



Welding, Tooling and Automation Solutions for Seats

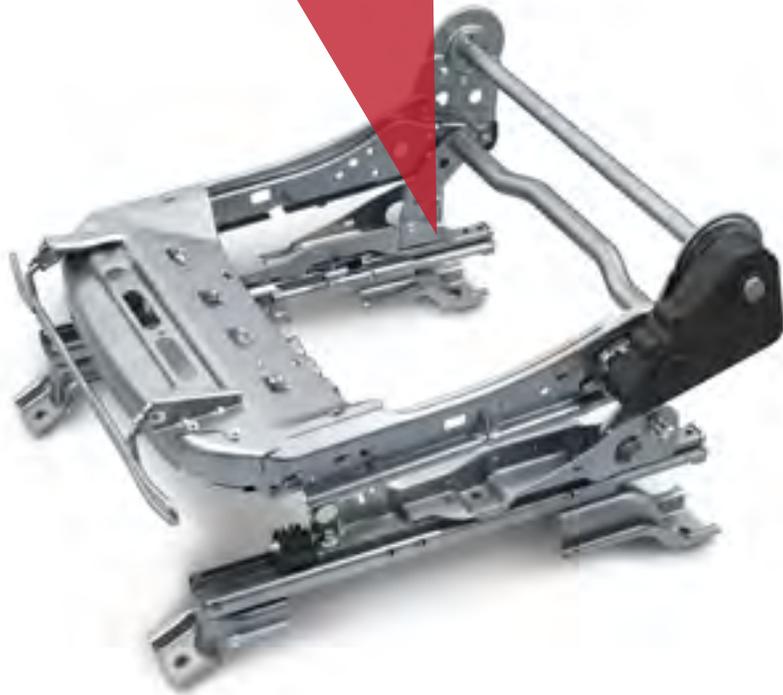


Under Control

with less rework and shorter cycle times

We know there's nothing easy about manufacturing auto seats. Over and over again, shift after shift, you have to make multiple, complex parts fit up and stay stable for welding. And that's just in one cell. You need different welding modes for many different joint types, and there are tough welds -- tube joined to plate, welds that are hard to reach and welds with gaps. The seats have to perform: welds need to be spatter-free so the seat can move on its track and all mechanisms perform properly. For safety, the welds have to be strong because the seat frame has to hold up. And then there's the added challenge of welding the advanced, high-strength steels.

Lincoln can help. We're the full service welding experts with the depth and breadth of expertise to address every issue you face. **Heat sensitive joints and tricky fit-ups?** We offer advanced automation waveforms and best-in-class consumables to create strong, clean welds even under difficult conditions. **Complex construction slowing things down?** Our custom, cost-effective robotic cells can help minimize cycle time. **Upstream tooling and fixturing issues?** Lincoln has a full portfolio of high-tech, pre-weld fabricating machines and complex tooling solutions. With years of experience in seating system manufacture, Lincoln Electric can help you exercise more control over your seat assembly operations.



Precision Welding

From gaps to spatter issues, there are a lot of ways welding an auto seat can go wrong. Your welding system has to perform with Swiss watch precision to execute a series of effective welds on a complex seat frame. Lincoln's expert attention to detail helps manage the unavoidable variations.

Perfect wire placement

Bargain welding wire may be tempting, but the costs can be inconsistent wire placement, downtime and rework. Lincoln Electric's SuperArc® welding wire is made from lot-selected metals, precision engineered to a uniform diameter and then uniquely bulk packaged. The consistent specifications of our wire ensure even feeding, a more stabilized arc and fewer weld parameter adjustments. Wire placement is measurably more stable, which helps to compensate for gap and fit-up variations. Upgrading to the right welding wire can create stronger welds and stronger seats.

Out-of-position welds

Building an automobile seat means anything but flat welds – you're managing multiple joint types and welding positions. You need a welding system that can change welding parameters on the fly to accommodate the weld variations in a seat. Lincoln Electric Power Wave® welders deliver the advanced performance you need, providing consistent quality welds even when weld conditions change.

