

**Infrared Riveting**  
**The compact feed unit**  
**for infrared riveting**



# Infrared feed units for riveting

Best results obtained by focusing the radiation

As a specialist in plastics joining technologies and in building special machines, SONOTRONIC has expanded its portfolio and now offers infrared feed units for riveting in addition to ultrasonic feed units. The still new infrared process is primarily suitable for working components which, because of their material properties, are not ideal for working with ultrasound. Infrared is therefore a logical addition to ultrasonic welding. Both processes are extremely energy efficient and are therefore clearly superior to hot air and heated tool riveting.

## Contactless process

Infrared riveting is a very gentle process. Unlike heat contact or friction-producing joining processes, infrared riveting is contactless and therefore prevents the formation of particles, adhesions to the tool and imprints on the evermore sensitive surfaces or visible sides of the work pieces. Following intensive development work, SONOTRONIC has succeeded in achieving similar energy efficiency for infrared riveting as for ultrasonic riveting.

## Permanent joints

SONOTRONIC's compact infrared units operate with focused, short-wave infrared radiation. This means that not only is radiation rapidly generated but it is also possible to penetrate deeply into the material at a relatively large distance from the component and evenly to heat and plasticise to the bottom of the rivet dome. The process was also optimised so that almost no smoke develops during riveting. Following heating of the rivet dome, the rivet calotte is uniformly shaped by the embossing punch. The resulting rivet joints create a permanent bond with a high strength.

## Advantages

- Infrared units from experienced special machine manufacturers
- Compact design compared with existing market solutions
- Infrared lamp highly efficient by focusing the infrared rays
- Clearly reduced joining forces with process control using embossing depth
- Heating and embossing in one position (without moving)
- View of riveting position when setting up
- Heating position of infrared lamp can be adjusted by hard stop; position maintained, even after changing the lamp (no adjustment necessary)
- Infrared lamp can be rapidly changed
- Integrated purge air and electrical control

## Efficient hybrid solutions

With **ultrasound** and **infrared** solutions, SONOTRONIC now offers two complementary processes. If required, because of the material properties of the components, the standard and special machines are fitted with infrared units. In addition, total solutions can be achieved by a combination of ultrasonic and infrared feed units (hybrid machines). A classic example of this is loudspeaker grilles made from POM, which are to be fitted into door panels together with other parts. The innovative infrared riveting process is already used in the market in many cases in customised machines. Both hybrid machines with ultrasound and infrared, as well as special machines have been produced, with more than 50 infrared feed units in each case.

