

RoboTankWeld

A revolutionary method for plastic welding of the highest quality with a flexible robot system

Joint Development



F. Gottschaller
Managing Director
Autoloader GmbH

- Software specialist robotic automation
- Inaccuracy-tolerant automation technology
- Focus on logistics automation
 - Airports
 - Parcel provider



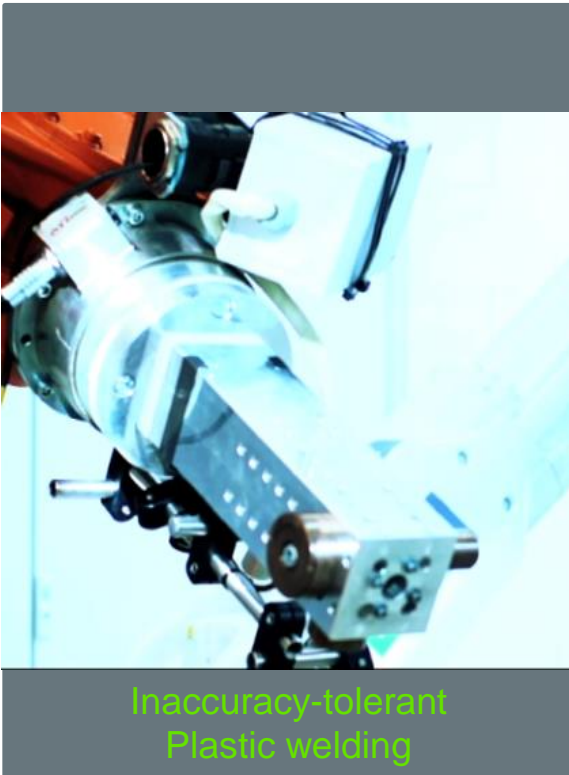
T. Breuer
Managing Director
BF Maschinen GmbH

- Standard and special purpose machinery manufacturer
- Specialist for hot plate welding machines

RoboTankWeld resulted of the combination of our know-how (patent pending)



Summary



- ▶ We are using two **co-working** industrial **robots** to **replace** traditional **hot plate welding** facilities.
- ▶ **Tolerances** of blow-molded hollows (or injection molded parts) can be compensated **fully automatically** **during** the welding processes for **optimal quality**.



Advantages (1/2)

- Cost:**
 - Replaces several **low volume facilities**, optimizing **utilization**
 - **Minimal interference** and maximum operational **availability**
 - Low initial **investment**
 - Low **maintenance** through standard components
- Flexibility:**
 - Low-volume friendly: **batch size 1**
 - Can be used for an unlimited number of **different** (low volume) **parts**
 - Intuitive **teach-in** mode
 - Enables faster & cheaper **prototyping**
- Quality:**
 - Sensors enable **controlled** welding processes in real-time with unrivaled **precision**
 - Inline quality **inspection** with optical detection of matching area or weld bead
 - Optional: temperature profile through **infrared camera**
 - Less defective goods



Advantages (2/2)


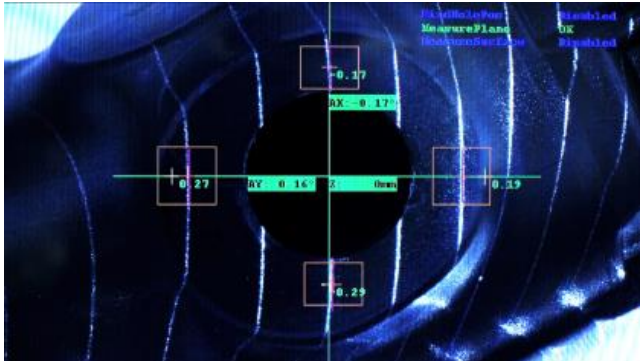
Documentation: - Each part is analysed, documented and processed individually

Technology:

- Self-controlled & auto-calibrated welding processes in real-time w/ sensors
- Easy to use & adapt (teach-in mode for worker)
- Repeat accuracy +/- 2 N; max: > 1000 N





Process Details (1/6)

Function	Description	Detail
1. Typification	<ul style="list-style-type: none">- Vision system determines type of part- Automatic parameterization	
2. Visual Analysis	<ul style="list-style-type: none">- Specifics of the part- Centerpoint & position ->Ok to proceed?- Data Transfer to robot	