Low spatter performance

You can't afford spatter in seat manufacture. First, spatter is just wasted metal. And then, with so many mechanisms in such a tight space, spatter can just gum up the works. To avoid spatter, waveforms and waveform controls need to be optimized. Lincoln's innovative Rapid X™ waveform and our Power Wave welders can help you execute quality welds with no spatter.



Robotic Welding Cells From The Simple To The Complex

A robotic automation cell should be a reliable component of your seat production line, contributing to quality and productivity. Lincoln Electric has the depth of expertise in robotic automation for seats to anticipate the potential cycle time killers and provide steady performance.

Lincoln is the only single source automation provider. Automation cells for seating systems include arc welding, spot welding, mixed spot/MIG welding, laser welding, tooling and material handling, and can be customized to your part. With Lincoln as your automation supplier, cycle time is minimized and reprogramming is user-friendly. Lincoln Electric was a pioneer in robotic laser seat welding systems.



Upstream Automation

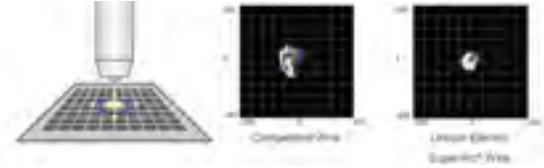
The effectiveness of upstream automation becomes more critical in a demanding welding environment like seat manufacture. Component parts produced in the bending line have to consistently fit the position required in the downstream weld. Precision upstream equipment can be key to improved productivity.

Lincoln provides a wide range of custom, flexible tube bending and handling solutions. In most cases raw tube to finished assembly is accomplished in one pass. Our Flexbending[®] machines are cutting edge fabrication systems that work with all seat designs.

When the upstream equipment and welding line equipment are supplied by the same manufacturer, start-up, fit-up and ongoing operation run more smoothly. Lincoln Electric is the only supplier of both upstream and welding automation.

LINCOLN ELECTRIC: WELDING, TOOLING AND AUTOMATION SOLUTIONS FOR SEATS

CHALLENGE: Gaps and poor fit-up can make welding a seat assembly tough. Factor in uneven wire placement and you may face costly rework.



These visuals prove the superior placement performance of Lincoln SuperArc welding wire. During high speed robotic welding, two-dimensional oscillation of the fed wire was measured by laser one inch below the torch contact tip. As shown by the tight dispersion pattern, the motion out of the feeder of the Lincoln MIG wire is significantly more controlled than that of competitive wire, leading to more consistent wire placement.

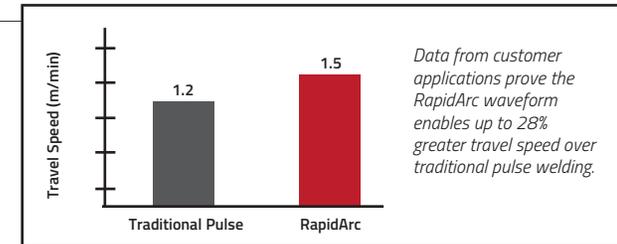
SOLUTION: Tight control of all variables can dramatically improve welding performance. Lincoln Electric's SuperArc MIG wire is consistently more true to diameter than the competition and is packaged to strict winding specifications. The result is significantly better wire placement for welds on tricky seat frames where there are varying gap sizes and locations and poor fit-up.

Lincoln also controls other wire parameters for superior welds. SuperArc wire is made from lot-selected metals for chemical consistency and surface finished for easier feeding. The tight specifications of our wire also ensure a more stabilized arc and fewer adjustments to weld parameters.

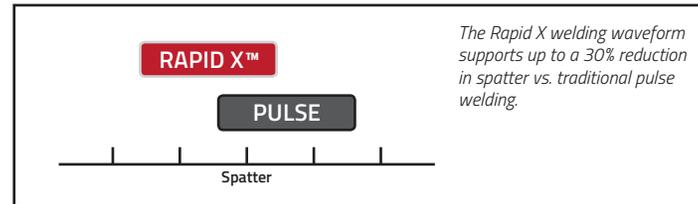
WELDING

CHALLENGE: Assembly of complex seat frames means welding out-of-position and multiple joint types. If the settings on your welder don't adapt accurately throughout the cycle, weld quality may suffer.

