

COMPANY PROFILE

MICRO CONTACTS

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COMPANY NAME:	Micro Contacts, Inc.
STREET ADDRESS:	90 Colorado Avenue
TOWN:	Warwick
ZIP CODE:	02888
STATE:	Rhode Island
COUNTRY:	USA
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E-MAIL:	mikej@microcontacts.com
WEBSITE:	www.microcontacts.com
CONTACT PERSON:	Michael R. Jannetty, Tool Room Manager Steve Veselaski, Vice President Technology
PRODUCTION:	Progressive dies and injection molding tools for own production of - contact parts - extrusion-coated contact parts - complete connectors, sensors, - electronic components
TARGET MARKET:	International
EMPLOYEES:	160
FOUNDED:	1963
EDM SYSTEMS:	1 Agiecut Challenge 3 1 Agiecut 250 HSS 1 Agiecut 100 1 Agie Mondo Star 20
PROGRAMMING:	System 3R
CLAMPING SYSTEMS:	- Peps von Camtek - Esprit X
MEASURING, CHECKING:	- Smart Scope - Optical checking systems for mechanical and dynamic measurement

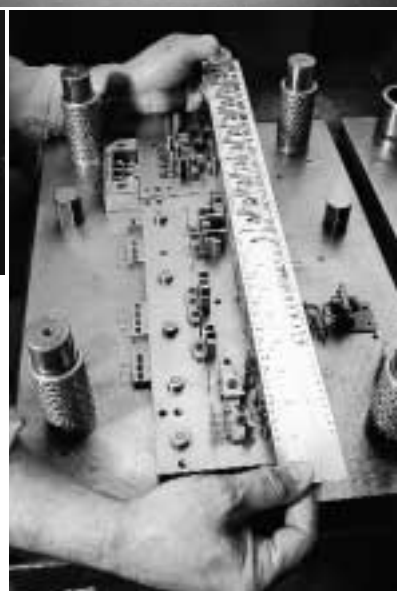
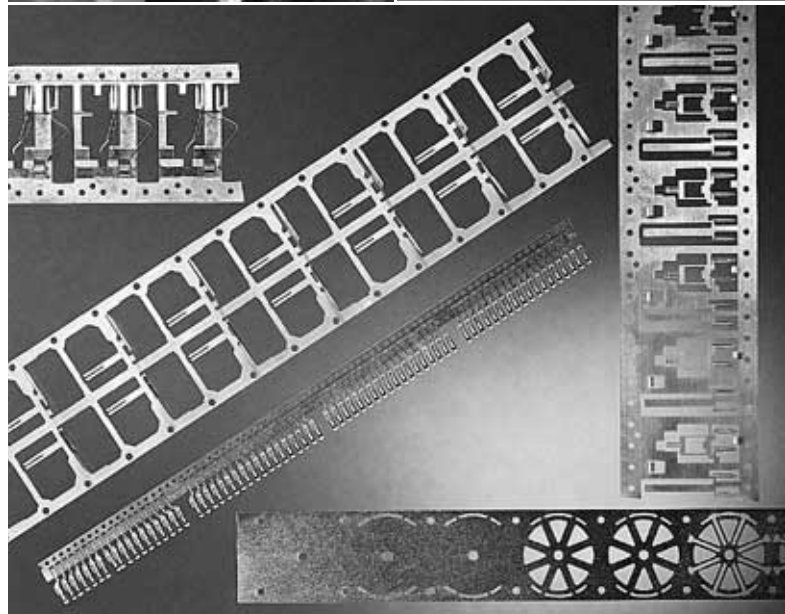
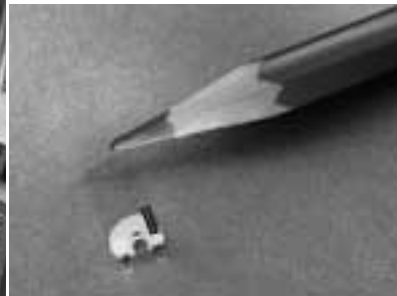


Fig. 1: Micro Contacts, Inc., based in Warwick in the state of Rhode Island, is one of the leading American manufacturers of progressive dies and injection molding dies for the manufacture of contact parts, as well as complete connectors, sensors and electronic components of the highest precision and smallest dimensions.

Taking up the challenges in tool making with EDM



High quality standards ensured by EDM

Micro Contacts, Inc. founded in 1963, has a total of 160 employees on its payroll at two locations. The parent company is in Hicksville in New York state where the production and complete assembly are also located. The tool-making side is based in Warwick, a suburb of Providence, state capital of Rhode Island. The company has enjoyed an excellent reputation for over 30 years in the

- automotive
- electronics
- security
- medical
- consumer goods

industry sectors, as a supplier of high-precision sensors, contact parts, electronic components, connectors and extrusion-coated contacts of the smallest dimensions. In order to also be able to meet the high quality standards of the future, the tool making section of Micro Contacts, Inc. has invested in ED machining. They recognized early on that ED machining is indispensable in tool and mold making due to its reproducibility of shape and definable precision, as well as a high degree of automation and autonomy. How ED wire cutting is employed as a key technology at Micro Contacts, Inc. is shown by the example of a progressive die for the manufacture of contacts for the automotive industry.



Fig. 2: The workshop drawings for the progressive die for electromechanical contacts which are supplied extrusion-coated to the automotive industry. The geometry programs for EDM are prepared with Peps from Camtek. The CAD program Esprit X is used for the 3D programming of the injection mold.

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The tool is oriented towards the finished part

Micro Contacts, Inc. received an order to manufacture a tool for the production of extrusion-coated contact parts with the following properties:

- service life: 15 million
- precision: 12 µm tolerance on the finished part
- material thin copper alloy
- stations: punching, bending, cutting
- geometry: parts CAD data from the customer.

