DEVICE TO ANNEAL BY INDUCTION AN HEATING ELEMENT

Figure 1 Mod. 148/03.300000 + 140/50.FI3000

WATCH THE VIDEO

This is a machine to anneal austenitic stainless steels by induction, with manual feeding.

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Summary

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COMPOSITION

- Numerical control insertion system
- Annealing section
- Induction generator
- Cooling system for the induction generator
- Unloading section

OPERATION

From the control panel the operator selects the mode of operation:

1. Spot annealing
2. Full annealing

1. Spot annealing

The operator defines the number of spots, the start and end of each spot, the speed and induction power.

Note: the induction power and speed will depend on the material, wall thickness and diameter of the tubes being treated. When setting up the machine one has to take into consideration the effect of the mass of the MgO which acts as a heat sink.

Once the machine parameters are set, the operator puts one element on the feed section and presses the start button. The element is pushed forward by the feed arm. Just as the element reaches the coil, a sensor identifies the start of the tube and the numerical control is activated meaning:

The element is pushed forward and when the start point of the first spot is reached the induction system is activated until the end of the spot length is reached, at which point the induction is turned off.

The element continues moving to the next point and the procedure is repeated.

In its movement to the exit or unloading area the element is doused with water so that the temperature is reduced very quickly, and when it is off loaded, it is offloaded in a water bath. This limits the burn up of oxidation above temperature of 300 °C as the element is not atmosphere protected.

2. Whole element mode

It is basically one spot. The operator defines start point and finish, power and speed.
The start and finish points need to be set carefully because of the plugs (plastic) in the ends: too near will melt them (but not completely).
The plugs should be left on the element as they limit the wetting of the MgO at the ends when the elements are dropped in the water.

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LIMITS

This is basically a spot annealer and the process is quite fast. This means that an induction system does not remove residual moisture from the elements and therefore the elements need to undergo a de-hydration or moisture removal cycle.

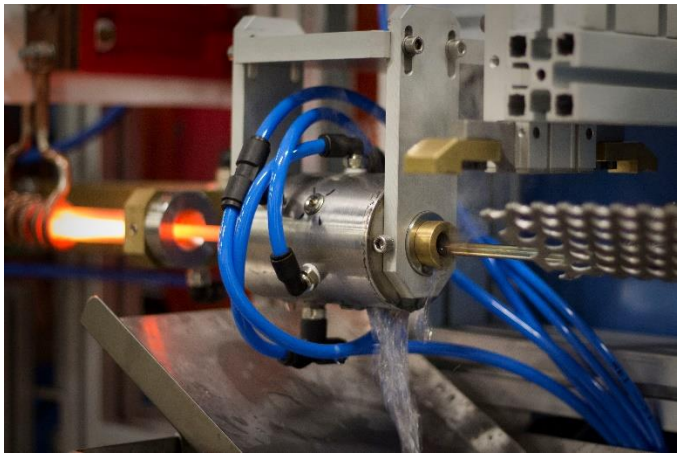
It should be pointed out that the MgO powder should be relatively dry as too much moisture can cause the elements to rupture, as when the “instantaneously” high temperature reaches a section the moisture expands rapidly into superheated steam and cannot be rapidly ejected because the MgO is compacted.

If too much power and low speeds are used, the element may fail under the pressure exercised from inside.

ADVANTAGES

COST SAVING as the machine is only turned on when it is used

SPEED OF PROCESSING



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SET-UP

a) When using different diameters, it is necessary to change the guide tube inside the coil. The guide tube is essential to keep the element centered within the coil.

b) Cooling. The sparger is made for a range of diameters so it may be necessary to change this part.

Specification:

The machines are supplied complete for one diameter of element. To process additional diameters may require additional tooling.

The standard application is austenitic stainless steel. Copper can be used but a compromise must be reached for both materials and this means that some efficiency will be lost for the stainless steel.

If the two materials are to be processed, this should be specified when placing the order.

TECHNICAL FEATURES

Material		300 Stainless steel
Tube diameter	mm	6-16
Length of element	mm	300-6000
Mode of opertion	mm	Completa e spot
Number of sports when in sport mode	no.	12
Utilities:		
Installed power	V	3 x 400
	Hz	50
Air	Bar	6
Water (to drain)	l/min	2-4
Generator	KW	50 o 75
Speed	adjustable	da 0,5 a 10 m/min

Indicative operation speeds:

Material	Diameter	Speed
Stainless 304	8 x 0,5 mm	6 - 7 m/min
Incoloy	8 x 0,5 mm	1,5 - 2 m/min

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AVAILABLE VERSION

Mod. 148/03.600050 Device to anneal by induction for heating elements up to 6000 mm with 50 KW high frequency generator

Mod. 148/03.600075 Device to anneal by induction for heating elements up to 6000 mm with 75 KW high frequency generator

Mod. 140/50.FI3000 Automatic feeder for induction annealing device

LAYOUT

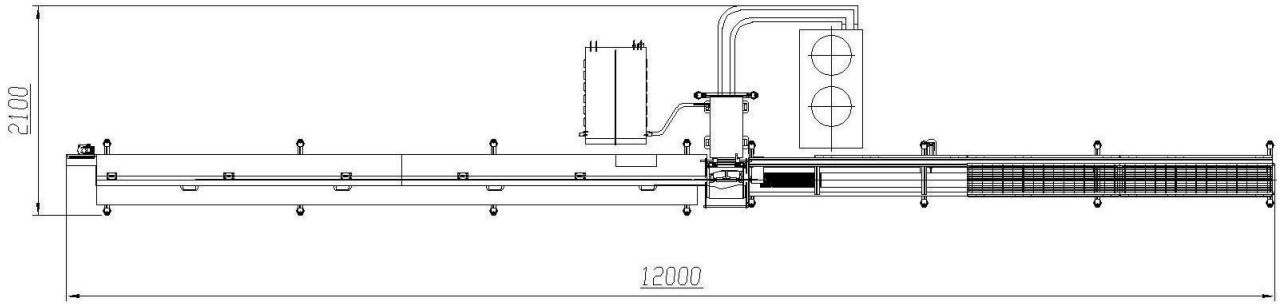

Figure 2 Mod. 148/03.400000

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