SOLUTION: Lincoln's advanced welding systems adjust accurately on the fly to optimize the disparate welds in your seat assembly cell – out-of-position welds, multiple joint types and tube to plate. The patented RapidArc™ waveform enables fast speeds for increased productivity, reduced cycle times and lower heat input. Lincoln's versatile and adaptive robotic welders can execute series after series of strong, quality welds in the most complex seat systems.



CHALLENGE: Weld spatter is particularly problematic in seat manufacture, since seat gear and track function depend on smooth weld surfaces. Spatter occurs when weld speed and other parameters are not optimized.

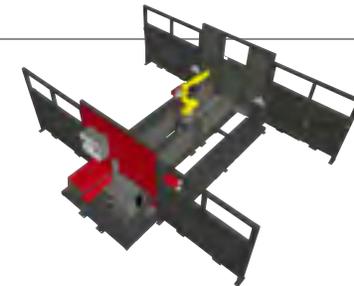


SOLUTION: Compared to traditional pulse welding, Lincoln Electric's revolutionary Rapid X welding waveform can reduce spatter by up to 30%, while increasing travel speed up to 40%, increasing penetration, reducing heat input and reducing distortion. Rapid X uses an extremely short arc length with low current wet-in technology. Reliable Power Wave welders with Rapid X can produce high speed, ultra-low spatter welds with low distortion even on tough welds like gears, tracks and tube to plate.

ROBOTIC WELDING CELLS

CHALLENGE: The complex welding conditions in seat systems require cells that are state-of-the-art, flexible and reliable.

SOLUTION: Lincoln offers robotic cells for automotive seat frames that include the most advanced arc and spot welding technology. Cells incorporate precision NAAMS tooling for complex parts as well as Lincoln's optimized welding systems. We can engineer customized units for all seat designs with automatic load and unload features or mixed spot and MIG welding options. Lincoln Electric is a robotic welding cell leader and the only single source robotic automation provider. We stand behind our quality-engineered units with high service standards for reliable performance.



We use 3D design and simulation software to validate overall system concept, robot reach and cycle time projections.

UPSTREAM AUTOMATION

CHALLENGE: Your upstream automation can make a critical difference in how gaps and fit-up are managed, and either hinder or help your productivity.



Seatback manufacturing system utilizing 1500RD CNC bend heads

SOLUTION: Where fit-up is complicated, gaps can be a problem, and precision upstream performance becomes more critical. Lincoln has deep experience in supplying quality tube bending automation to seat manufacturers, offering state-of-the-art systems and producing parts to tight tolerances. We also offer automated parts transfers and other upstream systems. Using the same supplier for your pre-production and welding automation systems can add synergy and productivity to your line.

Automation Solutions

Lincoln Electric's expertise goes beyond the weld process to all aspects of automated metal fabricating for seat manufacture.

- Flexible, automated systems for metal forming, fabricating and joining, including fixturing, laser and plasma cutting systems, press automation, tube bending and fabricating systems, tubular hydroform/structural frame automation and build-to-print manufacturing services
- Turntables, positioners, robot transport units, tool shuttles, transfer fixtures, conveyors and lifters
- High quality toggle, tube and wire clamps and retract pin devices