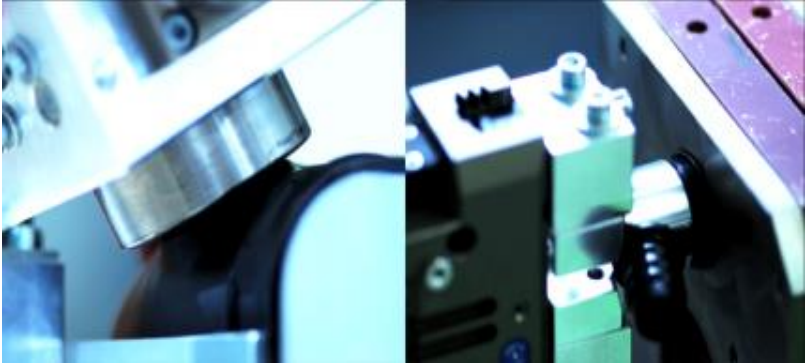
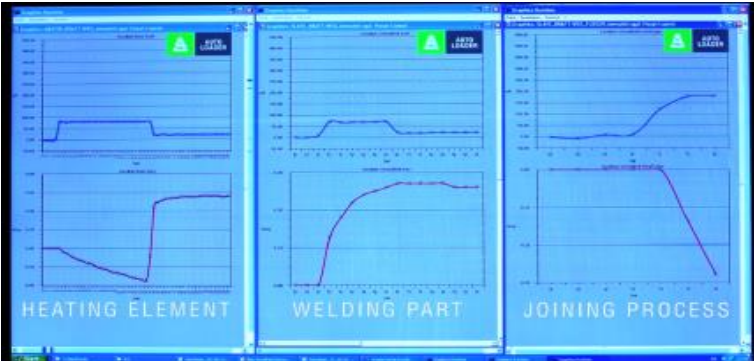


Process Details (2/6)

Function	Description	Detail
3. Adjustment	Robot1 (w/ hot plate) adjusts tool to parallelism	
	Robot2 (w/ component) approaches fix mounted hot plate	

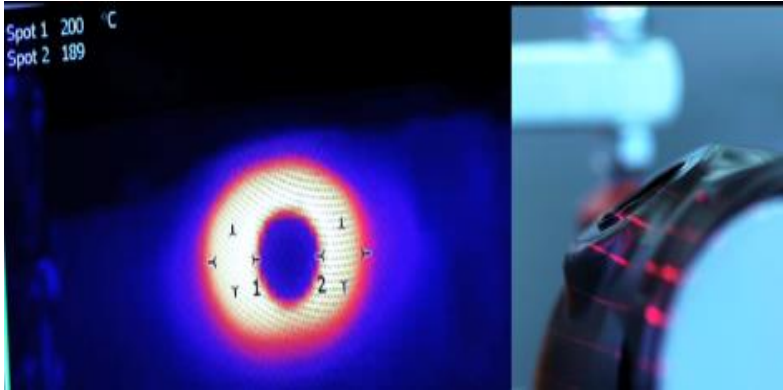



Process Details (3/6)

Function	Description	Detail
4. Matching / heating	Robot1 and 2 automatically control parameters: <ul style="list-style-type: none">• Force• Time• Temperature• Displacement	
5. Documentation & Visualisation	<ul style="list-style-type: none">- Applied force in N (blue line)- Displacement in mm (magenta line)	





Process Details (4/6)

Function	Description	Detail
6. Quality check #1	<ul style="list-style-type: none">- Using IR and laser systems- Distribution & amount of thermal energy- Geometry of matching area and bead -> continue yes/no?	 <p>The image shows a thermal camera view of a circular component with a central hole, displaying a color-coded temperature map. Text in the top left corner reads 'Spot 1 200 °C' and 'Spot 2 189'. To the right, a close-up shows a robotic arm with red laser lines projecting onto a metal part.</p>
7. Joining	<p>Robot2 (w/ component) automatically controlled parameters:</p> <ul style="list-style-type: none">• Force• Displacement• Time	 <p>A close-up photograph of a robotic arm assembly in a factory setting, showing various mechanical components and cables.</p>




Process Details (5/6)

Function	Description	Detail
8. Quality check #2	<ul style="list-style-type: none">- IR- and laser-system analyse weld bead<ul style="list-style-type: none">-> is the weld ok?- If not ok: e.g. automatic adjustment or message to worker	
		



Process Details (6/6)

Function	Description	Detail
9. Teach-in	<ul style="list-style-type: none">- Intuitive teach-in- Maximum flexibility, no robotic specialist necessary- System automatically determines all necessary coordinates	

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AUTOLOADER GmbH

F. Gottschaller

Tel. +49 89 289 787 85

Barer Str. 3

80333 München

Gottschaller@autoloader.de

www.autoloader.de

BF Maschinen GmbH

T. Breuer

Tel. +49 8171 3447-20

Wallensteinstr. 7

82538 Geretsried

T.Breuer@bf-maschinen.de

www.bf-maschinen.de