading from the resin bottle to the cover-valve, loosen the flange that secures the bottle, and remove the top from the bottle.

The capacity of the resin bottle is 11,4 litres.

Use mixed-bed resins, 50% strongly anionic and 50% strongly cationic (see figure 25).

In case the resins consume is too high, it could be due to the following circumstances:

- 1- Water conductivity from the general water distribution is too high. Then it is advisable to buy desionized water or install a small filter of inverse osmosis.
- 2- Deionization valve does not close totally when is not activated.
- 3- Water flow that passes through the resins is not enough. The flow that must pass through the resins bottle is 15 liters/minute. If the output flow is lower, **the stem of the resin bottle must be removed and the grooves of the diffusers must be cleaned with compressed air. This operation also must be carried out every time that the resins have to be changed.**

## **2.2 CLEANING THE CONDUCTOMETER DETECTOR**

The conductometer sensor should be kept clean to ensure that the equipment measures accurately. Like the walls of the filter tanks, it will accumulate a dirt layer consisting of erosion dust, oil and grease off the workpieces, and oil used in maintenance. The result is a coating on the detector electrodes that at times may hinder measurement (figure 25).

## **2.3 SLUDGE REMOVAL**

This operation is described in 3.4, “Description of filter”.

## **2.4 REPLACEMENT OF LIQUID**

The filter pump should never work empty, since if it does it may run dry and be destroyed. Ensure that the water in the dirt tank does not fall below minimum level.

When the filter tank is being filled, the maximum level indicated in red on the dipstick should not be exceeded. If it is, then when there is a washing operation in the filter, the liquid from the clean and dirty tanks may overflow (figure 25).

## **2.5 CLEANING OF THE LEVEL SENSORS OF THE DECANTING TANK**

The three sensors must be kept clean to insure the correct measurement of the different cleaning phases of the filter-carboy. On them, as well as on the filter walls, dirty accumulates.

### 3 GENERATOR

#### 3.1. CLEANING OF THE AIR FILTERS

These filters avoid the entrance of dust through the generator’s ventilation grids.

Cleaning periodicity of the filters must be monthly. To clean them, take them out and clean them with water and detergent. Dry them carefully and impregnate them using the VISCOSINA spray included, always on the outside.

The upper grid must be cleaned by a soft jet of compressed air from the inner part of the generator.