Environmental Solutions

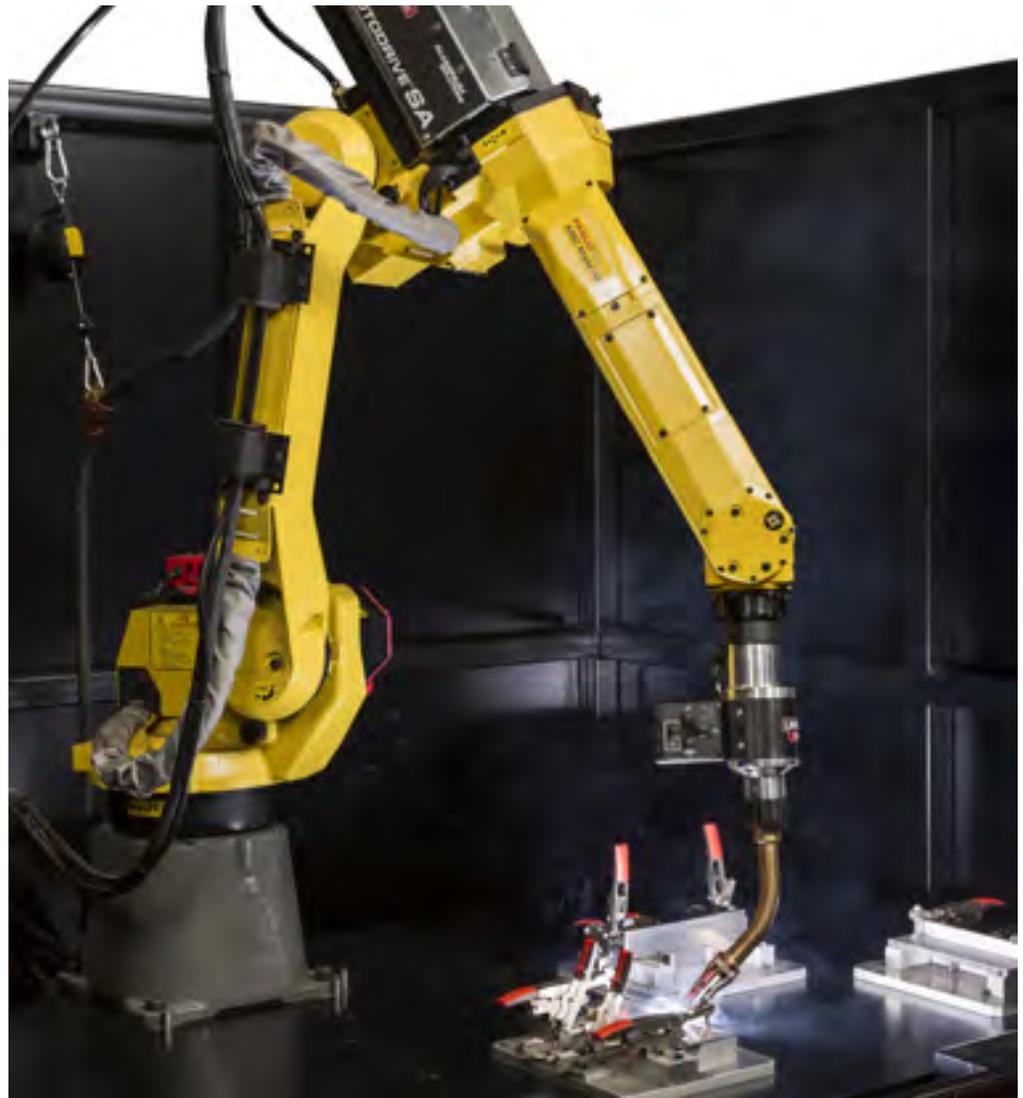
Lincoln Electric supports safety and regulatory responsibility around the welding process with a full suite of audit services and safety equipment, including:

- Portable, stationary and engineered weld fume control systems
- Systems for fire detection and suppression

Robotic Welding Solutions

Lincoln Electric knows welding, and we also know automation. We have the depth and breadth of experience in seat assembly to deliver the fastest, highest quality, most repeatable results for your robotic line. Our advanced technologies include:

- Workhorse welders
- Wire feeders for heavy-duty applications
- Innovative waveform technologies for strong, clean welds
- Unique welding consumables to optimize your results
- Laser welding systems



Lincoln Electric is the world leader in arc welding equipment, consumables and automation. We have been at the forefront of welding technology for more than one hundred years. Our product line now spans the breadth of the assembly floor, from plasma and oxyfuel cutting systems to arc welding products, weld fume removal products and robotic welding systems.

We offer a complete line of welding automation equipment and solutions for automotive assembly plants. We can customize your system with flexibility to meet the rapid changes in the industry. And with Lincoln, you receive full support, including modeling, procedure development, on-site programming, and training.

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company® is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

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