Soldering a copper chip to a silver dipped brass RF attenuator

Objective
Soldering a copper chip to a silver plated brass housing

Material
Copper chip .22” (5.5mm) x .26” (6.6mm), .04” (1mm) thickness, silver dipped brass housing .67” (17mm) diameter and 2.2” (55.8mm) long, solder paste

Temperature
425 ºF (218 ºC)

Frequency
264 kHz

Equipment
• Ambrell 2.4 kW induction heating system, equipped with a remote workhead containing two 0.5 µF capacitors for a total of 1.0 µF
• An induction heating coil designed and developed specifically for this application.

Process
A two turn helical is used to solder the chip to the housing. Solder paste is applied to the base of the copper chip and also to the 2 brass connector pins. The assembly is placed in the coil and power is applied for 55 seconds to flow the solder in the three areas.

Narrative
• The customer is currently soldering the three areas individually by hand with a hot plate and soldering iron and experiencing inconsistent results from operator to operator. By switching to induction heat the customer can perform the application with 2 less operators, increase their production rate by 50% and also reduce scrap parts.

Financial
• Cost of equipment - $12,000
• 2 employees at $10/hr + $41,600/year
• Increased production of 9360 parts per year (production rate of 5 mins/part) sold at a profit of $10.00 each = increased profit + $93,600/year

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$12,000 investment netted return on investment of $123,200/year
***Does not factor in any energy savings cost***
Results/Benefits  Induction heating provides:
- Repeatable consistent results
- All three areas are soldered at the same time, not individually
- Faster process time, increased production
- Even distribution of heating

Silver dipped housing and copper chip, circle shows location of brass connector rings

Assembly in coil for soldering application

Soldered assembly