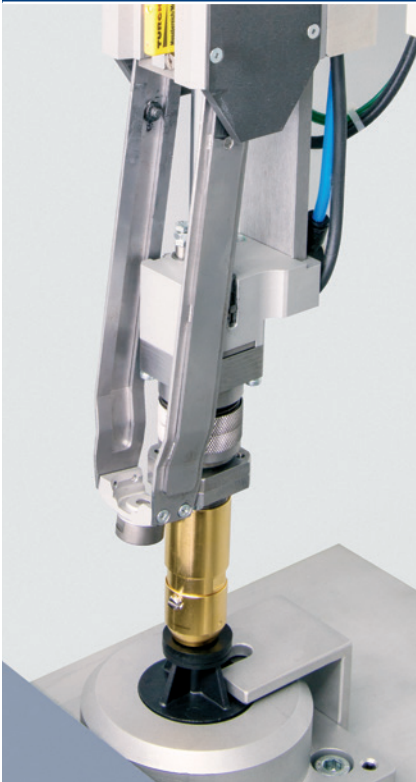


Infrared riveting machine for door panels

# Technical data

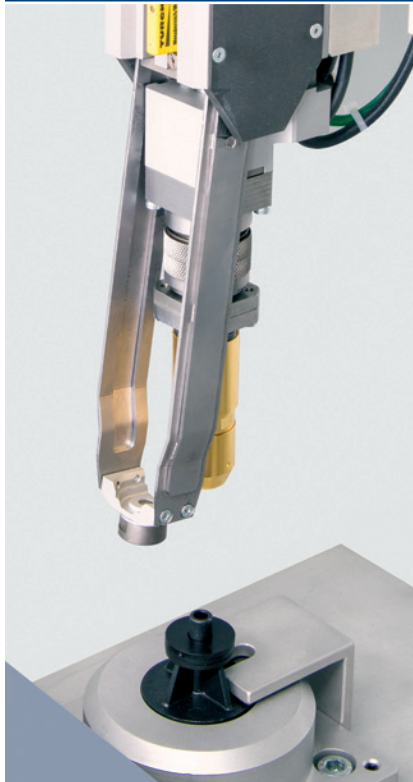
Straightforward incorporation into existing or new machine concepts

Position 1



Infrared feed unit with extended emitter emits focused radiation into the rivet dome.

Position 2



Infrared feed unit retracts emitter and moves the embossing device in order to initiate the embossing process.

Position 3



Infrared feed unit with embossing device folded in position moves towards the heated rivet dome for embossing.

## Optimised infrared process

To satisfy the market requirements, SONOTRONIC has optimised the characteristics of infrared technology. Given a heating time of approx. 6 – 12 seconds, the power required is only 80 Watts. Even the joining forces have been reduced and can be adjusted by an external pressure regulator. The mechanical components have been designed to be compact and interchangeable so as to achieve stable processes.

To improve the results further, consideration also has to be given to the design of the joint geometries and their environment during infrared riveting. This requires close co-operation between the machine manufacturer and the customer. SONOTRONIC will provide you with professional advice on the component-specific requirements for infrared riveting.

## Technical data

|   |                         |
|---|-------------------------|
| Lamp supply (DC) [V]  | 46 with current limiter |
| Lamp output [W]   | 80                      |
| Compressed air supply [bar] (unooled, dried and filtered)           | 6                       |
| Embossing force [N] can be adjusted by external pressure regulators | 90 – 260 (2 – 6 bar)    |
| Purge air [l/min] can be adjusted via external chokes               | 3 – 5                   |
| Main cylinder diameter [mm] can be selected by external valve       | 25                      |
| Slewing cylinder diameter [mm] can be selected by external valve    | 12                      |
| Main stroke, max. [mm]  | 60                      |
| Hard stop for main stroke [mm] (adjustable)                         | 0 – 10                  |
| Heating time [s] (depending on material)                            | 6 – 12                  |
| Embossing time [s] (depending on material)                          | 5 – 8                   |

Subject to technical modifications.



# SONOTRONIC Nagel GmbH

Building standard and special machines for joining plastics

With our many years of experience in the industrial processing of plastics, we develop and produce innovative standard and special machines used on ultrasonic, infrared, hot plate and hot air technology. Our machines are used worldwide in the production of external and internal plastic components. We are the market leaders in the automotive sector.



## Large product portfolio

For every plastics processing sector, SONOTRONIC's standard and special machines provide a large range of potential applications. We design and manufacture every machine with maximum care and precision. In this way, our customers benefit from our experience, our outstanding technical know-how and our flair for the best solution.

## Quality grown out of tradition

As a traditional company, we operate with over 350 employees at our main site in Karlsbad and our branches in Spain, USA, China, as well as a world-wide distribution network. For maximum quality, we produce the vital components of our machines, using our own tools and patterns, at the heart of the technology region of Karlsruhe itself.



### SONOTRONIC Nagel GmbH

Headquarters  
Becker-Goering-Str. 17-25  
76307 Karlsbad  
Germany  
Phone: +49 7248 9166-0  
Fax: +49 7248 9166-144  
info@sonotronic.de  
www.sonotronic.de

### SONOTRONIC, Inc.

Branch USA  
31132 Century Drive  
Wixom, MI 48393, USA  
Phone: +1 248 987 5970  
Fax: +1 248 987 5964  
info@sonotronic.com  
www.sonotronic.com

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