These were the requirements to which Micro Contacts, Inc. had to design the tool. The basis for construction of the workpiece were the CAD data for the contact part. The stations required, such as punching, bending and cutting, were fixed on the basis of the geometry of the contact part, and it was decided that the active parts giving precision were to be manufactured using ED wire cutting from CPM 10-V, a steel manufactured utilizing powder metallurgy. With its great toughness, resistance to wear and cutting edge stability, this material is extremely well suited to achieve the high required tool service life of 15 million contact parts.

Continuity from the drawing to the finished contact part

After it had been determined what was to be manufactured using ED wire cutting, the individual geometry programs for punches and dies were prepared using Peps from Camtek and linked with the desired cutting technologies. The data input was limited here to a few machining requirements, such as surface roughness, contour tolerance, workpiece material and height, as well as the EDM wire. The workpiece itself was measured out automatically in measuring cycles by the software module Agiesetup 2D, thus making fine adjustment unnecessary.

For Micro Contacts, Inc., these are the further advantages of Agiecut Challenge:

- storage of cutting technologies for recurring machinings with Workmodel.
- insertion of express orders quickly and without problem with Pieceinsert.
- generation of oxidation-free surfaces with Purecut.
- cutting radii unbraked with Dynamic Corner Control.
- achievement of the highest precision on the workpiece with Wire Bending Control.

The sum total of this: Achievement of higher precision faster. An important factor for reducing the pressure on prices and deadlines to which Micro Contacts, Inc. is also increasingly exposed.

“ AS A WORLD LEADER IN THE INDUSTRY WE REQUIRE THE BEST. ADDING THE AGIE CHALLENGE AND MONDO STAR TO OUR EDM DEPARTMENT MAINTAINS OUR COMPETITIVE ADVANTAGE NEEDED TO PRODUCE THE VERY BEST POSSIBLE PRODUCTS FOR OUR CUSTOMERS. THE AUTONOMY OF THE AGIEVISION INTERFACE PERMITS US THE FLEXIBILITY TO MULTITASK EFFICIENTLY. IN ADDITION WITH THE MONDO STAR'S MATERIAL REMOVAL PERFORMANCE, STATE OF THE ART FINISHES AND TOOL CHANGING ABILITY; ALLOWS US TO MAXIMIZE PRODUCTIVITY AFTER HOURS, ENSURING UNPARALLELED COST EFFECTIVE SOLUTIONS. THIS IS ESSENTIAL TO MAINTAIN THE CONTINUOUS IMPROVEMENTS THAT ARE NECESSARY TO BE BOTH COMPETITIVE AND UPHOLD OUR NUMBER ONE PRIORITY, COMPLETE CUSTOMER SATISFACTION. ”

MICHAEL JANNETY,
TOOLROOM MANAGER

Fig. 3: The bottom half of the progressive die with the "creator" of the punches and dies in the background, an Agiecut Challenge 3.



Fig. 4: The setting up of the workpieces on the Agiecut Challenge 3 is made conveniently by manual operation and the workpiece position in the level is automatically plotted with Agiesetup 2D so that there is no longer any need for fine adjustment.

Figs. 5 and 6: The two halves of the mould for the injection molding die were ED die cut on an Agie Mondo with graphite electrodes. In the production, the contact parts are them fed to the injection molding tool and extrusion coated.





Implementing highest precision in smallest dimensions

At Micro Contacts, Inc., quality is not just some department, but runs like a thread through all the planning, manufacturing and assembly stages. Parts are punched as a matter of routine with just $12\ \mu\text{m}$ tolerance from the thinnest material of $0.051\ \text{mm}$, contacts are linked with solder wire thinner than a human hair, or contacts weighing just $15\ \text{g}$ are extrusion coated. Certified in accordance with QS 9000/ISO 9001, Micro Contacts, Inc. offers checkable quality beginning already at the planning stage and then showing itself on parts produced by the million. It is obvious that tool making at Warwick, Rhode Island, with its EDM machines has a key role here.

We would like to thank Micro Contacts, Inc., in particular their workshop manager, Michael R. Jannetty, the Vice President Technology, Steve Veselaski, as well as our sales representative for them, Ken Otzel, for their kind support and helpful cooperation with this report.

Responsible
Sales Manager:
Michael Powers,
Agie Ltd, USA



Fig. 7: The tool is completed with punches and dies. All the active parts were ED wire cut with a contour tolerance of $T_{km} \pm 4\ \mu\text{m}$ and a surface roughness of $R_a = 3\ \mu\text{m}$, thus guaranteeing simple fitting and perfect operation.

Fig. 8: Punched strips from production in progress are submitted to a thorough check. The quality of the tool is to be seen at the interfaces of the contacts. Smooth surfaces mean the tool is running as intended. Torn or broken interfaces mean the active parts must be checked and exchanged or reground if necessary.

THE TOOL DATA

TOOL NAME:	Progressive die or prototype injection molding tool
FINISHED PART NAME:	Electromechanical contact parts for cars
TOOL MATERIAL:	CPM 10-V
TOOL WEIGHT:	ca. $68\ \text{kg}$ (150 lbs.)
TOOL SERVICE LIFE:	ca. 1.5 million parts
ELECTRODE MATERIAL:	ED wire cutting CobraCut A and D / ED die cutting graphite
SURFACE ROUGHNESS:	$R_a = 0.3\ \mu\text{m}$ active parts
CONTOUR TOLERANCE:	$T_{km} \pm 4\ \mu\text{m}$ active parts

